From traditional farm practitioner to herd health advocate: key principles

Forecasts of challenging milk prices and volatile farm gate prices on dairy, beef and sheep farms have created a demanding financial environment for most farmers. Frank O'Sullivan MVB MSc (Food Science) MRCVS and Charlene Grice MPH BHSc examine the role of the farm vet in assisting farms to maintain viability and profitability by engaging the farm in disease prevention principles and monitoring key parameters for herd health maintenance

CHANGE OF MINDSET ON FARM AND IN VETERINARY PRACTICE

The farm herd health focus is to optimise animal health and welfare, reduce clinical and subclinical disease and maximise production. The farm objective is to increase farm profit and avoid clinical 'disasters'. The vet has a key role in seeking and maintaining efficiency on farm. This is particularly important prior to and during the expansion phase, especially when milk and beef prices are relatively low. The mindset change for farmer (and vet!) is to consider the veterinary practice as a key partner in maintaining animal health equilibrium on the farm while maximising production. What clearly does not work is the vet being called to treat chronic clinical cases on farm that are not only expensive to treat but will also have a very poor treatment outcome.

SEGMENTATION OF DISEASE SECTORS

In order to manage clinical and subclinical disease on farm, it is easier to segment into key components (Figure 1): nutrition, calf health, infectious disease, parasites, fertility, lameness and mastitis. Constant monitoring is a method of providing regular and positive feedback to the farmer that he is carrying out good practices. Equally, monitoring allows an early intervention should that particular parameter be outside of the normal ranges.

ENTRY INTO THE HERD HEALTH CYCLE

In Ireland, most veterinary practices still have a considerable caseload of clinically ill animals. These cases can be used as the gateway into the herd health cycle by helping to identify animal health issues on the farm (Figure 2). Therefore, the veterinary clinician morphs into the herd health practitioner as he takes a 'wide-angled' approach on farm. For example, if a vet is on call in the month of March and treats a calf or two with diarrhoea, surely it is the norm that other calves are assessed, scour samples are taken for the laboratory, a detailed history is taken of similar problems in the previous weeks, months or years, bedding and hygiene conditions are considered and colostrum intake is monitored. What begins as a simple clinical event has developed into a herd health plan facilitated by the vet with the farmer.

Figure 2 subsequently promotes reviewing of the records, walking the walk on farm, using laboratory aids for differential diagnosis and suggests a farmer vet/report that aims to identify where on farm corrections are necessary. In addition, targets are set and progress is measured. This herd health approach is results-driven and not just activity-based. Herd health planning is dynamic and constantly evolving.

In addition, modern-day veterinary practices may not solely rely on clinical cases to identify issues on the farm.

There is an array of other tools that can at least be used to open a conversation about a particular heard health aspect. These include bulk milk testing, the Irish Cattle Breeding

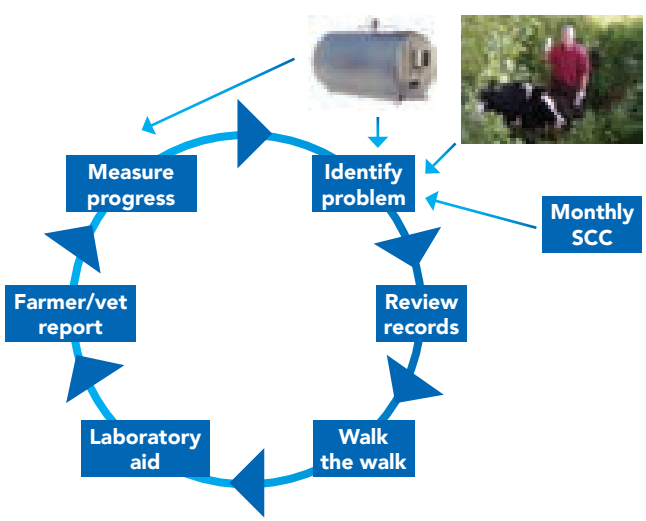

Figure 2: Herd health flow diagram.

Figure 1: Farm herd health – herd management areas.

Federation (ICBF) reports, especially fertility reports and the CellCheck reports. The CellCheck report provides some dashboard headlines that can assist in opening a conversation on somatic cell counts (SCCs). Is it the case that farmers who milk record do not often get value from these reports? However, vets are in a key position to assist with interpretation of the CellCheck farm summary, eg. a herd I dealt with recently was losing almost 80L per day, which could translate into €600 per month. In addition, 22% of the herd has an SCC over 200,000 cells per ml. Further questions worth asking include: 'Why did the recent infection rate spike during the months of June to October to almost 35% of the herd?'; and 'What needs to be done to address the 23% of cows with persistent infection?' There is plenty of work to be done in this herd!

