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## **Dairy herd health and production management practice in Europe: *state of the art***

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### **History**

In the 60's and 70's herd fertility schemes have been introduced to cope with the disorders occurring after implementation of new technological developments in dairy farms and increasing herd sizes. The time spent per cow diminished, leading to eg increased calving interval and lower pregnancy rate. These schemes addressed deviant cows trying to keep them within targets (eg. 1<sup>st</sup> insemination at 55 days in milk) and the interpretation of performance figures followed by managerial action (<sup>6</sup>). Such schemes were often coupled to vaccination programs, or to an udder health control program (<sup>3</sup>). In the 80's and 90's, dairy herd health programs have been designed where different dairy farming elements were integrated into one program. Herd fertility was still the basis because by having the cows at risk for disorders in health and fertility under hands (i.e. from calving to 90 days in milk), different clinical activities could take place simultaneously to keep cows within target ranges.

Within the European Union, EU, animal welfare, disease eradication and disease control policies were prioritised not only referring to highly contagious OIE list A diseases but also to diseases like BHV-1, or BVD, and to the quality of raw foods, consumer protection (e.g. precautionary principle), quality assurance in food production chains (eg. as related to outbreaks of BSE, salmonellosis, VTEC). Consumers in the EU have a large impact on food animal production. Retailers have translated the increasing public concern about food animal production into terms of reference for primary producers if they desire to deliver products to the [international] market: the license of farmers to produce and deliver. EU directives and regulations like EC 92-46 (milk hygiene); EU 97-12 (veterinary farm inspection); EU 178-2002 (consumer protection and food safety); EC 2377-90 (veterinary drugs) were issued.

Against this background two topics will be addressed in this paper: [1] current dairy herd health and production management practice in Europe, [2] the shift toward an integrated quality risk management program comprising both herd health and quality.

### **Current veterinary dairy herd health and production management practice**

A program is started either for routine farm screening to assess herd performance, or when a herd problem exists. Broad monitoring of cows and cows' environment is applied because of the multifactorial causality of disorders. First, the farmer or vet fills a form (*strengths & weaknesses*), scoring various farm items from 1 (poor) to 5 (satisfactory). Based on this form,

priorities for a herd health program are discussed. Planning of farm visits (once every 1, 2 or 4 weeks), structuring activities to perform during each farm visit (routine monitoring), envisaged duration of the visits, the appropriate recording system, protocols of herd problem analysis, costs per visit, costs for problem analysis, a farm visit report (1-3 A<sub>4</sub> max) and problem analysis reporting (<sup>4</sup>) are all part of a marketing approach.

Routine monitoring examples are listed in Table I. The frequency for each monitoring activity as well as its intensity (eg general inspection versus individual scoring) are defined. In that way a tailor-made, farm-specific, highly structured monitoring program can be established. *Monitoring* is meant to obtain early signals about good performance, trends and deviations. The interpretation of the data is crucial. It can also be used to assess the effect of the interventions made earlier, or may trigger further *problem analysis*.

A *protocol* is a schematic outline of activities envisaged for a farm area, e.g. claw health. Such protocols are meant to provide the farmer with insight into goals set, activities planned, procedures followed and follow-up planned; there should not be any surprise for the farmer. It also forces the vet to follow strict procedures in order to deliver a product that is wanted by the farmer. Examples of such protocols have been described (<sup>4</sup>).

**Table I.** Examples of activities for routine monitoring

<b>Cow monitoring</b>	<b>Environment monitoring</b>	<b>Records monitoring</b>
Body condition	Cubicles and bedding	Milk production
Rumen fill	Barn climate	Milk quality features
Feces consistency	Milking method	Roughage analysis
Undigested fraction in feces	Milking parlor condition	Drinking water quality
Teat end callosity	Pasture management	Sire evaluations
Lesions of udder/teat/skin	Grass harvesting (silage)	Soil analysis
Clinical disease cases	Maize harvesting silage)	AI records
Reproductive examinations	Floor design & maintenance	Disease and drug records
Ectoparasites	Ration formulation	Farm economics report
Locomotion and claw score	Feeding management	Slaughter findings
Young stock growth	Hygiene practices	Laboratory findings

An often neglected aspect regards the *farm visit report* (1-3 A<sub>4</sub> pages); it comprises a shorthand writing of activities performed, findings, conclusions drawn, and the advice given. *Plans of action* in the program have a short term and a longer term perspective: chronic lameness cannot be solved in a couple of weeks, while for clinical mastitis or feeding management short term advice is appropriate. *Work sheets* like e.g. herd mastitis treatment advisory plan are part of this component; they should cover a time-span of 3 or 6 month max.

### **Integrated dairy quality risk management program**

Within the EU there is a growing demand for proving the status regarding food safety and public health, as well as herd health and welfare on dairy farms (EU regulation 178-2002). Preferably farms should comply with a HACCP-compatible program for quality control where quality regards the forenamed four areas. Both the product [milk] and the production process should be brought under control. A HACCP-like approach could be followed although it is not a panacea for every issue on the farm (<sup>5, 8, 9</sup>). A HACCP-like approach can only be implemented once the right attitude is adopted by farmers. Many of the issues associated with attitude refer to good management practice, GMP, which comprises the risks common to most disorders. Examples will be given during the presentation. Key elements in a HACCP-like approach with examples on the dairy farm are presented in Table II.

