Cattle health schemes are not a new concept, and a variety of schemes is currently available in the UK. They represent an opportunity for health, welfare and economic improvement in the industry by facilitating the process of farm health planning. The schemes tend to be directed at controlling either single-agent infectious diseases, such as bovine viral diarrhoea, or endemic management diseases, such as mastitis. This series of two articles discusses the rationale behind cattle health schemes, with Part 1 describing some of the cattle health schemes aimed at managing single-agent infectious disease, with particular emphasis on schemes offered by laboratories and milk recording organisations. Part 2, to be published in the June issue of In Practice, will review the evolution of schemes designed to deal with multifactorial or management disease.

Factors affecting participation in herd health schemes

In 2004, only about 1 per cent of UK cattle herds were members of a certified health scheme. Paul Burr of Herdcare, one of the then three certified cattle health schemes operating in the UK, asked the British Cattle Veterinary Association (BCVA) conference that year why membership was so restricted. He suggested that:

- ...the effects of chronic infection are not sufficiently obvious to prompt action. Interterritory, poor milk yield and high cull rates are too often accepted as part of farming;
- ...the highly individualistic and competitive nature of the UK cattle industry...with minimal government interest in improving endemic disease status, militates against the successful uptake of health schemes;
- ...while disease remains endemic nationally, eradication through herd health scheme membership programmes is only possible for those who can operate closed herds or a highly disciplined quarantine policy;
- ...BCVA and cattle vets are not fully supportive of improved herd health.

This low level of uptake has been associated with a number of barriers to health scheme participation, including a lack of perceived advantage, limited numbers of eligible herds and restrictive requirements. A clear premium for health scheme cattle would make membership more attractive, especially given the additional costs of perimeter fencing and disease surveillance that these herds incur. Also, there are few eligible herds available for sourcing replacements or breeding bulls, which increases the costs and challenges of maintaining high health status.

Cattle Health Initiative

Defra’s Farm Health Planning project (2006 to 2008) aimed to promote farm health planning to the wider agricultural industry and was pivotal in delivering its Animal Health and Welfare Strategy (AHWS) in England. It was based on three principles:

- Working in partnership;
- Understanding roles and responsibilities;
- Prevention is better than cure.

Overall, the project made £6 million available for the livestock sector, of which £2 million was allocated to the Cattle Health Initiative (CHI), covering both beef and dairy cattle, which had the following strategic aims:

- To overcome the initial barriers to widespread adoption of farm health planning;
- To achieve higher standards of animal health and welfare;
- To contribute to a more profitable and sustainable cattle industry;
- To generate a support network to promote and advise on farm health planning;
- To promote the voluntary adoption of farm health planning and management systems so that they become an automatic part of livestock keeping (Statham 2008).
The CHI therefore required projects that would facilitate measurable delivery of the overall objectives of the AHWS through dissemination of farm health planning. The aim was to ‘pump-prime’ health planning for future industry uptake. Existing cattle health schemes received a boost as a result of participation in this initiative, while new schemes have emerged following the pump-priming process of the CHI, together with new developments in the milk recording and ‘management disease’ sector (see Part 2).

Cost of poor health

Disease represents a huge cost to the UK cattle industry. In a world without subsidy, reducing disease represents an opportunity to remain profitable. Disease losses are economically highly significant for cattle farming, and may be due to:

- Major single-agent infectious diseases, which may result in losses independently of management or environment;
- Multifactorial diseases (e.g., calf pneumonia), which can be controlled to some extent by management changes (see Part 2).

Major single-agent infectious diseases

The major endemic infectious diseases affecting cattle in the UK include:

- Bovine viral diarrhoea (BVD);
- Infectious bovine rhinotracheitis (IBR);
- Leptospirosis (due to *Leptospira hardjo*);
- Johne’s disease;
- Neosporosis (due to *Neospora caninum*);
- Tuberculosis (TB).

