

with the possibility of rectal palpation playing a greater role in diagnosis. Again, we can get a “ping” of the gas pockets on the right side. If there is a torsion there are more signs of pain. This sort of thing is fairly much in the picture as far as diagnosis is concerned. The prognosis is pretty grave with the right side as compared with the left and most of them don't turn out too well and it is generally recommended that you might try to stabilize things with electrolytes and probably have to do surgery, but it has a pretty high mortality rate.

Chairman: Ken, do you want to give us some information on digestive problems.

Dr. Braun: Rumenitis is a big problem with us in dry cows, when you have 100 of them in the fresh up pens, that are going to calve within the next couple of weeks. They are supposed to be on a similar type of feeding program as when they freshen, but, then what happens with the cows that calve three weeks early? Sometimes they have just not read the book and they calve before you think that they are going to! We have a tremendous rumenitis problem with these cows. They are brought into the fresh cow pen and this is a big corn salvage farm, fed just like they feed cattle up north. The fellow has 6,000 acres of corn silage in this year, in his big bunker silos. They are feeding just like they would in the northeast. They go on full feed very suddenly. So, we have grain overload, in this condition where they are not used to the grain. We also have a problem with the self feeder wagons. They have two of these monsters and on occasion they will break down and some days both are broken down. Often times they are very very complicated and it will take them 12-18 hours to get them repaired. So, just the cows are out of feed for that long of time and then back into the feed bunk. Some are very aggressive eaters and it does not take too many, and you wind up with a rumenitis. I just take my stomach tube and stick it into the rumen. I carry a pH paper with me and it has quite a range and it gives me a feel for what is wrong with that cow early on. If it is down below 5.6 on this particular farm it is significant to me and I start to worry about it. But, sometimes the cows have to be off feed

for two days before it will get that low.

Traumatic reticulitis is a big problem. We give magnets to all heifers, 60 days before they are going to be bred. But, they have magnets on these feeder wagons and we had an animal die the other day. I did a necropsy and it had the wire like Archie talked about, but it had so much metallic objects around the magnets that there was no room for that little piece of wire. Others I have had where high school boys or someone would throw their aluminum beer cans out the window and they get into the chopper and they do not stick to the magnet. When I see a case of so called vagus indigestion like Arch talked about, there is a little diagnostic aid that I use and that is atropine. Most of these cows have bradycardia, if you get them early enough. They have decreased heart rates and I give them 35 milligrams of atropine subcutaneously. This was written up by Dirksen a few years ago. If you have about a 16% increase in heart rate from the monitor rate before you give the atropine at about 15 to 30 minutes later, and this takes quite a bit of time if you are a busy practitioner, but we can do it as an exercise, then it is pretty specific for vagus indigestion. Reasoning being that is the vagus nerve is 90% sensory and 10% motor. The intestines slow up, it fires up the vagus and it says give me some more juice down here to get my old tummy going and what it does it fires back down again and since the heart precedes the viscera, it has a modifying effect of slowing the heart down so that you get a bradycardia. It will be over ridden late in the disease when the abdomen is greatly distended and full of fluids then manytimes they won't have the bradycardia. It does not change the course of the disease but it helps me with the diagnosis.

Another digestive problem that we have is diarrhea with toxemia. Toxic mastitis and metritis can be quite a problem. I think what we are getting to here is that when I try to tell the students when we have an animal that we think has a digestive problem, we have to determine whether we have a detectable change in the appetite, in the viscera as we monitor them by palpation as in the consistency of the feces.

Central Area

Chairman: Dr. Robert Keith, Monroe, Wisconsin
Practitioners: Dr. Stanley Held, Buffalo, Minnesota
 Dr. Leland Allenstein, Whitewater, Wisconsin
 (Substituting for Dr. E. Dahlquist,
 Fayette, Iowa)
Clinicians: Dr. Terry Olson, Fort Collins, Colorado
 Dr. Lawrence Heider, Columbus, Ohio
Subjects: Mastitis, Respiratory Disease;
 Implementation of Herd Health.

Chairman: Dr. Held and Dr. Allenstein will present a problem; Dr. Heider and Dr. Olson will present ideas and known things, then we will open up the subject for discussion.

Respiratory diseases:

Dr. Held — Problems based on Minnesota area (climate, etc. affecting) and on age-old “traditions” (something done for no real reason, just because someone else did it).

Problem: 50 cattle on outside of barn (everything here mainly visual, description of pens, dirt, floor, poor ventilation, etc.).

Calf scours in first pen, calves coughing in middle pen, poor-doing cattle down the line, cattle and calves kept together.

Treatment brings no definitive diagnosis or response to the problem.

Discussion: Dr. Olson — Colorado also sees this as enzootic calf pneumonia.

Comes when it is warm (70) in day and cold (30) at night. Early morning, calves have a wet coat, loss of insulative value. Area of lung consolidated, abscesses, less than 20% of lung function in some cases, enlarged thoracic lymph nodes.

- Components:
1. Primary, secondary agents;
 2. Host immunity;
 3. Environment.

- Primary agents:
1. Viral — P13, IBR, BVD, adenoviruses, rhinoviruses, bovine respiratory syncytial viruses.
 2. Mycoplasma — *M. dispar*, pathologic.
 3. Chlamydia
(Agents variable upon environment, region, etc.; Chlamydia more important in Minnesota region, *M. dispar* in other areas.)

- Secondary agents:
1. Salmonella — may also at times be primary.
 2. Pasteurella — most common.
 3. Corynebacteria — result more than cause.
 4. Hemophilus — sporadic.

- Host immunity:
1. Colostrum levels.
 2. Innate mechanisms (or how they are interfered with).