Access to the herd health cycle is also facilitated by the bulk milk disease screening service that many milk processors and laboratories operate. These reports provide a fantastic overview of key disease sectors. Of course, the vet is absolutely well placed not only to know the limitations of these reports but also to understand the on-farm context to which they apply. In this particular herd, the bulk milk results help to open conversations on *Neospora* and liver fluke.

APPLYING HACCP ON THE FARM

There are significant advantages to using a systematic approach to disease prevention. The Hazard Analysis and Critical Control Point (HACCP) team should include the farmer, vet, key farm operatives and, when the need arises, other advisers such as the nutritionist or agricultural extension officers. The appropriate prerequisites should be in place and these are defined as good farming practices (GFPs). Suitable GFPs include:

1. Hygiene (in the calf housing, calving area, milking parlour, cow cubicles);
2. Training on farm, eg. milking techniques, calf feeding, medicine usage, body condition scoring;
3. Medicine usage and storage, considering the withdrawal periods and the appropriate records. The main areas for veterinary involvement include vaccine protocols and calendars, anthelmintic usage and dry cow therapy protocols; and
4. Farm structures and premises. It is necessary to have suitable animal housing in terms of design, ventilation and cleanability. Appropriate calf housing and cubicles are required, together with suitable milking facilities.

Consider a HACCP-based calf health plan to manage calf diarrhoea. When good farming practices are in place, the HACCP team initially considers the flow of events on farm (Figure 3), beginning with the dry cows and then calving, feeding and growing. Therefore, using HACCP for the prevention of calf health it is necessary to consider the major pathogenic risks, ie. *Escherichia coli*, coronavirus, rotavirus and *Cryptosporidia*. The team asks a key question at every step: 'How can we reduce the likelihood of these pathogens

Health risk		Vet/farmer solution
1. BCS: too fat/thin? 2. Minerals, vitamins (eg. iodine) 3. Parasites? Lice or fluke 4. Vaccine?	Pregnant/ dry cows ↓	1. Monitor BCS 2. Mins/vits via licks, loose, bolus 3. Parasite control programme 4. Scour vaccine
5. Facilities, hygiene 6. Difficult calvings	Calving ↓	5. Clean calving boxes,restraint 6. Normal (3 stages) vs abnormal (oversize or malpresentation); help needed? (vet)
7. Adequate colostrum? 8. Calf disease?	Suckling ↓	7. AHI 1,2,3 colostrum 8. Clean environment, disinfect navel
9. Nutrition? 10. Pneumonia? 11. Hygiene	Feeding	9. Quality milk replacer + ration 10. BRD, housing, ventilation, 'buying in' 11. Hygiene protocol

Figure 3: Calf herd health.

Table 1: Herd health monitors.

	Clinical monitors	Laboratory monitors	Other monitors
Nutrition	• BCS • Rumen fill • Gut fill • 'Cow signals' • Transition cow flow • Diet: forages and others • Heifers (1-2 years old)	• NEFAs (14 pre-40 days post-calving) • BHB (14 pre-40 days post-calving) • Milk/urine, ketostick • Calcium (24 hours pre and post-calving)	• Yields • Bulk tank fat, protein and urea • ICBF/IFC milk fats/ proteins • Weight targets
Calf	• General hygiene • Respiratory disease (listen and numbers) • Scours (no) • Navels and others • Nutrition: meal, milk powder, quality and quantity, straw (length), water	• Ig levels (total protein, bloods <1 week old) • Scour snap tests • Scour samples, culture • Swabs, BAL, TTL (pneumonia) • Retrospective antibody screening (pneumonia)	• Weigh (tape <1 year, scales >1 year) • EBI (ICBF)
Infectious diseases (BVD, leptospirosis, IBR, Salmonella, Neospora, Johne's)	• Clinical cases/history • Target sampling • Vaccination protocols • Storage • Method and hygiene • Timing and boosters • Heifers	• BVD: weanling sentinel bloods • Leptospirosis: bloods • IBR: wild virus six weeks post-illness and sentinel. From groups (heifers etc) and IBR swabs • Johne's bloods: AHI and vRamp • Salmonella: bloods (ref clinicals) • Neospora: abortion bloods and cohorts	• Bulk milk screening • BVD (ICBF and national scheme) • vRamp and bloods (Johne's)

having an impact at that particular stage?' Therefore, at the dry cow stage the team considers the following:

- What is the body condition score of the dry cows?
- Are there suitable dry cow minerals, including iodine, in the diet?
- Are parasites under control in the dry cows?
- Is the hygiene of the dry cows and their environment maintained to an acceptable standard? From previous experience, is it necessary to use scour vaccine to prevent calf disease?

