

Comingling: A Herd Health Time Bomb?

By David Scott Tomsche, DVM
Veterinary Associates of Melrose-Albany-Upsala
222 East County Road 173
Melrose, Minnesota 56352
320-256-4252
fax 320-256-7788
102175.3101@compuserve.com



Commingling: A Herd Health Time Bomb?

The expansion in the dairy industry has certainly had an affect on all other supporting dairy industries as well. As U.S. dairies grow in size, they have evolved into more specialized and efficient milk producing entities. In many cases the replacement heifers no longer make financial sense for the dairy. This specialization of dairy farms has opened the door for other business entities to step forward and take advantage of new economic opportunities.

The heifer raising business is one such venture. The concept is not new, there have been 'calf raisers' as long as there have been cows. The new twist to the calf/heifer raising business is the size of the operations and the amount of animals of which we congregate onto our ranches. The thought of encountering the proverbial 'wreck' instills fear into even the bravest of souls – and it should.

This fear of the wreck is strong motivation for enduring the planning process necessary for the success of all new business ventures. It is the reason that lenders demand business plans and cash flows prior to making loans in any business undertaking. They want to minimize the risk of failure and maximize the opportunity for success. Likewise, in the heifer raising business, we need to apply the basic knowledge known today to ensure that we, too, minimize our risks.

The concept of managing risk on a heifer ranch is what I refer to as biosecurity. It is not likely that we will ever achieve complete biosecurity on our heifer ranches, therefore, we will always be in the position in which we must manage our risks. We are, as you know, dealing with living things (heifers) which originate from a multitude of beginnings (farms of origin). My experience has been pleasing when good planning has been instituted on heifer ranches. The chances of disease and acts of nature always exist, but, to much less degrees.

I have personally been in the heifer raising business for more than 13 years. Until the last two

years, I purchased animals from auction barns and raised them from 'wet calves' until I could demonstrate a profit. This business was generally successful, but often times it was like a ride on a runaway train – it might be fast and exciting – but we might not like where, when and how the rides ends.

After experiencing a few of the wild rides, I decided to implement basic principles of risk management, or biosecurity, in an attempt to slow down the ride to a pace at which we were all comfortable. I would like to share this 'work in progress' with you today. The plan never seems to find a last page as we constantly critique and modify our protocols and standard operating procedures.

The first step was to assemble a group of people who had the same ideas and goals, thus the formation of Stearns Custom Calf. There are four partners in our business. Keep in mind that our business is premised on accepting 'wet calves' at two days of age. We raise most of our animals from birth to six weeks pre-calving.

As in every new business it serves us well to first review the current state of the business in the USA in an effort to not only benchmark our progress but also help us to improve our current protocols and procedures. The results of this investigation were rather stunning to say the least. I will share a handful of the statistics with you:

- 72% of producers do not quarantine new calves and heifers when they enter onto the dairy farm.
- In milking herds of 200 or more cows approximately 60% require vaccinations for BVD, IBR and leptospira. 74% required Brucellosis vaccinations.
- 90% of dry cows are not vaccinated with rota/corona/E.coli vaccines.
- 54% of maternity pens are used two or more times before cleaning.
- Most cows in the U.S. are in the maternity pen for more than 10 days.
- 66% of operations performed no testing for BVD,



Brucellosis, Johne's Disease or TB prior to bringing dairy cattle onto the milking farm.

- 5% of dairy farms wash cows' udders prior to collecting first milk.
- 34% of calves must suckle the dam to consume first colostrum.
- 40% of calves had failure of passive transfer when tested.
- 74% of calves are fed less than four quarts of colostrum at the first feeding.
- 53% of farms do not apply iodine to the navel of a new born calf.
- Pre-weaned heifer mortality is 11%.
- Post-weaned heifer mortality is 2.4%.
- 32% of non-weaned calves have physical contact with weaned animals and older.
- The average first post-weaned group size is 7.5 calves per pen.
- 55% of all horns are removed via the saw or gouge technique.
- 67% of heifer rearing facilities share feeding utensils without sanitizing.
- 46% of producers do not use coccidiostats prior to first breeding.
- 60% of producers do not vaccinate for BVD and IBR from weaning to first breeding.