- Environmental factors:
1. Temperature fluctuation (worst in fall).
 2. High humidity.
 3. Overcrowding.
 4. Wet manure.
 5. Ventilation.
(Many of these factors interrelated)

- Other answers:
- Ventilation improved (details given, using diagram).
 - Segregate calves from older stock.
 - Immunization for viruses BVD, IBR as a minimum
 - Separate cow from calf *after 24 hrs.*, best to put calf in calf hutch (if used properly).
 - Open* housing (to clear respiratory

disease), and get out of barns.

Question: How many of you vaccinate your cattle for BVD?

From the floor: Vaccinate all of them with BVD, IBR, leptospirosis and others, especially in problem herds; variable according to immunity of animals, and BVD vaccines will *not* cause abortions in pregnant cows.

Dr. Ned Brown, Texas — Texas about only one that does serological testing. Send paired samples through local lab to Texas, along with your tentative *diagnosis!* (history, clinical signs, lesions).

Dr. Allenstein — Visited herd 4 yrs. ago in Wisconsin, with respiratory problems in calves and joint problems in 2-3 yr. olds. Chlamydia was isolated.

A form of "Cat" vaccine was used, and owner thinks there is a downgrade of pneumonia. *May* also help joint problem.

Other Chlamydial problems — primary lung involvement. Parvo-virus correlated to cause of scours. Chlamydial problems related to cats; cats should be eliminated from dairy barns. Maybe cats also transmit agents which cause abortions in cattle.

Other observations Disease problems after vaccination (BVD, etc.) — too much blame put on vaccines, such as causing abortions.

Although there have been a few *minor* problems, it is better to vaccinate for BVD than not to: Also, it is better to keep an open herd.

Dr. Heider — Problems brought by bringing in cattle that are not properly vaccinated (add to herd, 10 days later — BVD).

Dr. Held — Reasonable approach to original problem (Barn): change ventilation in barn (take the bad air away from the cattle, give them fresh).

Also, drafts and cold do not necessarily kill calves (*humidity* is a greater problem.)

Overall solution; vaccinate, and better ventilation management.

Mastitis:

Dr. Dahlquist worked up a problem, presented by Dr. Allenstein.

Owner receives report in mail from Quality Milk Control that his somatic cell count is up to 1,000,000 (usually below 500,000); that his cattle need treatment; and that his milk will be rejected if it goes up to 1,500,000.

Visit next Morning: Owner milking 40 cows a day in all stages of lactation in an average-sized barn, operating 3 units all alone (not enough supervision). Washes off udders with iodine solution using the same towel for all cows. Not dipping the teats and not always employing a stripcup

Machine: fluctuating from 14 to 18 lbs. of vacuum (1½ dead-end line with 30 gallon reserve tank).

Bedding: straw, with a lot of manure and other material. Outdoor barnyard unusually wet during August, fed green chop, and 2nd week in September confined lactating and fresh cows to a cement lot with a large shed bedded with sawdust adjacent to the cement lot. Owner "intends" to fix machine. Several cows show some clinical mastitis, but seem to respond to udder infusion. One of the better cows is off feed, quality of milk watery, T.-107, diarrhea profuse, sensitive edematous udder, dehydration, and toxemia. Cow calved 6 days ago. Treated only dry cows that he remembered having trouble. Previous production — 13,000 lbs. per cow. Worst problem, with corn harvesting (cornitis).

1. Must help dairyman's problems.
2. Must put on herd-health program.

Dr. Heider — man *needs* to change attitudes.

Problems:

1. Elevated cell count.
2. Severe clinical cases.

Solution:

1. Teat dipping (*total dipping!!*) in germicide solution is the biggest factor.
2. Routine dry-cow therapy.
3. Treat Klebsiella, Staph., and Streps.
4. Check while milking, collect samples.
5. confirm bulk-tank scores (somatic cell count accuracy).

Herd:

1. Environment.
2. Milking technique.
3. Machine function.

Exercise lots not in good shape.

Needs adequate good, clean, dry, straw bedding (get rid of manure, do not use sawdust).

Environment must be dry, ventilation adequate.

Milking technique — clean, dry udders (clean with iodine solution, dry with *paper* towels).

Efficient attachment of unit, and stay around while milking goes on (check time, etc.).

Overmilking not as much of a problem as undermilking.

Machine function needs to be adequate (airflow — 24-30 CFM with 12-15 in reserve.).

Dr. Heider: I don't think he's got adequate air because of the change in vacuum level that was observed by Dr. Dahlquist. The second point that I think is glaring, he didn't say it was milk-line, I assumed it! He's got an inch and a half line in there. That's adequate for two units if it's single-sloped and he said it was dead ended so it obviously is. Well, he could do two things. He could drop a unit, probably wouldn't extend his milking time that much longer and if we can save some of that \$161 it would probably be time well spent and good return on it anyway. I know that they got to get their corn picked, but you'll probably be making more money in that barn if you'll do the job right. So two units on that inch and half line, if he's got to use three units or four he could go to a two inch line or he could double slope that inch and half line. The air line or the pulsator line, I would say, in

this kind of a system a minimum of a two-inch line but today with inexpensive PDC lines a three-inch air line looped, both the air line and the milk line ought to be looped, then he would have adequate air flow in the system. I think that he said in this system he noticed change in vacuum level between 14 and 18 inches of mercury. I don't know what to tell you to set it on a high line, depending on the height, I think somewhere around 13½ to 14 is probably right, it's going to drop during milking time and so you don't know exactly where, during peak flow of milk, I mean at the teat end, so you don't really know where to be on the line. If it was a low line system or a wage R system or a bucket system we would want to set it at, I think, 12½ inches and I'm convinced of that, with a high line, just a little bit higher is all right. The other thing is, it should be balanced, equal vacuum on the teat end and the pulsator chamber. So, balanced tanks should be near the trap with the regulator there. I think one regulator adequate in size to take care of the total air flow is what we want rather than several of them sitting around.

