

Maintaining Animal Health Systems in Large Herds

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Introduction

Our background

Kath Taylor has been a dairy vet for 13 years. She has been working in Southland for five years, following eight years spent in Taranaki as a dairy vet.

Mark Bryan has been a dairy vet for 18 years. After spending seven years in Cheshire, England at a large dairy practice he moved to Te Awamutu and for the past nine years has been working in Winton.

Roles at VetSouth Ltd

Kath is the leader of VetSouth's milk quality team. She is primarily concerned with: investigating grades, monitoring and managing somatic cell counts and outbreaks of clinical mastitis, training staff and advising on mastitis control. Kath also performs dynamic machine testing and works with a wider team to improve milk quality on farm.

Mark is the leader of the dairy vets in Winton, and is an executive director of VetSouth Ltd. He is responsible for managing the dairy clients and dairy vets. He is also in charge of research and trial work within VetSouth under the umbrella of VetQuest.

This paper

In this paper we will look at ways to manage animal health in larger herds. In the first part, we ask whether large herds are any different to smaller herds, and look at general concepts of approaching cost effective animal health systems for larger numbers of cows. In the second part, we will focus specifically on mastitis and milk quality in large herds and, using real case studies, discuss options and ideas around this.

Are large herds different? Should being a large herd be an excuse for poor animal health? (Mark Bryan)

To answer these questions, we need to question more closely the nature of animal health in larger herds and ask:

- Do different diseases occur?
- Is disease more likely?
- Are the consequences greater?

- Is detection harder?
- Is treatment any different?
- Are the economics different?

On the face of it, a cow is a cow, and disease shouldn't vary with herd size. The reality is that some large herds experience (and tolerate) very high death and disease rates. This has an economic impact; but it also has a wider impact in generating a negative perception amongst many people towards 'large herds' in the dairy industry.

However, well managed large herds with good animal health are very possible and can be immensely rewarding. To briefly answer the questions posed above:

Different diseases

There are very few diseases that are unique to large herds. Even lameness, which is a bane of large herds, can be present in smaller herds. The scale of disease can be much larger, resources will be much further stretched, and psychologically it can be a lot more stressful. This makes preventative strategies more important.

Disease more likely

What is different is the chance of disease occurring. Herds are often put together from several different source herds and during wintering-off cows will come in contact with other herds via trucks and yards.

Cows walk further. In Southland in particular they may be wintered differently. The risk of subclinical mastitis is greater for each cow as she has more potentially infected herd mates. And the level of observation/intervention tends to be lower.

Greater consequences of disease

In a large herd, small and subtle disease changes can quickly lead to significant effects. A missed clinical mastitis case will have the chance to infect many more cows in a large herd than in a small herd. The economic effects can therefore be far greater and snowball far quicker.

Disease detection is harder

Detection of disease can be difficult in large herds and cases are sometimes not detected until later in the course of the disease. It is obviously more difficult to observe 1000 cows to the same level as 100 cows, even given the extra staff involved.

Staff may not have adequate training in 'cow signals'. When you watch an experienced farmer/stockman they are tremendously skilful at picking healthy and unhealthy stock, but this is done almost subconsciously and is very difficult to put into words to train less experienced staff.

Is treatment any different?

Treatment of disease is daunting due to numbers of cows involved and sometimes the skill level of the labour force available. Treatment of cases may often be less successful because of the more advanced stage of disease at detection.

Treatment may need to take into account the risk posed to other cows in the herd; or it may involve consideration of staff and resources. If you spend time treating an old down cow during spring what are the chances of missing something preventable amongst the rest?

Are the economics of disease treatment/prevention different?

The economics of disease can very quickly snowball. Similarly, large herds may 'accept' a high level of disease or poor performance because fixing it seems too difficult and costly.

However, the converse is true: the rewards of a healthy herd with minimal deaths are greater; and the costs of prevention and intervention can often be spread over more cows. In individual cows, because detection is generally slower, disease is more advanced and the costs of treating is higher, with a lower chance of success.

Maintaining animal health in large herds

Good large herd animal health doesn't happen by accident. A positive approach is needed to identify potential problems and have systems in place firstly to minimize the problems and secondly to deal with them efficiently.