To say the least, there is significant room for improvement relative to the current state of the heifer replacement business in the U.S.

Traditional Methods of Risk Management/Biosecurity

In working with heifer raisers in my consulting practice, I have concluded that there are essentially nine steps which must be implemented to limit our risks.

1. Establish a working relationship with a veterinarian. Disease and the subsequent poor performance and/or mortality are the source of the 'wrecks' we all dread. In most cases the veterinarian is the only person who is in a position to help us in this regard. The veterinarian brings an understanding of biology, physiology, immunology and nutrition, and generally understands the farm as a production unit. It may be the case that your local veterinarian is only prepared to meet some of your needs, in which case you can seek help elsewhere for the balance.

It is my personal philosophy that all animals who die must undergo a necropsy (post-mortem exam) by your local veterinarian. Within our 16-

doctor veterinary practice, Stearns Custom Calf is by far the largest customer for diagnostic lab referrals. No animals die on our farm without a necropsy and a written report by the attending veterinarian, which is put into our database. Our clients are then informed at the end of the month via written illness and necropsy reports.

There is no doubt that having ongoing necropsy reports has allowed us to be able to abate problems much earlier than we ever could have before.

2. Isolation/Quarantine. This rule is frequently broken on heifer ranches. New arrivals must be isolated for 21 days despite the vaccination program. Most vaccines require 10-14 days to mount a proper immune response and 21 days is considered the required wait for incoming animals who may be incubating disease. A frequent mistake is to consider paddocks with fence line contact as adequate isolation—this simply is not the case.

I suggest that sick animals be removed from the general population and isolated for 14 days. Sick animals need additional attention and the sick pen should be located in an area which will accommodate the tasks of frequent observation and treatment.

3. Vaccination and Parasite Control Programs. This issue requires the participation of you and your veterinarian. Be advised that the current immune status of your heifer calf will dramatically effect the success or failure of your vaccination program. Remember also, all the vaccines in the world will not compensate for poor nutrition, poor management practices, or overwhelming exposure to disease organisms.

I have shared the program we use at Stearns Custom Calf. It is essential that these programs pass both the test of good immunology and the test of practicality – we have tried to keep the program as simple as possible while ensuring our goals. You must sit down with your veterinarian and identify which diseases you need to be concerned about.

In our hutch farm we have all but eliminated the major causes of scours due to the vaccination program we demand of our dairy producer clients. Rota virus, corona virus, E.coli, salmonella and clostridia infections are a true rarity in our 'wet calves'. We insist that the dry cows are vaccinated with two shots of Scour Guard 3K-C. In addition, all the newborn calves are vaccinated with Calf Guard at birth. In the event the dry cow is not vaccinated with two shots of Scour Guard 3K-C, we

insist that the calf also receive a dose of Genecol 99 (Schering) or Bovine Ecolizer (Grand Labs) as well as the Calf Guard at birth to help prevent both the rota and corona viruses and E.coli bacterial infections.

Animals vaccinated prior to three months of age must be boosted again due to the possibility of maternal colostral interference. We use only modified live vaccines for BVD, IBR, and BRSV protection. The recent release of Pasturella haemolytica vaccines has also eliminated a frequent cause of both death and illness. We make every attempt to avoid giving shots at times of possible stress and in fact, we attempt to vaccinate prior to anticipated stress, such as weaning or moving into larger commingled groups. Parasite programs are mandatory and the literature is filed with multiple options. This issue depends largely on your locale and housing schemes (pasture vs. dry lot).