Defra funded the development of a number of cattle disease cost–benefit models at the University of Reading as part of the CHI (Fig 1). These models can be downloaded free of charge at www.reading.ac.uk/fhpm.models.

Bovine viral diarrhoea

BVD was estimated to cost the UK industry up to £31 million in direct costs by Bennett and others (1999). The cost of BVD over 10 years in a 100-cow beef herd was estimated to be £46 per cow per annum, while in one year the loss due to BVD in a dairy herd was estimated to be as high as £61 per cow. In 1998, around 95 per cent of UK dairy herds were antibody-positive to BVD in a bulk milk antibody survey.

Infectious bovine rhinotracheitis

IBR is caused by bovine herpesvirus-1 (BHV-1). In 1998, 67 per cent of 341 dairy herds sampled in England and Wales were positive for BHV-1. Bennett and others (1999) estimated the total loss due to IBR in the UK was in the range of £8 million per annum. Losses from contributions to the calf pneumonia complex or subclinical dairy cow losses have not been as well evaluated but a loss of 9.5 litres of milk per animal was estimated in the Netherlands at the time of seroconversion. This was without assessing fertility-related losses due to abortion or other reproductive problems.

Fig 1: Cost-benefit model for bovine viral diarrhoea

(University of Reading)

Leptospirosis

Leptospirosis due to *L. hardjo* can involve more subtle costs through infertility and reduced milk yield. Losses can be more challenging to demonstrate, but have been estimated to be about £70 per cow per year or 0.6 pence per litre (ppl) in chronically infected herds. The seroprevalence in UK herds was estimated to be around 50 per cent in 1998, although the pathogenicity of different serovars complicates interpretation. In addition to cattle costs, this disease is a zoonosis and represents a risk to human health.

Johne’s disease

Johne’s disease caused by *Mycobacterium avium paratuberculosis* (MAP) has been estimated to cause losses of around £17 per cow per annum in the beef sector and relatively greater losses of £26 per cow per annum in the dairy industry. The herd prevalence of MAP was estimated to be about 20 per cent in the dairy herd, but may be much higher. Anecdotal evidence indicates that there is a significant problem in beef herds in the UK, particularly pedigree herds, and this is reflected in problems created by stock bulls developing disease after purchase.

Neosporosis

Neosporosis is caused by the protozoan parasite *N. caninum* and has been estimated to cause 6000 abortions a year in the UK, which represents 12.5 per cent of the total and 35 per cent of all abortions submitted to the Veterinary Laboratories Agency (VLA). Estimates of national dairy herd seroprevalence vary from around 6 to 10 per cent.

Tuberculosis

Tuberculosis caused by *Mycobacterium bovis* remains hugely challenging to manage. In 2008, 4986 new TB herd incidents (breakdowns) were recorded in Great Britain compared with 4193 in 2007, and 37,012 total test reactors were identified in 2008 compared with 26,057 in 2007. The total number of cattle herds registered to the year ending 2008 was 85,585 compared with 86,658 in 2007 (Gibbens 2009).
Reducing disease losses

Health planning is designed to reduce losses from disease by:

- Preventing the entry of major single-agent infection into a herd and by controlling and eradicating infectious disease agents when present;
- Implementing changes to management practices and the environment, and using vaccines where appropriate to reduce multifactorial disease costs.

A wide range of cattle health schemes exist to facilitate these two processes:

- Accredited laboratory-based schemes, aimed principally at controlling infectious disease;
- Schemes based on milk recording data, aimed mainly at controlling management disease;
- Regional and practice-based health schemes driven by regional/local objectives.

As well as mainly beef initiatives led by pedigree breed societies (eg, Welsh Black or Limousin breeds), regional initiatives include:

- The Highlands and Islands Hi-Health scheme in Orkney and Shetland;
- BVD control scheme in Norfolk, Suffolk and the South West of England;
- Healthy Livestock South East.