We feel there is huge value in spending time with clients outlining potential areas of disease *before* they happen. Whether it be mastitis, post-calving problems, lameness, etc, these can all be identified as likely problems, and strategies can be devised to identify the best means of addressing the problem. This is quite different from what is considered 'traditional' vetting, where we attend sick cows and fix problems *after* the event.

Firstly, we identify potential or historical health problems for a herd. We discuss the effects – both short and long term – of a particular set of problems and then consider how we

can minimize it. We then go on to develop a standard protocol for staff to follow to prevent, or diagnose and treat in the early stages. This is communicated to all staff and kept as simple as possible.

The key factors in this approach are:

- Informed farmers: The more informed farmers are, the easier it is to develop these systems
- Communication: We work for the bill payer. We need to understand their drivers and we need them on board
- Relationship: We need to have a good relationship with all members of a farm team. This leads to trust and openness
- Education: Often the success of these systems – and hence the farm profitability - rests on the shoulders of key junior staff, who need to be upskilled and trained, so we spend a lot of time educating these people
- Risk management: An understanding of this becomes critical. For each herd there are subtle differences in peoples' attitudes to risk, and this drives the protocols that we develop
- Economics: This goes hand in hand with risk. Often, whilst the risk of a disease happening may be low, the economic consequences may be disastrous

Some general examples

Reproductive problems

We all know that calving problems and post-calving disease can lead to poor fertility. This may manifest as anoestrus, a low conception rate, or an inability to breed.

We also know that most sick cows occur in the first week of calving. The majority of these illnesses are linked to some event at calving.

The range of 'calving problems' that may lead to animal health problems is large: milk fever, dystocia, dead calf, twins, mastitis, abortion, etc. A 'traditional' approach may be to identify all these animals and classify each disease and treat accordingly, but this is unwieldy.

Another approach is to take an easy signal. We often use retained membranes (RFMs), since these are a common consequence of any of these diseases. We set an acceptable period, which will vary for each herd according to their perception of risk. Say 48 hours. We discuss the options and develop a strategy: say "*All cows still with RFMs 48 hours after calving are treated*".

We are using an easily detectable signal (RFMs) as a marker for a range of diseases (calving problems) which we know are highly likely to lead to significant economic loss (reproductive wastage). We then come up with a treatment protocol that suits the herd and communicate this to all staff.

Down cows

As in the previous example, a range of conditions exist that lead to cows going down after calving. Obviously, calving problems and metabolic disease are high on the list. Most of these cows are found by whoever brings in the herd in the morning, and in large herd situations there can be a wide variation in their skills.

To simplify the process, we identify a few key steps to differentiate the common from the uncommon; and then to treat appropriately. We keep the treatment protocols for metabolic disease very generic- metabolic disease can become very complicated but simple steps will save a cow until a better diagnosis can be given from someone higher up the chain.

In this case we are empowering the staff to provide good quality 'first aid' treatment to cover most situations and save the cow. This will then be backed up and augmented by someone better aware of other complicating scenarios.

The benefits

The benefits of this proactive approach to large herd animal health are significant. When the wheels fall off in a large herd, it gets very expensive. Equally, keeping a large herd healthy may take a similar amount of time and effort as a small herd, but will obviously have far greater economic dividend.

Well managed large herds are very positive for the industry, at a time when not only the general public but farmers too are concerned about the herd health they have seen in some large herds.

Multi-farm operations

A pro-active rather than a reactive approach will apply equally well in more complex operations where more than one farm may be involved. In these situations, each farm may have quite separate risks and health issues.

Let's take an example of a scenario where we have an owner of 4 farms each milking around 600 cows, with a manager on 3 of them and a sharemilker on the last. Firstly, we have a different bill payer with the sharemilker, so we need to be aware of this. However, the cows may share a run off through the winter; there may be sharing of staff; there may be economies we can source for the group; and there may be systems that we can set up that can apply over the whole group.

On the three managed farms the average BMSCC for last season was 104,000, 240,000, and 310,000. Obviously, these herds have different milk quality issues and will need different approaches to training and advising milking staff; identifying and managing mastitis cases; treatment of mastitis cases; perhaps even different approaches to numbers of herds; and also to

other factors such as teat spray, DCT, etc. In this instance the systems and processes used to manage milk quality will vary.