4. Metaphylaxis. This is a new term for an age-old plan of mass or systematic treatment. Typically, we may choose to mass treat at stressful times such as weaning, transporting, or early indications of disease onset. For example, at Stearns Custom Calf we treat weaned animals with AS-700 for five days post-weaning.

5. Test and Cull. This technique is a great but underused tool. The recent advances in testing for persistent BVD infection is a good example. Brucellosis testing is an example of a successful program, however, it was both a government mandated and a government funded program. In the test and cull programs I use in a heifer rearing operation, the cost of the test and the cost of the culling decision will have to be incurred by either the buyer or the seller. Other disease examples will be discussed when we discuss the Quality Assured Heifer Program.

6. All in-All out Housing. We are currently trying to use this technique more in our heifer farm, especially in the younger animals. Clearly, the idea of continuous animal flow barns is dying in both the swine and poultry models. I suggest that we can eliminate significant disease problems if we embrace the thought as well. The jury is still out at our heifer farm but we are pleased with the early data. Our present facilities do not yet allow us to completely adopt this strategy.

This concept is really what the success of both calf hutches and 'super hutches' is about. We can

limit disease transmission if we move animals 'by groups' and into 'clean barns'.

7. Fly, Rodent and Bird Control Programs. It has been well documented that all the aforementioned pests can spread disease. The options of control are plentiful.

8. Sanitation and Manure Management. As a veterinarian, I subscribe to the 'germ theory'. This axiom states: if you expose an animal to enough pathogens it will eventually succumb to the disease, despite the number of vaccinations administered. There is no hope of long term success if this issue is not adhered to.

9. Veterinarian to Veterinarian Contact. This is also an idea I 'borrowed' from the swine and poultry models. It is common for the veterinarian of the buyer to personally call the veterinarian of the seller to establish the current and past health parameters of the animals to be transferred. Honesty prevails when two DVMs are talking about a group of animals. Without it, their next conversation will likely be in an attorney's office.

Farm Effect

Despite using all the above strategies, we were frustrated to experience mortality and treatment rates at only slightly better than the national average or extraordinarily high treatment costs if we wanted to improve on the national average. We discovered that many of the problems we had to endure on our farm were really a result of actions or a lack of actions at the dairy farm – the farm of origin. We have come to term these actions as the 'Farm Effect'.

Examples of farm effects, which the heifer raiser must endure, would include failure of passive transfer, navel infections, and most cases of neonatal scours. On the other hand, the dairy producer also must live with a similar list of 'Farm Effects' which we at the heifer ranch can have significant effect upon. Examples of these include utilization of AI breeding, free stall 'broke' animals, steady state calving, pre-culling of persistent BVD and John's positive animals.

It is the feeling of the author that extraordinary results can only be achieved when we eliminate as many of the 'farm effects' as possible. This requires that we rethink the current business and find a way in which we can have a positive effect on the animal before we actually take possession of the ani-



mal. I found that as a heifer raising business, we needed to demonstrate the 'added value' we would provide to the dairy producer. This added value will not only be in the form of more live animals returned to the dairy, but if we take the concept one step further, we could also provide an animal free of a specific disease(s). We have come to term this concept as the 'Quality Assured Replacement Heifer'.

Chart 1: Farm Effect Ontrol and Consequences

	Primary control Heifer farm	Dairy farm	Primary consequences Heifer farm	Dairy farm
Failure of passive transfer		X	X	
Navel disease		X	X	
Perinatal scours		X	X	
Genetic improvement/AI	X			X
Calving health	X			X
Freestall/feed bunk conditioning	X			X
'Steady state' calving	X			X

Quality Assured Replacement Heifer

The Quality Assured Replacement Heifer is an animal in which Stearns Custom Calf raises in such a way as to be free of Brucellosis, Persistent BVD, and Johne's Disease when it is delivered back to the dairy producer. This concept requires that the heifer raiser and the dairy producer are in complete agreement and willing to cooperate toward this goal. The dairy producer must want his/her heifer calves back in an attempt to reach the goal of a secure herd status. This concept can be expanded to include control or testing measures for salmonella dublin and, to a degree, staph aureus mastitis and bovine leukosis as well.

