

PART 2: Monitoring Transition Cows

This month we continue our discussion on monitoring and begin to focus on transition cows. The information has been reprinted from "Monitoring Transition Cow Programs" by Drs. Steve Eicker, Steven Stewart, John Fetrow, and Paul Rapnicki.

There are other issues with monitoring that have produced less than desirable results. Remember, if monitoring is really calculating parameters, then using their values as a test, there are other characteristics of a test that are important: how sensitive is the test (will it always detect the actual problem), and how specific is the test (can other factors create the appearance of the problem when the problem does not really exist?) In addition to all these issues of lag, momentum, variation, bias, sensitivity and specificity, there are often multiple parameters that are available for the same problem. Many times, one parameter will be far superior to another.

How "Sensitive" is the Parameter?

A monitor is sensitive if it always detects a problem. Unfortunately, there are few examples of really sensitive monitors. There are many more examples of insensitive monitors. For example, perhaps someone proposes using bulk tank SCC to monitor fresh cow mastitis. Fresh cow mastitis probably has an affect on the bulk-tank SCC, but it makes little sense to use bulk tank SCC as a monitor of fresh-cow mastitis. BTSCC is not very sensitive to fresh cow mastitis - diluted by too many other cows. The following are relatively sensitive: Fever in cases of clinical coliform mastitis; or maybe hemorrhages in the sole in cases of grain overload rumenitis/laminitis.

How "Specific" is the Parameter for the Problem?

A monitor is specific if it only changes when there is a real problem. Fresh cow-mastitis causes decreased reproductive performance, but it makes little sense to use pregnancy rate to monitor fresh cow mastitis. Thus, a change in PR is not a very specific indicator of fresh cow mastitis. An example of a highly specific monitor might include fecal tests for fecal culture for Johnes, or Salmonella.

Screening Tests

The purpose of monitoring is not to follow a problem until we are absolutely certain that a problem exists ($P < 0.05$), but rather to detect problems as early as possible. Operating a dairy farm involves management of risk. The level of evidence required to launch an investigation, or its subsequent intervention, depends on both the strength of the evidence and the potential cost-benefit ratio of the proposed intervention (note intervention here includes changes that improve an already acceptable situation as well as those needed to correct "problem" areas). Therefore, for management purposes, measures that will reliably alert one to potential problems are critical. It is likely far better to occasionally declare that a problem may exist than to provide false reassurance that no problem exists when one truly does. In traditional diagnostic terms, one wants a monitoring system that is very sensitive, i.e., is likely to detect problems if present. Again, mere detection of a problem is no guarantee that the cause is identified, nor is it assurance that intervention is justified.

If there is a very large economic downside potential, but an inexpensive intervention is possible, the evidence needed for implementing this "insurance" may be much less than that required for scientific proof. An example of this might be the routine use of Leptospirosis vaccine to prevent abortions. On the other hand, if there is a high cost of implementing a given intervention, but relatively low downside potential, even evidence that is statistically significant may not be enough to justify an intervention.

Is this parameter the best monitor?

Often we have focused on monitoring parameters, rather than trying to

find out the answer to a question. We too often say "We have all this data, what is it telling us?" We should be asking "Here is the question, let us find the data to help us answer it." We must frame the question carefully first. We do not go to the hardware store, buy a hammer, then wander around the dairy looking for nails! Rather, we decide to build something, and then procure the appropriate tools.

For instance, most DHI organizations provide a culling summary, stratified by reasons why the animal was culled. What can we do with these data? Perhaps we can quantify the economic effects of mastitis, or identify the impact of reproductive problems, etc. Unfortunately, we found an answer (tool), and asked "What can we do with this?" Had we asked, "How can we assess mastitis?", we might have listed the following: bulk tank SCC, individual cow SCC, recent incidence of clinical cases, etc. Almost no one would suggest waiting for a year to see how many cows died or were sold that were "identified" as mastitis culls.

Do not monitor what cannot or will not be changed

Each measurement should logically lead either to another question or directly to a management action. What is often needed is not a measurement of the performance of those animals whose outcome (positive or negative) has already been resolved, but rather the identity and status of those animals where positive management action can still be taken. Monitoring pregnant cows is rarely useful - there is little action that can be taken on pregnant cows that will help the dairy. We must monitor open cows, and be prepared to implement some action.

Always estimate the economic impact of the solution

Almost every dairy could improve heat detection, lower bulk tank SCC, and have fewer fresh-cow diseases. Informing a dairy that they have "too much" disease is not useful. Telling them that they had too much disease last year is even less useful. Suggesting a plan, and estimating both the implementation costs, and also the benefits and probability of success are useful. Implementing a monitoring system that can track the changes resulting from the plan is recommended.

Summary of Monitoring Issues:

1. Lag - the time delay between when the problem occurs and when it's detected.
2. Momentum - a time effect because of dampening changes with averages.
3. Variation - false changes in averages because of outliers or too few cows.
4. Bias - errors that occur when certain data are ignored.
5. Sensitive - will the test actually detect the problem?
6. Specific - what else could cause a similar change in the test?
7. Screening test - It is better to have a sensitive test than a specific test.
8. Ask the question first, then look for the BEST tool to address it.
9. Never run a test that will never change an action.
10. Not all solutions are superior to the existing problem.

Fresh Cow Monitoring

The ideal cow freshens with no problems, has a healthy calf and a voracious appetite, consumes an excellent diet, and her milk production increases quickly to a very profitable level and remains high throughout lactation. She gets bred back promptly, does not get mastitis, or become lame or be afflicted any other disease, and she has the correct length dry period, and repeats as necessary.

Transition programs can have an impact on this process. Deficiencies can decrease milk yield, affect milk components, cause diseases, premature replacement, death, calf diseases, and even calf death. Monitoring becomes important.

Disease costs

There are both direct and indirect costs of diseases in dairy cows. These costs include the following categories: decreased milk production, decreased milk sold, treatment costs (including labor and drugs and facilities), decreased reproductive performance, and premature replacement.

Dr. Charles Guard, from Cornell University, has estimated the average financial losses incurred from the common diseases of dairy cows. Even a cursory look at this analysis will be sobering for most dairies. As a general rule, there is significant profit that results from proper efforts to better control these diseases.

Obtaining accurate information on disease incidence is often difficult. On many farms there are neither written or computerized disease records. On these farms the dairyman's memory is the only source of information, not always as objective a source as desired.

Even dairies with written or computerized records, diseases may be either under-reporting or over-reported. Under-reporting has arisen because the computer software is attempting to record each disease event in great detail. The burden of data entry becomes too much and the dairyman ends up recording nothing. Over-reporting occurs when each treatment is recorded as a new incident of a disease.

For many dairies, the establishment of standardized protocols for diagnosing, recording, and treating diseases provides immense value. Daily, each dairy needs a list of diseased cows to be treated with the proper medications, or cows that must have their milk withheld. Weekly or monthly, the incidence of each disease can be tracked to see if changes have occurred. And long term, the records are available for federal and local requirements.

For reporting and monitoring, a simple list of cows sorted by date or even a count of the event occurrences can go far in meeting the needs of a monitoring system. Tables or graphs with a time-scale are also often useful.

Fresh cow diseases of primary interest include retained placenta, metritis, ketosis, displaced abomasum, and clinical mastitis.

****Next month we will continue this fresh cow discussion, and look at several other monitoring parameters. For more information, call Dairy One at 1.800.496.3344 or email: dmr@dairyone.com***

References

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