Pulsator function rate: I don't care, 50 or 60, I don't see any difference there. Ratio: I think there is good data to show that if we're going to milk at 12½ inches of vacuum, 60:40 ratio is probably preferable but I would have no objection to a 50:50.

The last point I wanted to make is about a wide ratio and a high line. Now, that would be dependent somewhat on the strength or the collapse differential of the liner in there. That collapse differential of that liner is important and we need to take it into consideration because particularly again with a high line where there is vacuum fluctuation in the teat end you may not be getting very much teat end massage. The only place I know where there's any information on it is in an article of McDonald's some time back, it is from observation, he says that we need between 6 and 11 inches of massage force at the teat end. I think that is right, I guess we would all like to see a little more information on it, but from the standpoint of observation where you have observed abnormal teat ends, you find either too little massage or in some cases actually excessive massage where you get a flattening of the teat end and a kind of pinching of the teat end. The other point on inflation is this, I think he said that the inflations were being changed every 3 months and that is not adequate. The fact that he has had cracked inflations and does have cracked inflations now tells you that he is not changing them frequently enough. In this case, he's milking forty cows, he has fifty but he's milking forty so that means eighty cows are being milked a day, that's about 17 cows per unit per day. Let's make it twenty, and so in thirty days that is six hundred and in 60 days that is twelve hundred. That would be about long enough. He is changing them every 3 months. He needs to shorten that up and change them more frequently; depends on the liner but most companies with conventional liners are saying between twelve hundred and fifteen hundred milkings. Some of them are shorter than that, depending on the type, there's some that say longer

than that. But when they are cracked you know that they have been used too long. There is some more recent information out on that, where they are milking long periods of time and taking a long period of time to wash these systems up.

Dr. Olson: They want me to comment on treating coliform mastitis and I guess that I approach it with some trepidation because of the lack of good sound research evidence as to good routes or forms of therapy, a lot of it's become empirical but I guess we can make some general comments. We feel that probably one of the most important things is to get that cow milked out — that the onset of the clinical signs are associated with the influx of leucocytes into the glands and the release of endotoxin. Probably one of the most important things you can do to help that cow is get rid of as much endotoxin as possible, in this case, it would be stripping out the gland and I think oxytocin is very important in getting that gland stripped out but with the onset of mastitis there's inflammation, the gland's sore, the cow doesn't let down as she normally would to milking, so I think oxytocin is pretty important. As far as antibiotics, any of a number of antibiotics have been suggested in the treatment of coliforms. I think one comment that has been made to me by somebody that has done quite a bit of work with coliforms is that, in contrast to the type of coliforms we see with calf scours, the type of coliforms we see in coliform mastitis are more so the "barnyard variety", they aren't the type that have been selected for resistance, so usually antibiotic resistance is not near the problem that it would be with calf scours. Probably, as far as routes of antibiotic administration, either, well certainly systemic, and I guess our preference is to milk out the gland and then the last time that the primer milks it out at night, go ahead and infuse the gland with an antibiotic that has good gram negative spectrum. As far as antiinflammatory drugs, if we are dealing with peracute coliform mastitis I think probably glucocorticoid or cortacosteroids are indicated but it probably is going to take large doses, shock type of doses that we would use in the neighborhood of probably a milligram per pound. If we are probably going to do some good with glucocorticoids its going to take fairly high doses. Cows that are toxic like this showing a profuse diarrhea, I think certainly IV and oral fluids both probably are indicated and sometimes we can at least save ourselves a little bit of hassle if we can administer part of the fluids orally but certainly at least initially some intravenous fluids are indicated.

I think that I made the point about what I would recommend, but of course sometime later you are going to get the results of your cultures and you may find that this herd is indeed a *Streptagalactiae* herd the way he has been doing things and I recommend to go in there and eradicate the *Streptagalactiae*. That will probably do him as much to get his production up and cell count down as anything. If it's staph, you make recommendations on improved machine function, tighten up the teat dip and dry treatment program.

I would just defer to Dr. Ned Brown's statements about autogenous bacterins if that's in the back of your mind. I would have nothing to add to that. We don't routinely recommend them and one instance where I was in and the problem herd was staph, where they did use it, it turned out to be a disaster so it's one of those things where whatever you do is not without some risk. The third point, you may confirm that it is a Klebsiella problem and in my experience with problem herds you have to get them off sawdust, at least temporarily. I think that's absolutely important. The other very common finding in the history of coliform herds, particularly Klebsiella, is failure to dry udders before the milker is attached.

Question: What about Nocardia?

Answer: In Kentucky they have had problems with Nocardia and with *Mycobacterium fortuitum*. There is not very much in the literature about *Mycobacterium fortuitum*, although it has been studied. Peterson in Washington has taken a look at that and then the most recent work has been in Kentucky, at both your labs and then also people in California have seen some of it. I don't think there is any treatment and I think where it is a problem you tighten up all the management procedures you can and you start culling cows. Certainly, with Nocardia, the only thing I know to do is to cull cows. By the way, if you are doing your own cultures, some of the reasons you are finding negative cultures on acute clinicals is that you are reading them at 24 and 48 hours and throwing them out. You better let them cook for 96 hours or you are going to miss some of these yeasts and things like Nocardia particularly.

Question: Would you comment on the use of teat shields?

Answer: To comment about the use of teat shield, a 3M product, against coliforms, I think that what they have done there makes it look like it might be an effective protective mechanism against coliforms and perhaps would work here also. But I don't know that for sure. Their data showed that it had some improvement in protecting cows against coliforms. I have some reservation about it though, that it does not have a germicide in it and I think that maybe in the midst of the problem, use it but I think that before that kind of a concept really is widely adopted we are going to have to have a germicide in that dip. In the last journal of AVMA Journal there is a tremendous article on mycoplasma.