There is additional expense due to testing and labor. The issue of who should pay is paramount. It has been our experience that we can demonstrate to the dairy producer the cost savings for the dairy in the area of decreased cull rates. Decreased cull rates is the benefit or payment received by the dairy producer for his/her added expense and labor. In an effort to improve the understanding of the cull rate issue we have assembled the following data facts:

- It is estimated that the cost of raising a heifer ranges from \$.72-\$2.00/cwt of milk sold. Factors affecting the amount would include cull rate, age at first calving, and pounds of milk sold/cow/year.
- A 10% decrease in the cost of raising a heifer will result in \$.08-.20/cwt milk sold increase.
- A gain of 400 pounds milk/ cow /year is negated by a 5% increase in cull rate.
- If we decrease culling by 1% annually, we will increase net income by \$750-\$800 annually.
- Involuntary culling reduces net revenue on a dairy by limiting the opportunity for voluntary culling.
- If we could cull 10% of the cows, we could eliminate 50% of clinical mastitis cases.
- It is unusual that a heifer generates \$400 net profit her first lactation, therefore, our goal must be that 75% of first lactation heifers survive to the second lactation.

There are a number of diseases the dairy producer would be well advised to attempt to eradicate from the premise. Persistently infected BVD (PI-BVD) animals are a logical place to start when thinking about utilizing the Quality Assured Replacement Heifer concept. The test is relatively inexpensive and very accurate. Persistently infected BVD animals are plentiful, one in every 100 to 1000 births, and the animals who are infected average a 50% mortality the first year of life. PI-BVD is the major mechanism by which BVD is maintained in a dairy herd population. Family lines are subsequently infected, abortions are frequent and increased culling ensues for the dairy producer.

Control is easily achieved at the dairy by testing the calf pre-colostrum or at the heifer farm after four months of age and before the first modified live vaccine. The cost of each test is approximately \$5-10. Remember that if a pregnant cow tests negative for PI-BVD, her calf can still be positive. Pregnant animals must be considered as two animals.

All farms should insist that all bulls used on either the open heifers or the milking animals be tested for PI-BVD prior to employment! If we are dealing with either a closed herd or a secure herd, we can make significant progress toward completely

eliminating the disease after the first year! I

define a 'secure herd' as a milking herd which purchases multi-source animals but utilizes testing procedures to screen for diseases.

Johne's Disease is another nemesis of the U.S. dairy industry, which I feel needs immediate attention, and this program is a way to address it. Johne's is a contagious bacterial disease of the intestinal tract. The animals develop intermittent diarrhea, which eventually evolves into a chronic, persistent diarrhea. There is no cure. Infected cattle often develop signs after calving despite the fact the initial exposure and probable infection occurred when the animal was only months old!

It is the opinion of this author that Johne's Disease is a problem of massive consequences and is another great example of how a heifer raiser can provide 'added value' to a dairy operation. Here are some statistics regarding Johne's Disease:

- Regional surveys estimate a 3-18% infection rate in individual cattle. It is thought that approximately 2.6% of all US cattle are infected.
- It is a worldwide disease.
- It is worse in the northern tier of states, MN, WI, MI, OH, NY, and PA.
- It is estimated that 33% of Wisconsin dairy herds are infected.
- Estimated risk of an animal purchased from either an auction market or an individual dealer is 10% per animal.
- All things being equal, the likelihood of infection in a herd is in direct proportion to the frequency that owners buy replacements from outside sources.
- 90% of all cases are estimated to be sub-clinical.

Control of Johne's Disease involves both management and testing. Without the efforts of both the heifer raiser and the dairy producer our results will result in moderate improvement at best. It is the single best example of how the dairy producer and the heifer raiser must cooperate to achieve a better end. Both businesses have healthier animals to run through their systems. This is the 'Win-Win' relationship that any two businesses need to prosper together.