The Rural Development Programme for England (RDPE) is currently facilitating some of these schemes, including the South West Regional Health Initiative (SWRHI) and the Nidderdale BVD Control Scheme in Yorkshire and Humber.

Cattle Health Certification Standards

Cattle Health Certification Standards (UK) (CHeCS) (www.checs.co.uk) is a self-regulatory body for cattle health schemes in the UK. It is a non-trading organisation established by the British cattle industry for the control and eradication of non-statutory diseases using a set of standards to which all licensed cattle health schemes must adhere (Duncan 2000). These standards ensure that herd health status in one scheme is equivalent to that in all other schemes in the UK. Close collaboration by CHeCS with other countries ensures that licensed schemes in the UK are compatible with those in most other countries.

CHeCS is owned by the BCVA, the National Beef Association, Holstein UK and the National Cattle Association (Dairy). It received start-up funding from the Milk Development Council (now DairyCo), and the Royal Association of British Dairy Farmers provides administrative back-up. In its establishment and ongoing activities, CHeCS has had much support from Defra, particularly its chief veterinary officer, the VLA and various livestock auctioneer and valuer associations in the UK.

The main objectives of CHeCS are to:

- Promote improvements in cattle health and welfare;
- Provide standards and certification for cattle health schemes;
- Develop and maintain links with cattle farmers, breed societies, veterinary practitioners, laboratories, government agencies and animal welfare organisations to promote the above objectives.

A technical document sets out the rules to which cattle health schemes licensed under CHeCS and their member herds must adhere to retain CHeCS approval and to demonstrate compliance with the standards that have been agreed and found to be acceptable to the cattle industry. This document was originally drawn up by the technical group of CHeCS under the chairmanship of Andrew Taylor representing the BCVA, with Keith Culter now representing BCVA. The information, rules and disease control programmes contained in the technical document are reviewed based on the best currently available information and are intended to represent best available practice.

CHeCS cattle health schemes provide programmes for the monitoring, control and ultimate eradication of disease. The schemes also provide certification when a herd meets the agreed national CHeCS cattle health standards. A CHeCS cattle health scheme is a set of management rules and a disease testing programme.

Table 1 summarises the typical process for achieving accreditation under CHeCS. There are currently 10 health schemes licensed by CHeCS (see Table 2).

UK laboratory-based health schemes

A number of features are commonly offered through the currently available UK laboratory-based health schemes:

- Protocols for each disease giving details of options according to disease levels;
- Testing of samples taken by the herd veterinary surgeon according to the relevant testing protocol;
- Separate written guidance for subscribing farmers clients;
- Prompts for testing and, where appropriate, the identification of animals to be tested;
- Submission forms with prefilled ear tag numbers where appropriate;
- Provision of sampling materials for farmers to collect relevant milk and faecal samples;
- Health statements of herds issued, as appropriate.

Each scheme is characterised by different services within the CHeCS framework. Different levels of test accreditation are offered by laboratories.
Table 2: Cattle Health Schemes licensed by CHeCS