Question: What about Mycoplasma?

Answer: Most of the work that I have read that has been done on that is by Dr. Jasper and his group in California and I think they've got data to show what the herd prevalence is, and I think in some counties 7% of the herds have it. We did a survey in Ohio two or three years ago on bulk tank samples but we didn't find any. Contrary to that, as far as I know in the last five years in Ohio there have been three herds positively identified with mycoplasma mastitis, so it can occur. One we had just here last week, but it must be different, we have not typed it in the past, we are now going to start typing them because Dr. Jasper will do that free and we are going to send this one out there but in this case we had

just one cow in a herd and she was eliminated from the herd. We cannot culture it from the bulk tank so we think that it is not the kind of a case where there is a herd outbreak. I think that multiple dose vials, particularly in the hands of clients that don't know anything about aseptic technique, are a very high risk and I think they are a high risk anytime. That's not only a problem, perhaps with mycoplasma, but with also *Candidia*.

(Question: inaudible)

Okay, somebody can help me but I don't know of any data on this, we do have some herds where they cannot use anything other than sawdust with liquid manure systems. There I think it's beneficial to treat it with lime. Some have said it has worked and others finally changed to sawdust, but where we have had some positive response they are treating the last 18-24 inches, two to three times a week, with hydrated lime and just turning it white. It is an added labor expense but I think that it will help. The back 24 inches of the free stalls we are talking about. We have not had trouble with irritation of the udder. Dr. Boyer has seen them get dry skin.

In all of our sawdust in Ohio we just have very few softwoods and we get into *Klebsiella* problems, we also get into some algae problems with that, and I am sure that fresh raw sawdust from logs that have been skidded is the worst and what comes in fresh they seem to see new cases right after that. We know that *Klebsiella* is supported as a saprophyte on bark and I think that *Klebsiella* is an environmental organism, a coliform organism. I think that after any sawdust is in there for awhile you can get into trouble, at least, that's been my experience. I think the worst is raw sawdust. I think another thing that you might get these dairyman to make is to stack it so that it heats and two weeks ought to do it. They have to cover it with black plastic and weight it down with tires. One guy with liquid manure system that I know of has done that, in addition to the lime and he has seen a remission of cases.

I guess that the only defense that I can see for a 70:30 is that there are some dairymen that are using it and do not have milk quality problems, but my own opinion is that there is certainly a higher risk to use that wide ratio.

Chairman: It sounds like sawdust will be a thing of the past because Dr. Darlington, Washington said that out in the west coast they are pelleting all the sawdust and using it for energy. So, it will probably be something to be coming to the midwest, I would imagine, once they get the process.

Dr. Allenstein: I would just like to second what Stan has said because we do the same thing. You have to be careful opening that udder up. That's the only thing about treating it back there in the tail end of lactation and I always try to make sure I have milk in the udder before I treat it a second time. I hate to go into a perfectly dry udder and force an infusion tube up in there. I think I would rather have something I could strip out, clean up the end of the teat and do it, and then I also stress teat dipping following that and I think this is a good thing that you can follow. This resistance

is one of the things that we don't recognize. It has been written up by Norcross, in New York and then some work was done in Ohio too, and was presented at a AVMA meeting here about a year or two ago. The internal resistance of the udder is a factor that we probably should play up more. I would like to go on with Dr. Dahlquist, we want to give him full credit because this man did quite a lot of work on this problem and I think he had a little different idea maybe of the cause of the problem in this herd. He got some real questions at the end and I'm going to read this from his letter, "by way of explanation to the above presentation the facts were assembled from several different cases" (this is all not one herd, which we surmise when we read it) "however, all the situations presented can and do occur frequently. The type of mastitis that I'm suggesting is a coliform mastitis." In other words, he thought coliform was the entire problem, it couldn't be the entire problem in this herd "literature seems to reveal a varied opinion as to the importance of coliform mastitis. Talking to the heads of quality milk control laboratories in two different dairies I have found one that does not attach any importance to this type of mastitis." In other words, coliform was a non-entity in causing high somatic cell counts. "The opposite opinion was proposed by another dairyman, quoting from A.W. Schalm from the Journal AVMA in 1977 he states 'coliform mastitis is emerging as a serious problem in herds in which the more common mammary gland infections have been reduced to low levels by widespread use of antibiotics.' Now, Larry gave his opinion, I'm giving Dr. Dahlquist' opinion. "In our practice, we believe coliform mastitis, especially the peracute form, is becoming more prominent increasingly. One explanation for this may be the increase in promiscuous use of antibiotics." We hope to have some comments on this from the crowd afterwards. Possible questions that you would like to ask the people in this crowd he says "do you feel that high somatic cow cell count is a realistic indicator of coliform type mastitis?" In other words, do you think coliform mastitis can raise the somatic cell count in a herd? "What is your opinion as to the advisability of non-lactating treatment of the entire herd versus selected cows" and I think we've answered that one already. "If coliform mastitis is responsible for this thing, would the somatic cell count suddenly jump from 500,000 to a million? What is the percent of coliform mastitis as opposed to the other types of mastitis that you see in practice?" He also goes on to question "how effective is a phagocytolytic effect activity of leucocytes in controlling coliform types of mastitis? Is there any work that has been done to control this type of mastitis by the use of vaccines? Is teat dipping effective in controlling coliform mastitis?" Now, I think that we have to get that Dr. Dahlquist feels that the somatic cell count and everything was raised by a coliform mastitis problem in this herd. These are the questions he sent to us to ask and first I would ask, Do you think there is any aid from new vaccines, coliform type vaccines?