Considering these aspects may prompt actions and solutions at this 'dry cow' stage to reduce the likelihood of scour and calf disease. The vet becomes involved here in helping to monitor the effectiveness of these controls, giving advice about body condition scoring, hygiene standards and vaccine programmes.

RISK ANALYSIS APPROACH

HACCP application on farm provides a risk analysis tool where the analysis leads onto identifying key risk management practices. The farmer may question the effort, finance and labour of some of these risk management practices and a key role for the vet is to provide him with guidance. For example, if the probability of a *Cryptosporidia* clinical outbreak is high and the consequences are reasonably significant, then the farmer understands that it would be wise to invest in its prevention. Most modern-day farmers frequently use their veterinary practice for fire-brigade services, coming out and treating sick cases. In addition, many practices sit down with the farmer and plan out a strategy for the year, looking at key areas: nutrition, calf health, fertility, parasites, lameness and mastitis – the high-risk diseases that are going to be the most important on the farm.

Diseases are then ranked based on risk. The degree of risk is determined by two factors: the probability of an outbreak occurring and the consequences or costs of an outbreak. For example, the risk of leptospirosis affecting a herd is very high, so most farms vaccinate against it. On the other hand, the probability of a *Salmonella* outbreak might be low, especially in a settled, closed herd, but even if there is only a small risk of it getting in, the consequences are very high because it can wipe out a crop of calves and end up taking down some cows, too, with diarrhoea and abortion. Therefore, the probability is less significant than the consequences of a *Salmonella* clinical manifestation, which would suggest that it needs to be managed, possibly by vaccination.

PUBLIC HEALTH BENEFITS OF ON-FARM HACCP

There are three main benefits of using HACCP to control calf diarrhoea on the farm:

1. As there is less calf disease, there will be a significant reduction in antibiotic use. In particular, use of antibiotics in enteric disease may encourage sharing of resistance-coded plasmid and DNA material to commensals. Therefore, reduced antibiotic usage in the calf will result in a decreased pressure for antibiotic resistance in both animals and the environment;
2. Most scour pathogens are zoonotic: *E coli*, rotavirus, *Cryptosporidia*, *Salmonella*. These may cause illness to humans through direct contact or further down through the food chain. A first, and key, step is to control these zoonoses on farm; and
3. HACCP and GFP are food safety management systems that are understood by international markets. This is especially important as consumers and retailers are very keen to interrogate food safety systems pre-farm gate.

KEY DRIVERS TO BEHAVIOUR CHANGE ON FARMS

Goal setting is the process in which people develop realistic targets or objectives to attain. Results from a review of field studies on the effects of goal setting on performance show that in 90% of the studies, specific and challenging goals led to higher performance than easy goals, 'do your best' goals, or no goals. Goals affect performance by directing attention, mobilising effort, increasing persistence, and motivating strategy development. Goal setting for herd health is most likely to improve task performance when:

1. The goals are specific and sufficiently challenging and feedback is provided to show progress in relation to the goal;
2. Rewards such as financial bonuses (eg. quality milk or less subclinical disease) are detailed for goal attainment;
3. The vet is supportive; and
4. Assigned goals are accepted by the farmer.

In herd health planning, it is important to consider these factors when setting farm goals for disease management and reduction. Feedback is generally regarded as crucial to improve farming knowledge and farm skill acquisition, as well as helping to motivate. Preparing the farmer to receive feedback is key. In addition, the most effective method for the vet to provide the farmer with feedback is in private. As in sport, a positive reinforcement, emphasising the improvements, will likely encourage the farmer's resolve to achieve the goals set. The vet's role is in monitoring and maintaining herd health. By using a combination of monitors, it increases the reliability and accuracy of the results and helps to provide greater insight (Table 1). The role of the vet is key here; for example, in dairy herd nutrition, he uses his visual and clinical skills to a maximum. Therefore, in a herd of cows the vet's sense that the gut fill, faecal consistency and body condition score are not correct may prompt use of target and appropriate laboratory monitors such as non-esterified fatty acids (NEFAs) and beta hydroxybuterate in the transition cow. In addition, the vet can interrogate other external 'feeds', bulk milk tank and ICBF fats and protein ratios to support or reject suspicions.

CONCLUSION

More than ever, Irish farms need the traditional clinical and obstetrical skills of the vet. In addition, they require a practitioner who can: firstly, systematically investigate the background to clinical disease; secondly, in conjunction with the farmer, provide solutions and targets that are meaningful and give results; and finally, be involved in monitoring the health of the farm for early intervention and preservation of a stable and calm productive herd.