We have to look to the dairy farm in a more structured way. We must be highly specific about hazards and risks in process steps, CCP and CMP definition and monitoring, and proper control measures. In Table III an example is given of a part from a HACCP-like program. It addresses the chemical, physical and microbiological contamination of milk during the production process step 'Milking' and the step 'Cow treatment' (<sup>7</sup>). Some hazards have been listed. The risk is weighed based on best estimates by experts or epidemiological analyses by setting probabilities for occurring and effect estimation, leading to a risk level score. Next, it is estimated whether a true risk is at hand or not. Then, CCPs and CMPs are defined and preventive or corrective measures listed. When needed, cross references are being made to other documents, like a work sheet for treatment with veterinary drugs or a herd udder health treatment plan. A conclusion drawn from this Table III is, that it also comprises those items that would already be addressed in a herd health and production management program. Moreover, it is a further structuring of the activities in such programs. Therefore, it can be stated that the HACCP-like approach means "structuring and formalizing what a truly good farmer and veterinarian would do anyway" (after Ryan, 1997, <sup>10</sup>).

HACCP is not a panacea, as stated before. It does, for example, not apply to the area of feed and feeding management on a farm; there are no CCPs for that area, but there are ample CMPs. Feed mills should apply a HACCP-program for the production of concentrates to safeguard the farmer from hazards. Mycotoxins in feed commodities can be a hazard. Their control through HACCP cannot be done on the farm; it should be executed by the delivering firm. There is also a difference between the approach of hazards at the herd versus the individual level. Zoonoses should be addressed through the herd rather than through the individual; the more when diagnostic tools for individual cows are not available. In different European countries dairy quality assurance programs are being applied at farm level too, sometimes in a compulsory manner.

**Table II.** Key elements in a HACCP-like approach for quality assurance on dairy farms

<b>Key elements in the HACCP-like approach</b>	<b>Examples on the dairy farm</b>
Hazard identification	OIE-list A diseases; endemic diseases (IBR; BVD); management diseases (mastitis; lameness); zoonoses; residues
Risk assessment	Qualitative or quantitative (odds ratio) analysis of risks related to diseases
Process decomposition diagram	Identify different steps in production process where hazards and risks occur
Critical control points, CCP	Defined on the basis of risks identified, includes standards and tolerances, and the monitoring procedure
Critical management points, CMP	See the monitoring elements under the herd health program and the risks identified
Measures for correction	Preferably also including cost-benefit assessments
Record keeping	Refers to the monitoring, but also to lab results/inspections; work sheets
Verification and validation	Through inspection visits; check performance figures and records

### Conclusions

Given the current developments in the dairy sector it is indicated that dairy farmers adopt formal and holistic dairy herd health and production management programs from their veterinarians. Such programs help them to control failure costs, to solve and prevent problems, to get better information about disorders, and to become more aware of risks.

Herd health and production management programs can be considered as a first step toward adopting good farming practices, the basis for further expansion to quality risk management programs. By integrating the herd health and production management approach (operational level) with GMP practices and HACCP-compatible programs (strategic level) the best possible product of veterinary consultancy for dairy farms can be obtained. It is up to the bovine practitioners to take up the challenge for entering that new market segment.

### Abstract

Plusieurs programmes de gestion de troupeau des vaches laitières ont été appliquées pendant les années passées. La reproduction était souvent la base de ces programmes. Malheureusement la plupart de ces programmes étaient monodisciplinaires, négligeant les intérêts des autres disciplines. Surtout l'éleveur a besoin d'une programme multidisciplinaire et intégrée pour lui supporter dans ses décisions. Cette programme sera discutée dans cette présentation: protocoles, observations cliniques, interpretation, intervention, plan d'action. En plus, il sera discuté comment on pourrait combiner une programme de gestion avec une programme d'assurance de qualité (HACCP-compatible) dans les élevages.

**Table III.** An example of a HACCP-compatible approach to certain hazards on a dairy farm

Hazard	Weighing risks		Risk Level	Risk present	CCP CMP	Preventive measures
	Prob	Effect				
Wrong drugs being used	2	2	4	No	CMP	Set right diagnosis, check label, Use treatment plan, see work sheet F
Residues in meat product	1	2	2	No	CMP	Stick to withdrawal period, use treatment plan, see work sheet F
Poor dosage of drugs	2	2	4	No	CMP	Check right dosage, use treatment plan
Use off-shelf life drugs	2	1	2	No	CMP	Check expiration date, see work sheet F
Treated cows not identified	2	3	6	Yes	CCP	See work sheet F
Injection needle breaks	1	1	1	No	CMP	Apply injection carefully
Antibiotic residues in milk		2	3	6	Yes	CCP Identify treated cows, stick to withdrawal periods, check milk. stick to indication, see work sheet F
Listeria monocytogenes	2	4	8	Yes	CCP*	Milking hygiene, milk of Listeria-cows not delivered, reduce infection transfer (feed, climate, milk tank) on herd basis
Staph. aureus in milk	3	2	6	Yes	CCP*	Milk of Staph.aureus cows not delivered, reduce infection transfer (see udder health plan) on herd basis
Campylob.jejuni in milk	2	2	4	Yes	CMP	Milking hygiene (herd approach)

Work sheet F refers to a separate sheet which the veterinarian has drawn for the herd with regard to treatment of different indications and the use/dosage of different medicinal drugs.

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