Dr. Orr: I don't think vaccines would be of much value

because coliforms are such a heterogeneous group, coliforms are really a very large group, it's very doubtful. Could I make a comment in general about coliform mastitis. If you were to survey a herd of cows you might find a very low percentage of cows infected with coliform yet you would have a problem because the organism can multiply in the gland and be eliminated in 12 hours, 24 hours or a couple of days and then the cell count can persist for two weeks to two months after this, so if you were to survey a herd you might not find infections in all these cows, in fact, you can find a lot of high cell counts and are not able to culture anything. Of course you must eliminate things like mycoplasma and these other bacteria but if you can eliminate that, you may have a coliform problem.

Chairman: Can you give us a comment on sending samples to the lab or something that might help us so that we don't get new growth a lot of times?

Dr. Allenstein: I would like to second what Dr. Orr just said. I think we have seen that when we bring that sample of milk in and plate it and use swabs instead of loops, taking plenty of milk under the agar plate we have been getting a lot better growth. It is, I think, the quickness. Instead of sending it to a lab we have had some good luck by incubating it for four hours and then taking a swab out of the bottom.

Chairman: One thing I would like to throw in is how soon is he putting his milk in?

If he had 25 cows recently calved, if he is only milking about 40 cows he could raise that high cell count just by adding his milk in there just one day early and, also, if we didn't dry up some of our herds if they have a high cell count I can get them off the problem until we can get to the real problem, so just by drying about five or six cows, that will take care of the high cell count until we get back to the mastitis problem. Jerry I think had a comment about isolation of *E. coli*.

My comment was with respect to isolating organisms from acute clinical cases. We usually have our students do our own samples and, again, sometimes it is fairly discouraging. I haven't kept track well enough of our numbers but I did call Dr. Bob Bushnell in California and asked him what percentage of acute cases he felt he could isolate an organism from and he felt that on the average they were running a 60% chance of isolating an organism from an acute clinical mastitis case and they went to probably a greater degree of trouble than I would. On the samples, they would take a sample from the initial isolate and go ahead and freeze the sample and try reisolating after they froze the sample and they felt they could improve some of their isolation by freezing and thawing.

Comment: I tend to agree with you and I think the reason that it has gone up to 18 is that he has no air flow in the system, so he probably added more weight or he did something to close off the regulator and he probably doesn't have any regulator on the system. Increasing the vacuum level at the regulator to compensate for inadequate air flow is heading for trouble.

Question: If you are going to culture this entire herd, what are you going to do with the results?

Answer: I think that particularly in a herd where the problem is high cell count that you should culture at least 20%, depending on cost. Then, I think that in 24 hours you should know whether or not you have *Strep agalactiae*. In forty eight hours you should confirm it and I am an advocate of eradicating *Strep agalactiae*. I don't think you are going to do much in addition to what I recommended here in the way of management if it is staph. But at least, you will know what you are dealing with and you will have eliminated *Strep agalactiae*. I think that you have got to do it and I think that if you don't do some cultures in a problem herd then you have eliminated an important part of the clinical examination of that herd.

In the case of those quarters that are infected with *Strep agalactiae* if you simply use 100 thousand units of penicillin you are going to get about a 90% cure rate. Even if you base your judgment on sensitivity testing and if the organism was staph., we had a recent experience where we had a high cell count in a herd, 16 of 32 cows were infected with *doublezone coagulans positive staphylococci*, the kind you like to see, you expect to see in some of these herds. We selected Novobiocin, we used it as recommended on the tube, penicillin novobiocin it was, because the organism was shown to be sensitive. We went back in two weeks and cultured them all again, we cleared one of those cows. There was another report in the *Veterinary Record* earlier this year where that kind of testing was done. They found that the drug of choice was cloxacillin and they had a 7% cure rate. Most of the other literature says that with staphylococci, treating them with the drug of choice on sensitivity testing during lactation is going to get about a 30% cure rate. No, I don't recommend treating staph. cows. but you might have to treat some.

We've mentioned earlier that we had surveyed some bulk tank samples and, of course, there are some errors there, but in Ohio about 1/3 of our herds are still infected with *strep agalactiae*. The evidence says that if you eradicate *strep agalactiae* you can expect to get somewhere between a 5 to 15% immediate response in production and you can see that in your own practices. I think it is a definite aid to getting in a mastitis control program on a herd where frequently we are left out. I think it's a good procedure.

Someone commented about cleaning the regulator. I think that is an important point. The other thing is, of course, regular cleaning of the air line, the pulsator line.

From the floor: Just to comment on coliform I see in my herds where we can get the milking equipment functioning properly where we have a 60:40 ratio I have heard that their monthly WMP scores are coming back between 3 and 7 and their bacteria counts come back between 3 and 10 or 3 and 20,000 every month. They are just doing a good job of dry treating. On my cultures, my results over the past year in the acute stage, the early stage when the cow is running a temperature, I'm finding about 90% of these are coliforms,

so that is my comment on how many coliforms I am finding in these herds rather than other bacteria. What we have to get back to, a change in the management condition. They are not going to the bunk anymore, they are either going to free stalls or else they stand in the ponds.

Chariman: Then don't you find that we run into a lot more mastitis problems right during the state high school wrestling finals when they go to watch their sons, when they have to get the milking done just a little bit sooner or they have to go to Madison or whatever, it is somewhere like that. This is some of the management that we find is very hard to control, at least, in my practice.

Dr. Allenstein: We have this filter somatic cell coming back from DHI reports. How many in this audience have these or use them or, could I have a show of hands? All Wisconsin practitioners, as I thought, there are no other states that have it as much. We are having this come back and I had an interesting thing happen last week in one of my practices. I hadn't checked the WMT and he called me one night all in an uproar. He had had two of the filter tests and he put himself on it but never showed them to me every two months. He was scared to show them to me when he found the first one, he was embarrassed so he didn't show it to me. The second time he gets it he's more embarrassed and he's shut off the milk market. This bothers me a little bit that, I feel this is one of my better clients and just to make a long story short, I found a complete plug in the pipeline. It had to be some cracked inflations or something in milking the line that had to be something else and we found them now. We got them all eliminated but he had already corrected all this before I got there, but I think this is a test that we are seeing in Wisconsin that a practitioner can utilize very handily. I utilize it in every place.