However, there may be many opportunities to streamline other processes across all farms. For example when scanning cows, we find it particularly useful in these operations to use the same identifying process for all herds. We rarely use numbers but often use sheep tags to identify mobs of animals. So we may identify all the empties with a red tag and all the lates with a yellow tag, irrespective of farm. Across the whole operation this simple process will minimize the risk of errors through winter and streamline drafting no matter what mobs the cows end up in.

In devising strategies to minimize the risk of anoestrus cows, we can institute systems that may be applicable across all four farms. These may include monitoring of hypocalcaemia in colostrum cows; having a common policy on RFM cows; management and treatment of 'at Risk' cows; and a whole host of other options.

With multi-farm operations, although they may be more complex, we can still apply sensible systems over the whole group and then tailor each one at an individual farm level.

Improving and maintaining milk quality in large herds (Kath Taylor)

Why bother?

BSCC is an indicator of milk quality and the level of mastitis within a dairy herd. The SAMM plan outlines an industry target of maintaining an average Bulk Somatic Cell Count (BSCC) of 150,000 cells/ml. Why would you want to achieve this?

Suppliers are not penalized for supplying milk with a BSCC above 150,000 cells/ml. Neither are they rewarded for supplying milk of low BSCC. So for most suppliers there is no obvious and immediate incentive to reduce cell count. Progress towards achieving this industry target has slowed, if not stopped all together!

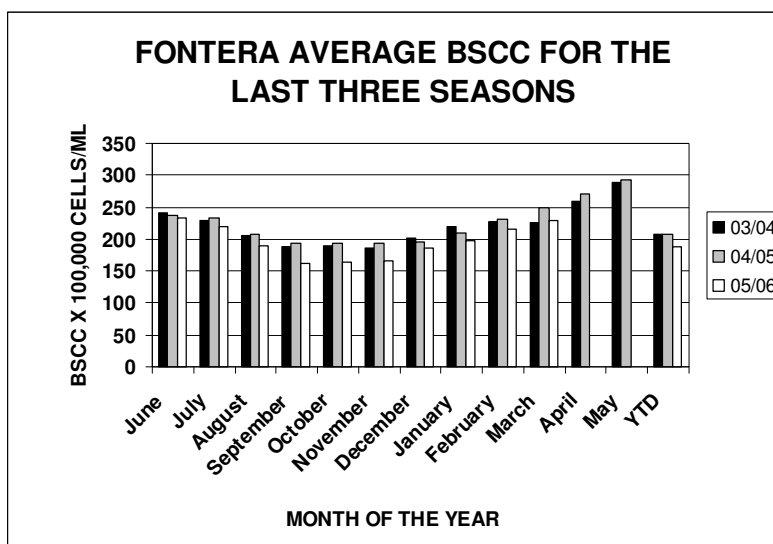


Figure 1: National average BSCC for the last 3 years (courtesy of Arney Griffiths, South Island Milk Quality Officer for Fonterra)

Perhaps this slow progress is because of a lack of financial “signals” from Fonterra. In Australia suppliers are paid a premium for milk with a BSCC below 250,000 cells/ml and progress to lowering the national herd BSCC was quite rapid in the last part of the 1990’s.

Another reason for the NZ dairy industry’s lack of progress may be the current focus on reducing inductions. Many farms have adopted a policy of taking the bull out earlier without adopting any management strategies that might help to improve reproductive performance within this shortened mating period. The higher empty rates that have resulted have consequences for culling for other traits eg chronic mastitis cases.

Money is a great motivator for most people. Even though Fonterra is not providing financial signals to lower BSCC there are benefits associated with running at a lower Bulk Somatic Cell Count.

Increased production

For every 100,000 cells/ml the BSCC is above 150,000 cells/ml there is a 1-3% drop in production. (Radostits et al 1995). In an average 650 cow herd producing 360kg MS/cow in a \$4 payout year this amounts to \$9,400-\$28,000 dollars a year. Or \$4,700- \$14,000 for a 50:50 sharemilker.

Table 1: Estimate of loss of production with increasing ISCC (McMillan et al 1983)

Individual cow SCC (cells/ml)	Loss in volume production
<250,000	0%
250,000-750,000	2%
>750,000	6%

Improved cow value

This year many sharemilkers are selling cows out of their herd to benefit from the high cow prices. Three teat cows and those with high SCC are often excluded from sale agreements or prices for such cows are much lower.