The control measures must begin in the maternity pen. It is well documented that one of the main sources of infection is colostrum from infected mothers, therefore, any control program which avoids dealing with the dam will result in only minimal control within the herd. Calves must be fed colostrum from a Johne's-free cow. This mandates that the dairy farm personnel must make efforts to test animals who will be used for colostrum donation and cull them from the donor pool, and hopefully from the herd. They are a source of infection to all calves as potential frozen colostrum donors and to their individual calf via the womb.

Also critical to a good Johne's control program is the exposure the young animals have to older animals, including the dam, while in the maternity pen. Animals must be born from a test-negative dam and into a clean, dry environment. As you can see, there is little that the grower can do if the animal comes to them infected. The grower can do a lot in the form of prevention if he/she takes possession of a Johne's free calf.

A complete control program involves two tests on each adult cow. First, test the cow at dry off with the BACTEC fecal culture test (8 weeks for

Quality Assured Adult Vaccination Protocol

EVENT	CALVE	UTERUS CHECK	PREG-NANCY CHECK						MOVE TO LOW GROUP		DRY DATE	TRAN-SITION PEN	CALVE
MONTHS POST-CALVING	0	1	2	3	4	5	6	7	8	9	10	11	12
PROCEDURE	<ul style="list-style-type: none"> • J-5 • TSV2 • Vitamin E 300 • Vitamin B • MU-SE • CMT 	<ul style="list-style-type: none"> • MLV BVD 	<ul style="list-style-type: none"> • Lepto-5 						<ul style="list-style-type: none"> • Johne's Fecal Culture 16 weeks or (Bactec method 8 weeks) 		<ul style="list-style-type: none"> • J-5 • Alpha 7 • Scour-guard • Quarter-master • MU-SE • Evaluate for Pirusue Therapy • ELISA Blood Test for Johne's 	<ul style="list-style-type: none"> • J-5 • Scour-guard 	

© Copyright 2/5/97



results) or if we use the traditional fecal culture techniques, 16 weeks prior to calving. This generally coincides with the movement of the animal into the low production group. The fecal culture techniques accurately detect 50% of the animals and are somewhat more accurate in the early stages of the disease.

Finally, at the time of dry off, the ELISA blood test should also be performed to catch any animals which may have evaded the fecal test. The ELISA test will generally identify 50% of the early infections and 85% of the animals showing clinical disease symptoms. Early sub-clinical infections in adults and in animals less than 18 months are likely to be missed by both tests.

As you can see, quality assuring replacement heifers for Johne's Disease is more cumbersome, labor intensive, expensive and somewhat less reliable than persistent BVD. Does this mean we should not bother? It is up to the dairyman to decide as much of the initial effort is on his/her side of the equation. I submit to you, can a dairy producer afford not to test?

I have observed an explosive growth in the number of dairy farms diagnosed with this disease

over the last ten years. Continued neglect will likely only delay the inevitable. In the case of herds who either do not see a benefit in testing or will continue to purchase animals on a 'as needed' basis, blood testing with the ELISA test prior to purchase and good hygiene in the maternity area will have to carry the day.

There are a number of reasons why a dairy producer and a heifer producer would want to team together to help prevent the spread of certain diseases into both operations:

Liability: Disagreements about the introduction of diseases into animal populations have been food for litigation for many years. I have seen many 'multi-source' heifer ranches bring a virulent disease into their ranch from an outside source farm and in turn have the entire ranch population contract the disease in short order as well.