Dr. Hick: Well, the first thing you found it, is that it scares a lot of guys when they get reports back. The first report doesn't mean a thing because the only thing I can find any use is this constant count that stays high even when it shouldn't be. When you culture along with that you get some interesting results. You will find that there is a nice correlation between the high cell counts and your staph. counts and we have had a lot of those situations where the cell count is up and the staph is low. A recommended action for culling is easier if you have cows calved three or four months and not bred.

Dr. Heider: I was surprised that not more hands went up when there was discussion about indirect cell counting on DHI testing because in Ohio we have access to CMT testing which I think is not as good as the filter DNA which I think is not as good as they have in some states where they are using direct cell counting methods and getting a direct count on a composite sample from cows every month. The point that I wanted to make is there is considerable information on the Monthly Herd Summary that the owners that you work for who are on DHI tests receive every month. I think if you are not familiar with the Monthly Herd Summary you ought to.

Chairman: We ran over on our mastitis but when we are

talking mastitis we are also talking herd health and I tried to write down a definition of herd health or herd health programming and I couldn't write one down. I can tell you what I do and I can tell you what goes from checking cows every three months for this one man and he only has probably 15 - 20 cows. But every three months he'll want you to come. Well, that's a herd health for him but that is not a very good one. Then there is the one that we are trying to do where we work in reproduction, mastitis, nutrition, vaccination programs, complete management, economics, parasite control, the whole works! When you come to herd health, I think we can all get started on herd health easily by reproduction. We have it in there a lot of times. We all try to do herd health on mastitis as we have run into a problem, I hear the door is open. How do we keep them on it? How do you keep them on a mastitis control? They get it corrected. This is some of the questions we want to answer. How do we get it, we can get a vaccination program, that is not too hard to sell. A nutrition program, how do you sell this? If you sell it, how do you get paid for it, this is another problem. I think we will, I took a quote from Dr. Johnson, "in herd health we are not doing a herd health program unless we are making money for our clients." We are also not doing a herd health program if we are not making a profit because, I attended a nutrition seminar and they talked and someone would say that I spent half the night figuring it or I do this and a lot of them, it's their interest and so as an introduction I would like to ask Dr. Heider to give some economics and some fodder that he's going to throw out as to where we can use herd health programs.

Dr. Heider: The question was asked "How do we implement herd health" and I think there are two aspects to implementing it. We have all discussed and rediscussed the plan. In the past, implementation may be a problem. I think that among those of us who are institutionalized the person who has got the most experience in herd health is Jack Cote and Jack has an article in the most recent *Bovine Practitioner* which you have just received. I think he titled it "Twenty Years of Experience with Dairy Herd Health" and he has some suggestions in there on implementation. But I think that you are not likely to get involved extensively in herd health unless you are willing to do some evaluation, too. We'll run through these, how do you implement it - I think it works easier in a multi-person practice but some individual practitioners do a good job of it. You demonstrate your abilities with excellent medical, surgical, skills and they gain confidence in you. They know that you are interested in them, you have an interest in cattle and that works well toward gaining their respect. In addition to your knowledge of veterinary medicine, you must have a knowledge of management, nutrition and housing. You have to be willing to consult, I think that is a two-way street. To go on, again, the reproductive program is certainly the entry. It was amusing to read Jack's article, he said "It's been said that no foot - no horse, I would say no reproductive program - no herd health." So that I would agree with. I think the other

thing is that one of the reasons we can get in here is that we are management specialists, disease control specialists, we can offer some unbiased advice and they respect us for that and I think we need to try to maintain that. You have to be interested in promoting economic practices, just seconds what Bob just said. You must evaluate the program and you must be willing to use a bit of salemanship and you must be willing to engage in education of the client. They will grow with you but you are the leader.

The evaluation - I think that as far as *nutrition and metabolic disease* are concerned, of all cows on test, Holstein cows on test, the average rolling herd average is 15,500 pounds of milk, so I think that should be a minimum goal in these herds. Metabolic diseases, of all those that you can think of, I think a dairy herd that is fed and managed properly will have less than 2% a year. You can only do that if you go back and look at the records, the individual cow records, the way we are set up at the present time. There may be some expansion on that in the future when we get DHI records computerized to handle disease information. I think that would be an aid to us in our evaluation of herd health. *Mastitis* - well, we think one way to evaluate it here, a monthly WMT of less than 8 millimeters. Philpot says 12, I think it depends on the lab in your area, I think the way the milk marketing incorporated labs are doing it in Ohio, we think that the good ones are going to stay at 8 or below. You might do the DHI cell counting that Lee alluded to. In Ohio where you have the CMT we expect our good herds to have better than 90% negatives and traces. That is not all that difficult to achieve. We have many herds, of course, once they have reached that, we suggest that they reset their goal to get around 96 to 98% negative and traces. No strep, agalactia, less than 15% infected cows or 8% infected quarters and less than 3% severe clinicals in a year.