Improved reproduction

Infection of the udder has negative effects on reproduction. Kelton et al 2001 reported an 8% drop in conception rate for cows that had a case of clinical mastitis within 30d of being mated. Barker et al 1998 reported that cows that had clinical mastitis prior to mating took longer to cycle and cows that got clinical mastitis during AI needed more inseminations to get pregnant than those that didn't. Those are the effects of clinical mastitis. Sub clinical mastitis will also have an effect.

Table 2: Case Study – 804 cow Friesian herd in Southland

	Average age	Empty rate
Severely chronically infected cows (n=70)	7.8 years	14%
Non-chronically infected herd mates (n=734)	3.3 years	9.8%

This was not an age effect because the 54 cows in the herd that were 7 years or older that did not have a severe chronic infection managed to achieve an empty rate of only 9.2%, which does not differ significantly from the main herd. In this case study, chronic infection was defined as ISCC over 150,000 cells/ml at three or four of last years herd tests *and* ISCC over 300,000 cells/ml at three or four herd tests this year as well.

Reduced incidence of clinical cases

Because of the high incidence of environmental mastitis in New Zealand a lower BSCC doesn't always lead to a low number of clinical cases but it can help reduce clinical cases. Associated with this is a lower risk of culling, inhibitory substance grades, and less time involved in treating cows.

A conservative cost of a clinical case of mastitis could be estimated at:

Drug cost	3 tubes @ \$7.00	= \$28.00
Milk withheld	5 days @ 1.7kgMS/day x \$4/kgMS	= \$27.00
Labour		= \$20.00
Loss of production (udder damage)	7% x 1.7kg MS x 200d x \$4/kg MS	= \$95.00
Potential for culling	2% chance x \$800	= \$16.00
Reproductive effects	2 days less milk next season	= \$14.00
TOTAL COST		= \$200.00

If money is not enough motivation to control mastitis within your herd, then maybe you could be motivated by aiming to be better than the Aussies or the North Islanders! At the moment there seems to be very little difference between the BSCC of milk supplied from the different regions of New Zealand.

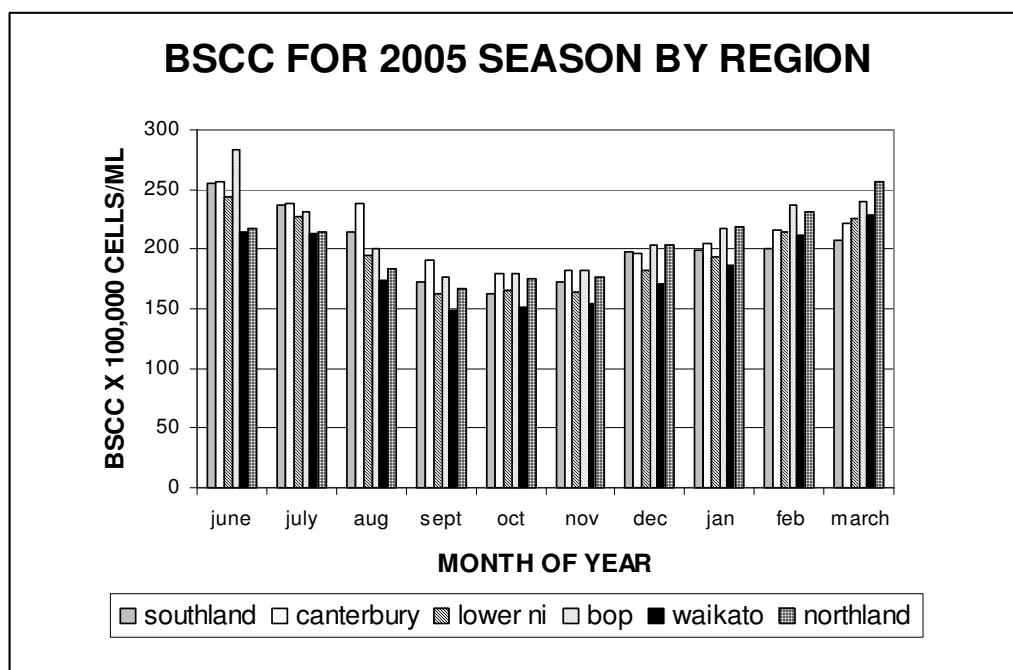


Figure 3: BSCC by Region for the 2005/06 season (courtesy of Arnie Griffiths, South Island Milk Quality Officer Fonterra)

So once you are motivated to reduce the level mastitis on your farm, what can you do?