Increased Profits: There is absolutely no doubt in my mind that we save significant dollars annually because we control the management practices of the dairies for whom we raise calves. I have evidence that the efforts we undertook resulted in a healthier animal for the dairy producer. Time will tell what the cull rates on the quality assured ani-

Stearns Custom Calf Quality Assured Single-Source Calf Vaccination Program

AGE	0	6 Hrs	1 Mth	6 Wks	2 Mths	4 Mths	5 Mths	12 Mths	13 Mths
EVENT	BIRTH			WEAN	COMINGLING				BREED
LOCATION	MATERNITY PEN	MATERNITY PEN	HUTCH FARM	HUTCH FARM	SUPER HUTCH	GROWER BARN	OUTSIDE LOT	BREEDING FARM	
PROCESS	<ul style="list-style-type: none"> • 4 qts. colostrum • Navel dip/tie • Calf Guard 20 minutes precolostrum • TSV2 (optional) • BO-SE • Vitamin A/D • Vitamin E • Iron Dextran/5ml • Weigh • Tag w/ ID# x 4, D.O.B., Wt. • Initial calf chart • Remove from barn 	<ul style="list-style-type: none"> • 2 qts. colostrum • Navel dip • Initial calf chart 	<ul style="list-style-type: none"> • Resvac 4 • One Shot • Vitamin A/D • Vitamin E • Dehorn 	<ul style="list-style-type: none"> • Weigh • 5 Days A-S 700 	<ul style="list-style-type: none"> • One Shot 	<ul style="list-style-type: none"> • Resvac 4 • Alpha-7 • Weigh • Ivomec • One Shot (optional) • TSV2 (optional) • Brucellosis (optional) 	<ul style="list-style-type: none"> • Resvac 4 • Alpha-7 • Brucellosis • BVD blood test • Remove extra teats 	<ul style="list-style-type: none"> • Bovishield-9 (+Vibrio if bull breeding) • Sort for breeding 	
MINIMUM END WEIGHT		70 LBS.		160 LBS.		350 LBS.	500 LBS.	900 LBS.	

© Copyright 4/3/97



mal will calculate to be.

State or Federal Mandate: Brucellosis is the best example of this issue. If there is ever an association between an animal disease and a human ailment as well, a mandate will likely result.

Consumer Demand: 'Mad Cow Disease' is the best example of this reason. Consumers were demanding government action even before all the evidence was compiled.

'Right Thing To Do': I believe that if we can improve the 'state' of our business, we must do all that is reasonable to do so.

Conclusion:

The issue of Quality Assured Replacement Heifers is still in its infancy – work in progress. Many issues need to be clarified. Included, but not exclusive, to this list are the following questions:

1. Who will pay for the testing?

2. Will the dairy producer perceive the value for 'today's efforts'? The benefits of decreased culling, improved salvage value, and decreased therapy costs are delayed by two years and difficult to directly attribute to the efforts of the heifer raiser.

3. Are today's dairies and today's dairy managers satisfied with 35-40% cull rates?

4. What do we do with the positive animals? Does 'cull' mean resell, slaughter, or destroy?

5. Are the processes described here and their future modifications going to survive the test of practicality? Is only a DVM foolish enough to attempt this?

6. Is there a desire on the dairy producer's part to migrate to a 'closed herd' status?

7. Are 30% cull rates in first calf heifers, as is the case in many 'commercial dairies', as good as it gets?

References:

1. Collins, M. T. and I. R. Morgan. 1991. *Epidemiological model of paratuberculosis in dairy cattle*. PREVENTIVE VETERINARY MEDICINE. 11: 131-146.
2. Collins, M. T. and I. R. Morgan. 1992. *Simulation model of paratuberculosis control in a dairy herd*. PREVENTIVE VETERINARY MEDICINE. 14: 21-32.
3. USDA: APHIS: VS. February 1994. *National Dairy Heifer Evaluation Project*.
4. USDA: APHIS: VS. May 1996. *Reference of 1996 Dairy Management Practices*.
5. USDA: APHIS: VS. September 1996. *Changes in US Dairy Industry: 1991-1996*.
6. Wilson, D. J.. 1995. *Financial effects of mycobacterium paratuberculosis on mastitis, milk production and cull rate in clinically normal cows*. AGRI-PRACTICE. 16: 12-17.