Reproduction - I think here that it is imperative for you to implement herd health to follow what is happening. If they are on DHI, you may have to do a little calculation although much of it is done for you. Your goal here would be to maintain average days open at 100 days or less. Most of these herds on test are going to be culling somewhere around 25 to 30% of their cows per year. The average in Ohio is 33% culling rate. How much of that is for reproductive problems? Less than 10% of it should be for primary reproductive problems. Those are the two main measurements I think of the effectiveness of your reproductive health program,— average days open and percent culled for reproductive problems. Services per conception may be an indicator of a problem if it goes above 2½ per conception but most of the time it is going to balance around somewhere between 1½ and 2½ and don't use it as an evaluation because sometimes you are doing a lot better job for them when the services per conception goes up a little bit. *Calf Health* - less than 20% morbidity. That sounds too high, but I am talking about any kind of a runny nose or a transient diarrhea or anything here. I think if you really follow them you are going to find that this is a pretty tough one to maintain. Even in hutches you

are going to have some temporary bouts problems. But certainly less than 3% mortality is a hard and fast rule and it is achievable and it is a shame that too many people operating traditionally don't believe it can be done. The average calf mortality in our part of the states, central area, runs about 12%. *Specific infectious diseases* - the goal is no outbreaks. Part of the education I think is to use some of the data. I will give you some that we developed a couple of years ago. There are certainly many other things. If you want to take time to review the literature on herd health you will find that there isn't a single article that indicates that herd health practices are not profitable to the producer. You have to work it out so that it is profitable to you. This work is not all that new, we compared a reproductive herd health program to a traditional practice. In the herd health program we were doing post-calving exams 15-30 days postpartum plus rechecks on anything that was abnormal. Pregnancy exams were done since they were going there, biweekly, between 30 and 45 days post-breeding and estrus exams were done about 60-70 days post-calving. The option in this herd, both groups, was 40 days, in other words, willingness to breed a cow after parturition, after 40 days fresh first heat breed her. Failure to conceive examinations - we did not want to examine them because conception rates don't go down in these cows until after a third service so we prefer not to see them after the third service. I think they have just about an equal chance of conceiving after the third service without any examination as they had at the first or second, so that was the reason for that decision. We paired these cows and they were housed and managed and fed as one group. We did not know which were which, only one person, a young man, Dave Gaulton, who is now down in Louisiana, evaluated what we were doing there. The traditional practice groups - we did no calving exams, no pregnancy exams, no failure to conceive exams, however, some dairymen would get upset about a cow not showing heat if she had been fresh a 100 days or more, so we were doing that in the herd. We looked at the following parameters. Let me give you the initials there first, that is days in milk at first service, a management measurement—efficiency of management measurement, services per conception, days open and then, of course, culls. In the reproductive herd health group the second column down, we had 73 days in milk at first service as compared to 86 days in milk in the traditional practice group, partly because cows were treated earlier and partly because anestrous exams were done. Services per conception - we did have better conception, 1.7 services per conception in the herd health group compared with 2.4 in the traditional practice group. Days open, which I think is the most valuable indicator of reproductive efficiency, we achieved 99 days open in the reproductive herd health group compared to 140 days in the other group. Veterinary costs were surprising, we were examining more cows at one visit in the reproductive herd health group. We had single cows generally in the traditional practice group to look at so the entire call fee was attributed to one animal usually rather

than divided up among a bunch of animals in the herd health group so I would have expected that the cost per cow would have been considerably less than the traditional practice group but this is the way it figured out. Per cow per year we spent about 17 dollars, \$16.94 in the herd health group and in the traditional practice group, \$15.34. In the per cow per calving group since we got more calves out of the reproductive health group the difference narrows, \$17.54 in the herd health group and \$17.21 in the traditional practice group. Expenses related to reproduction - we calculated expenses for semen costs, veterinary costs and replacements. Now we had fewer replacements in the reproductive health group and made fewer calls. Semen cost, veterinary cost and replacements cost and the sum of those three numbers, we were spending about .27 per experimental day in the reproductive herd health group compared to about .41 per day in the traditional practice group so that was a significant difference at the .05 level. There were fewer expenses on the reproductive health group. The expense difference amounted to, when you look at a primary reproductive call a decision being made by asking the question "If this cow were pregnant would I keep her?" If the answer is yes, but you are going to cull her because she's open, then she's a primary reproductive call. If she has some other problem, plus she's been open too long then we consider that to be a secondary problem. So on the one hand, we showed a difference of about .14 per day between these two groups and that amounted to an advantage to the reproductive herd health group of \$51.10 per cow per year. When we consider all calls that were in any way related to reproduction the difference was about \$84 per cow per year in favor of the herd health group and this is on expenses alone. Differences in income per cow per experimental day were not significantly different. Looking at it this way, income minus expenses, which is mainly a result of the difference on expenses at the primary call level, \$4.01 per day to the advantage or rather, this is in reproductive herd health group. Income minus expenses, net income in other words, \$4.01 per day. The traditional practice group, let's just look at the primary call rate, \$3.84. Now we are considering only reproductive, primary reproductive calls, the difference between the two groups shows an advantage of .17 per day or \$62.05 per cow per year to the reproductive herd health group. Foot published this last year, his estimate of loss due to days open \$1.80 per cow per day open over 85 days. Using his figures, and he was using an average production level, I think 15.5, we were averaging about 17.5 in both of these groups. Fourteen days over 85 days, remember we had a 99 day open interval in the reproduction herd health group, so that was a loss of \$25.20 due to reproductive failure or excessive days open and the loss in the traditional practice group was \$99. So, if you look at it in this way, the advantage to the reproductive herd health program was about \$73.75 so I think that really if you compare this work with what has been done earlier, there is just no question that all the studies indicate that we are going to save these farmers somewhere

between \$50 and \$100 per cow per year with an effective reproductive herd health program, if we will use the DHI monthly summary to evaluate the reproductive health program and then if we will take a little bit of time to calculate failure to observe days lost due to failure to observe heat and days loss due to failure to conceive which is a simple little mathematical thing. They should have all been bred the first time in 51 days, they were not. In the herd health group they were bred in 73 days so we lost 22 days in this group from failure to observe heat. Now remember, the services for conception was 1.7 in this group so that is .7 which is additional services times 21 about 14 to 15 days. So we should have had them all conceived at 88 days had we not lost any more days. We didn't get them bred there but we had cows that did conceive in 99 days so we lost another 11 days. Just in the reproductive herd health group we had days lost failure to observe heat 34, we had days lost failure to conceive 15. Why make that point in a herd? Often you are going to beat your head against the wall if you don't look at the data. He is going to be complaining about cows not settling, cows not settling, well here's one way to demonstrate that, in this case, twice as many days were lost because of his failure to observe heat than were lost due to failure to conceive. It may not always work out that way but in the average herd it is going to show you that their efficiency of estrous detection is only about 50%. There is another way of doing that but this is one way with records that are on hand in herds on tests.