Blame the weather? Try a new trace mineral product? Change teat spray? Abuse the milking machine company? Fire the relief milker? Ask for a “stronger” antibiotic?

If you are serious about getting to the bottom of a mastitis problem, rather than adopting a trial and error approach, or looking for a single cause or a miraculous product . . . take a good hard look at all the factors which could be contributing to the problem. Focus on the things that can be changed rather than those that can't. Be willing to make changes. Ask for help.

Mastitis investigations

Is there a problem? If so what is it?

You can't solve a problem unless you know what it is. This is an exercise in information collection. It is often tedious and labour intensive but is very necessary. Gut feeling is not always correct.

Is the herd experiencing a high BSCC or lots of clinical cases or both? If the BSCC has been over 200,000 cells/ml for the previous 6 months and/or if more than 10-15% of the herd is treated for clinical mastitis in a season then by definition – there is a mastitis problem

What part of the season does it happen? Is the BSCC high throughout the season or does it just peak at the end? Are most of the clinical cases at calving or do they continue into January and February? If most clinical cases occur at calving how long after calving are they appearing? Clinical cases within 7 days of calving are more likely to be due to springer mob and drying off management than milking management and shed factors.

Table 3: Case studies of two farms with different incidence of “peri-calving mastitis”

	% of cases within 7 days of calving	% of cases >7 days after calving
Farm x	18%	82%
Farm y	38%	62%

Which age group or mob of cows is affected? Is it a heifer mastitis problem, is it all old cows or is it spread throughout all age groups. Are different age groups affected in different years?