<table>
<thead>
<tr>
<th>Scheme Name</th>
<th>Address</th>
<th>Phone Numbers</th>
<th>Email Address</th>
<th>Website Link</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advance Cattle Health Scheme</td>
<td>Nationwide Laboratories Leeds, Gateway Drive, Yeaford, Leeds LS19 7XY</td>
<td>Tel: +44 113 250 7556, Fax: +44 113 250 0198</td>
<td>Email: <a href="mailto:nwl.leeds@vhlabs.co.uk">nwl.leeds@vhlabs.co.uk</a></td>
<td><a href="http://www.vhlabs.co.uk">www.vhlabs.co.uk</a></td>
</tr>
<tr>
<td>AFBI Cattle Health Scheme</td>
<td>Agri-Food Biosciences Division</td>
<td>Tel: +33 2690 525749, Fax: +33 2690 525767</td>
<td>Email: <a href="mailto:info@afbini.gov.uk">info@afbini.gov.uk</a></td>
<td><a href="http://www.afbini.gov.uk">www.afbini.gov.uk</a></td>
</tr>
<tr>
<td>BioBest Herdcare</td>
<td>BioBest Laboratories, 6 Charles Darwin House, The Edinburgh Technopolis, Milton Bridge, N14 6QY</td>
<td>Tel: +44 131 440 2628, Fax: +44 131 440 9587</td>
<td>Email: <a href="mailto:herdcare@biobest.co.uk">herdcare@biobest.co.uk</a></td>
<td><a href="http://www.biobest.co.uk">www.biobest.co.uk</a></td>
</tr>
<tr>
<td>Hi Health</td>
<td>Unit 5, Orkney Auction Mart, Kirkwall, Orkney KW15 1PL</td>
<td>Tel: +44 1856 878299</td>
<td>Email: <a href="mailto:hihealth.admin@bctconnect.com">hihealth.admin@bctconnect.com</a></td>
<td><a href="http://www.hi-health.co.uk">www.hi-health.co.uk</a></td>
</tr>
<tr>
<td>Jersey Island Genetics</td>
<td>La Route de la Tintin, Jersey Showground, Trinity, Jersey JE3 5IP</td>
<td>Tel: +44 1534 856655</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Munster Herd Health</td>
<td>Munster AI Farm Services Group, Ballyvorsheen, Mallow, County Cork, Ireland</td>
<td>Tel: +353 22 45238, Fax: +353 22 1010</td>
<td>Email: <a href="mailto:herdhealth@munsterai.ie">herdhealth@munsterai.ie</a></td>
<td></td>
</tr>
<tr>
<td>NML Herdwise</td>
<td>National Milk Laboratories, Woodthorpe WEGS Road, Wetheral, Newburn, Tyne &amp; Wear NE51 6TB</td>
<td>Tel: +44 1902 749950, Fax: +44 1902 749938</td>
<td>Email: <a href="mailto:milk@nationalmilklabs.co.uk">milk@nationalmilklabs.co.uk</a></td>
<td><a href="http://www.nationalmilklabs.co.uk">www.nationalmilklabs.co.uk</a></td>
</tr>
<tr>
<td>Premium Cattle Health Scheme</td>
<td>SAC Veterinary Services, Greycrook, St Boswells, Roxburghshire TD6 7EU</td>
<td>Tel: +44 1835 822425, Fax: +44 1835 822364</td>
<td>Email: <a href="mailto:pchs@bctconnect.com">pchs@bctconnect.com</a></td>
<td><a href="http://www.cattlehealth.co.uk">www.cattlehealth.co.uk</a></td>
</tr>
<tr>
<td>Shetland Animal Health Scheme</td>
<td>Environmental Health, Grantfield, North Road, Lerwick, Shetland ZE1 0NT</td>
<td>Tel: +44 1595 744841</td>
<td>Email: <a href="mailto:Hilary.ives@shetland.gov.uk">Hilary.ives@shetland.gov.uk</a>, Email: <a href="mailto:Jamie.leslie@shetland.gov.uk">Jamie.leslie@shetland.gov.uk</a></td>
<td></td>
</tr>
<tr>
<td>VLA Herdscare Cattle Health Service</td>
<td>VLA Luddington, Ludington, Stratford-upon-Avon, Warwickshire CV37 9SJ</td>
<td>Tel: +44 1789 750972</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Hi Health and BioBest Herdcare have recently announced a merger.
**Premium Cattle Health Scheme**

The Premium Cattle Health Scheme (PCHS) is one of the original three health schemes licensed by CHeCS in the UK and is administered by the Scottish Agriculture College (SAC) Veterinary Services. It represents a plan for improvement. The major single-agent infectious diseases are largely spread by purchased animals in the absence of adequate biosecurity. A pool of herds that are free from one or more of these diseases is necessary to improve the overall health status of cattle in the UK. The PCHS represents a partnership between farmers, their veterinary surgeons and laboratory testing services to provide accreditation programmes for herds free of disease and to provide control programmes so that infected herds can eradicate infections.