I think that the best work that has been done on evaluating the effects of herd health was done by Barfoot and Cote and that was in our Proceedings of the meeting held in Philadelphia in 1970. They had a different response to their herd health program, the different levels of response were measured by expenditure per cow per year and remember that this was evaluated in the late sixties, included veterinary services and supplies. The emergency herds only were spending about \$8 per cow per year, and that level of expenditure increased from 20, 25, 30 and 35 with up to maximum response. The average days open by response level shows that with increased response the average days open declined. Cow mortality at minimum response was about 2½% in these herds and they reduced that to about 1½% in their maximum response group. With regard to calf mortality, herds on emergency service had just a little over 10% calf mortality and that declined to, it looks like, about 4% and I don't recall exactly what it was in the maximum response group. I would think they could probably improve that a little bit more, but I think we have some better information today than we had in the late sixties. Culling rates declined, they had a health adjustment factor, in other words, how did health relate to production? Well, there was a better relationship with the maximum response and then, of course, this is a reflection of increased production in the herds on maximum response and we could certainly get better production than that today but they were running a little above average at that time. Somebody said last night

that we have got to show our clients that we are an economic benefit rather than a salvage operator.

From the floor: One comment, I think it should be made clear that this program alone isn't going to accomplish anything. This fellow has got to do something himself.

Moderator: I think though, that if you work with herd health your relationship with this client just improves vastly over the years. At first he's calling you and then he wants you to come, he's glad to, he'll call and say what day are you coming? A lot of times when you are there maybe a couple of days before, he'll say, "You are coming Wednesday aren't you," or something like that, at least, in my area and they are looking for you to come.

There was a suggestion from the floor to try a pilot letter on mastitis and reproduction.

From the floor: One thing you have got to realize is that everybody has a program to sell. You go out there hoping you can present it, tackle it and put a pitch in there to sell benefits. That's where veterinarians are very poor. They don't say a word about benefits. That's what the farmer is buying.

Chairman: How many of you are sending out a news information letter to your clients? I think they do this in a lot of other areas a lot more than we do in the midwest. I think maybe it's because we have so close proximity to our colleagues next door or sometimes the crossing of different clients, but in many areas they send out a lot of newsletters and information and I see nothing wrong with this at all.

Pacific Area

- Chairman: Dr. S. Smalley, Chandler, Arizona.
 Practitioners: Dr. Robert Darlington, Snohomish, Washington.
 Dr. Robert Abernathy, Duncan, British Columbia.
 Clinicians: Dr. Otto Radostits, Saskatoon, Saskatchewan.
 Dr. Robert Bushnell, Davis, California.
 Subjects: Mastitis; calf diseases; abortions.

Dr. Darlington: On a large dairy with its calf mortality problems, we started several years ago force feeding colostrum, looking at colostrum antibody levels and running the zinc sulfate turbidity test on every calf in the herd. At that time they were milking about 700 cows. The management of this herd decided that a gallon of colostrum was the right amount to feed. We argued about whether these calves needed a gallon. One of the two farms involved was milking a thousand cows where all the calves were not run through the zinc sulfate test. We did look at the situation and they ran a control study for us. The night shed man gave a gallon regardless. The day shift man gave 2 quarts if the calf would nurse it out of a bottle and then put it into a esophageal tube if a calf did not nurse and those calves received 2 quarts. We had no losses in these calves in about 30 days, but we did have a difference in morbidity and I think it made us take another look at the volume of colostrum that we should be giving to these calves. Thirty-six of those calves received 2 quarts and of those, 7 had to be treated within the neonatal period for some condition. Seventeen calves received a gallon and none of those were sick. I realize that is

a small number, but it is suggestive that volume of antibodies going into these calves did make a difference. To satisfy the need of whether or not you had to force feed or whether we could allow these calves to suck on their own, we maintained some bull calves and left them with the cows for four hours and ran zinc sulfate turbidity tests on those calves. Half of them had poor or none and half of them had good antibodies. I think this told us that it was necessary to force feed or make sure that calves did receive, in a lot of cases probably 3 quarts, rather than a gallon, but they did receive the volume force fed within the first 15 to 30 minutes. Going back after a year, there were 251 calves that we had data on, there were more calves that the zinc sulfate turbidity test had been run on. I went through and reviewed the health sheet to figure out the difference in the previous year of running the zinc sulfate test on morbidity and mortality. The percent that died was 2% for the good and 2% for the moderate, 11% on the poor and 24% on the none. One of our laboratory technicians in the hospital ran these samples and the herdsman or calf man would draw the samples and bring them to the office. The manager of the farm, just to check out the lab technician, continually ran in samples with 3 or 4 numbers all drawn out of the same calf to make sure our test was consistent. We were happy to find out that it was every time he checked us. When we got into figuring out the morbidity I took any calf that had been treated within the first 6 weeks for any condition, respiratory, scours or whatever and had received any medication and tabulated them for morbidity. There was only calves that lived through the 6 weeks, the mortality was out of this morbidity study so it is not a true morbidity. We ended up with a 20%, 40%, 60%, 54% morbidity of calves that had been treated for some