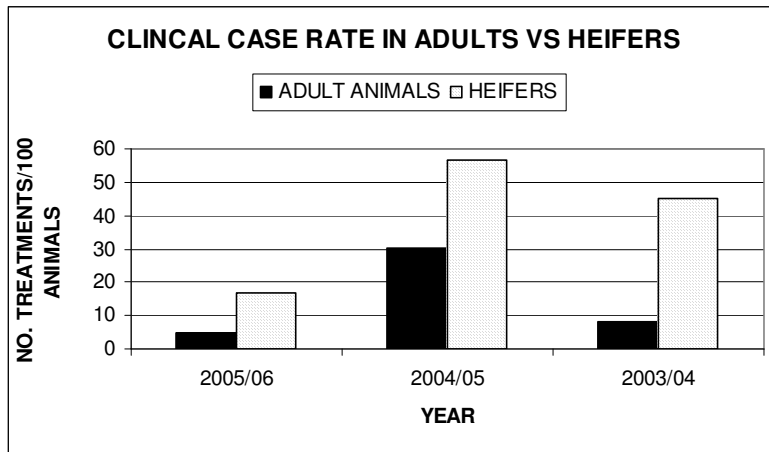
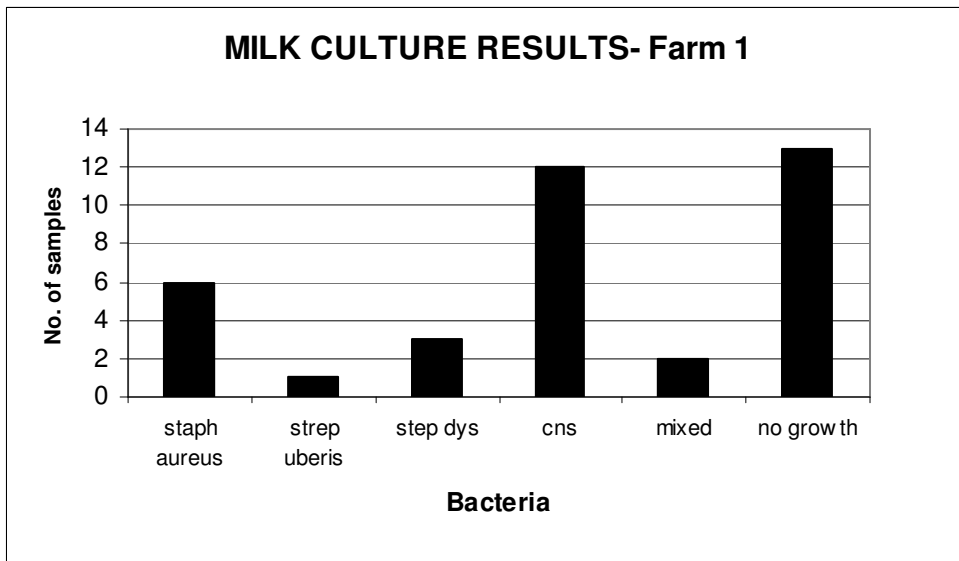
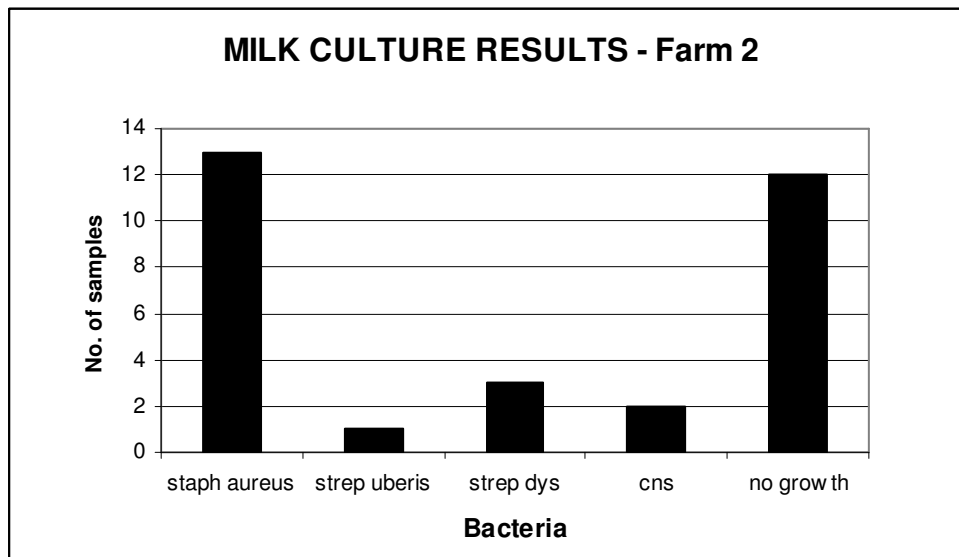


Figure 3: Case study - Heifer vs adult cow clinical mastitis (2005/06 data to Oct only)

What bacteria are involved? Milk samples are essential to determining where to focus your preventative efforts. You may not be following best practice guidelines for drying cows off but why completely change that management strategy if none of your milk samples grow environmental bacteria? You need a significant number of milk samples to get a good picture of the mastitis pathogens in your herd.





Figures 4 and 5: Milk Culture Results from High ISCC cows on two different properties. There are two very different pictures

Why is there a problem?

A lot of factors can contribute to a mastitis problem. To solve a problem you will probably have to change many things. The trick is to know which factors are most important. Milk samples can help direct you where to focus your attention by identifying whether the bacteria are cow associated or environmental. However even environmental mastitis can be influenced by milking machines and management. Teat health is important to the cow's defences against environmental mastitis. Milking cows out thoroughly every milking and as soon as possible after calving is important to removing environmental pathogens from the gland before they become established.

Are staff detecting and treating clinical cases early enough? Are clinical cases separated and milked last? Are the products that are being used working or are they just driving infections sub clinical?

Table 4: Case study example of "cure" of intra-mammary treatments on a farm. Cure defined as an ISCC <150,000cells/ml at the next herd test >2 weeks later. NB: Some treatments were used too infrequently to make any conclusions.

Product	No. of treatments	No. of “cures”	“cure” rate
a	13	6	46%
b	25	13	52%
c	8	1	12.5%
d	3	2	66%
e	3	2	66%
f	3	1	33%

Is teat spraying effective? What volume is being used? Is coverage of all sides of the teats happening? Is the final concentration of the made up teat spray high enough or are water quality issues reducing the effectiveness of the product? Water hardness, pH and bacterial counts can have significant impacts on the effectiveness of the spray. Is it being made up correctly?