The PCHS focuses on four diseases:
- BVD;
- Johne's disease;
- IBR;
- Leptospirosis.

This reflects the importance of these diseases, not only within this country but also worldwide. Scandinavian countries have already successfully taken steps to eradicate BVD from their national herd. Australia, Canada and the USA have well established herd programmes to manage Johne's disease and Switzerland, Denmark, Finland and Sweden have eradicated IBR, while other countries such as Germany have started to do so. Inferior health status represents a barrier to trade.

SAC Veterinary Services has operated a network of veterinary diagnostic laboratories throughout Scotland for many years. The PCHS reports and invoices scheme members directly, with copies sent to veterinarians.

**Herdcare Cattle Health Scheme**

Established in 1995, Biobest, a privately-owned business providing infectious disease testing for animals, carries out a range of tests for cattle as part of its Herdcare Cattle Health Scheme for dairy and beef herds, with a particular emphasis on virology, DNA testing and serology. It provides:
- Individual animal testing and sales certificates for private and auction sales;
- Johne's risk assessment for dairy and beef herds;
- A diagnostic test range for pharmaceutical companies, vets and their customers.

The scheme provides a means to improve the disease status of a herd to reduce animal loss, increase productivity and increase the sale value of breeding animals because herds can be accredited as 'disease free'.

Herdcare is a partnership with the farmer, the practice vet and Biobest's veterinary and scientific team, working within CHeCS to:
- Improve biosecurity on farm;
- Eliminate BVD, Johne's disease, IBR and leptospirosis from a herd and obtain accreditation for disease-free status;
- Prevent any reintroduction of the four diseases into a herd.

Samples for testing must be collected by the herd veterinary surgeon.

**Advance Cattle Health Scheme**

The Advance Cattle Health Scheme is offered by Nationwide Laboratories. Members can go down the formal testing route to achieve accreditation or they may use the testing facilities and control regimes to devise a tailor-made plan to suit their own circumstances. The scheme also offers more tests over and above those for the four CHeCS target diseases.

Membership of the Advance scheme gives farmers a toolbox of tests. The test panels include anthelmintic resistance testing and Nationwide Laboratories is collaborating with Evidence Based Veterinary Consultancy (EBVC), an independent veterinary consultancy, to provide metabolic profiling and nutritional interpretation in addition to the services listed above.

**HerdWise Cattle Health Scheme**

HerdWise Cattle Health Scheme, a Johne's disease screening programme, is run by National Milk Laboratories (NML) and administered by the NMR Group. This scheme requires the herd veterinary surgeon to produce a flexible testing and consultancy package for a specific farm, after which the programme analyses the same milk samples taken by NMR at the monthly recording. Charges are based on the number of cows in the herd.

Some introductory understanding of the level of prevalence of Johne's disease in a herd can be obtained by using a 30-cow targeted screen (ie, selecting 30 high-risk cows that are old, sick or experiencing reduced production).

A testing schedule (eg, quarterly) has to be agreed, after which all samples submitted for milk recording in the specified month will be tested for antibody against MAP. Care should be taken to avoid Johne's disease testing in the four to six weeks after a TB test as the Johne's disease results may appear higher than normal following TB testing. After laboratory analysis, all data is transferred to the NMR database and results are available for vets to review via Herd CompanionPRO, a web-based system. No results are sent through the post but all reports can be downloaded in PDF format.

The following reports are available:
- High-risk cow management report;
- Low-risk cow management report;
- Summary report of the last six test results for all cows in the herd.