Is the *culling* strategy working? Is there any culling for mastitis?

Table 5: Case study example of culling strategy which was not working

No. of cows over 700,000 cells/ml at final herd test that were kept	26
No. of those cows that had ISCC<500,000 at first herd test the following year	8=30%
No. of clinical cases in those cows	19
% of clinical cases for the year that were due to those cows	30%

Table 6: Case study example of culling strategy being less than rigorous but not impacting on BSCC or clinical mastitis incidence in the following year. This strategy is not recommended or endorsed but had no impact with the type of mastitis that the farm had.

No. of cows kept with > 3 clinical cases of mastitis in 04/05 season	13
No. of those cows with clinical mastitis this year	1
No. of cows with ISCC >500,000 this year	0

Are dry cow therapy strategies and insertion techniques ideal? Or have you spent all that money on dry cow therapy and the cows have caught a whole lot of new infections in the dry and springer period anyway and your cell count is exactly the same as it was?

Are the milking machines working optimally and/or are the milkers, cows and machines interacting like they should be? As with any disease, we must look at the symptoms in the cows and work back to the cause of the symptoms. Measurements can be made on, cow behaviour, teat firmness, teat end lesions, completeness of milking out, speed of milking out, degree of over milking, vacuum stability during milking when cups are being handled and there is milk in the plant. If greater than 5% of the herd has significant teat lesions then there is a problem. Significant lesions are not always obvious. If more than 20% of quarters are able to have 100ml of milk stripped from them then under milking is occurring. Delayed let down in more than 10% of cows can lead to poor milk out. (Targets from Countdown Downunder Technotes) All of these things are measurable and quantifiable.

Correcting the problem

After a thorough investigation the most important factors contributing to the problem will be identifiable. Of course it is best to start with the changes that don't cost any money first!

Vets can come up with all sorts of wonderful ideas for solving a problem (e.g. inserting teat seal into heifers pre calving) but if they are not practical to your situation (or are dangerous

to your well being) then they are not going to happen. There may have to be compromise but by discussing it together a workable solution can be reached that might not be perfect, though it will be an improvement on the existing situation. If you want your BSCC to drop, and mastitis incidence to reduce, then you are going to have to make significant changes. Unless you are prepared to do this there is little point in going through the exercise.

The people that milk the cows are the most important people in the solution of a mastitis problem. Without their co-operation and understanding nothing will change. Education is the key. Most milkers are quite open to change if they can see why they have to change and what the benefits are for them. A smaller penicillin mob and not having to RMT test the whole herd every couple of weeks to control cell count is definitely going to be a positive incentive for them! Actually demonstrating things to them in a “hands on” way makes it real for them, e.g:

- Showing the volume of milk that comes out of a cow after the cups come off too early
- Swabbing their hands and come back two days later and show them what bacteria we have grown from them
- Looking at the teat damage and haemorrhages and rough skin

Every year many of the people milking cows have never put cups on cows before, or taken them off. How much time and attention do we give to demonstrating how these vitally important jobs should be done? Have you actually sat down and talked about how to detect mastitis with your staff? Would this and any constructive criticism on their “technique” be better off coming from an independent and supposedly knowledgeable person rather than “the boss”?

The cost of a mastitis investigation in a large herd is the same as the cost of a mastitis investigation in a small herd. More cows benefit, more cows increase their production, many less cows get treated for mastitis and the return will be greater. It can make a difference. You just have to want it badly enough.

Conclusions

Having a large herd is not an excuse for having poor animal health. When animal health suffers animal welfare will be close behind, and we must be very careful with our stewardship of animal welfare. There are plenty of other organizations out there who would love the opportunity to more aggressively monitor and police animal welfare if we can't be seen to be doing the job well ourselves.

We think it is unacceptable to have a death rate of, say, 12 or 13%. To actually budget for this ‘because it’s a large herd’ is appalling. We think it is unacceptable to induce 25% of cows every year when some simple systems will go a long way towards minimizing reproductive loss. We think accepting a BMSCC of around 400,000 because the penalties aren't a high enough deterrent shows a disappointing understanding of milk quality and herd economics.

Being positive about large herd health is straightforward and very rewarding, and ultimately beneficial for the whole industry.