Cows are categorised into different risk categories after each test based on their antibody profile (Table 3). The risk levels can either be simplified into high- or low-risk cows, or divided into three cow types:
- Green cows, which are non-infectious and potentially non-infected;
- Yellow cows, which are equivocal and may or may not be infected;
- Red cows, which are positive for Johne's disease.

### Table 3: Risk levels and categories for cows in the HerdWise screening programme

<table>
<thead>
<tr>
<th>Risk level</th>
<th>Classification</th>
<th>Johne's disease infection group</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>Green</td>
<td>JD</td>
<td>Repeat ELISA negative (minimum two tests)</td>
</tr>
<tr>
<td></td>
<td>Green</td>
<td>J1</td>
<td>ELISA negative but only one test</td>
</tr>
<tr>
<td></td>
<td>Green</td>
<td>J2</td>
<td>ELISA negative but positive &gt;three tests previously</td>
</tr>
<tr>
<td>High</td>
<td>Yellow</td>
<td>J3</td>
<td>ELISA negative/positive interchangeable</td>
</tr>
<tr>
<td></td>
<td>Yellow</td>
<td>J4</td>
<td>Last test ELISA positive, all previous tests negative</td>
</tr>
<tr>
<td></td>
<td>Red</td>
<td>J5</td>
<td>Repeat ELISA positive (minimum two tests)</td>
</tr>
</tbody>
</table>
Yellow cows, which are infected but could be controlling the infection and may become 'Red' or be in the initial phase of no control of infection;

Red cows, which no longer control the infection and are considered to be highly infectious.

The ELISA cut-off is set at 30 per cent seropositivity (ie, seropositivity >30 per cent is classed as positive).

In addition to the cow types, there are a number of 'infection groups' into which cows are placed. This covers aspects of transmission as well as predictions related to milk production loss. Cows with one positive test result in the last four tests (infection groups 3, 4 and 5 – see Table 3) are considered infectious to some extent.

The control of MAP in a herd can be a long process and farmers should be fully aware of this and the challenges of interpreting data before entering into a screening programme (Caldow and others 2003). Repeat sampling is vital to overcome low test sensitivity. Risk-based management is possible with appropriate vet–farmer discussion.

Herdsure Cattle Health Scheme

Launched by the VLA in autumn 2009, Herdsure is a new health scheme. Previously only accredited for BVD under CHeCS, Herdsure has recently also received CHeCS accreditation for IBR, leptospirosis and Johne's disease. The scheme aims to offer additional disease testing and control services. BVD, Johne's disease and fasciolosis testing has been available since November 2009, and IBR, leptospirosis and neosporosis since mid-2010. A working group is being set up to liaise with CHeCS' technical committee to set standards for Neospora accreditation under Herdsure this year.

While CHeCS is largely aimed at providing a means of assuring disease-free herds, Herdsure aims to provide a structure for improving/maintaining health status irrespective of the infection status.

The VLA use the Herdsure Management System (HMS) to provide prompts and identify animals to be sampled, thus reducing the management role for veterinary practice.

The protocol for each disease is divided into three levels for all diseases:

- **Level 1**, which establishes the health status of a herd with regard to the diseases included under Herdsure;
- **Level 2**, which aims to improve the health status of a herd with regard to the diseases included under Herdsure;
- **Level 3**, which monitors and aims to maintain the improved health status of a herd with regard to the diseases included under Herdsure.

The role of the practicing veterinary surgeon is to:

- Identify clients who wish to enrol in Herdsure and complete a registration form for each;
- Assess the structure of the herd in relation to the Herdsure disease control protocol;
- Collect samples according to the relevant testing protocol and following reminders by the HMS;
- Advise clients on how to implement necessary management actions, in accordance with guidance in the Herdsure protocols, after test results have been issued by the VLA;
- Help clients to identify and implement changes in biosecurity procedures, in accordance with guidance in the Herdsure protocols;
- Issue health statements to farm clients when received from the VLA.

Biosecurity risk-assessments and MyHealthyHerd

Before embarking on a CHeCS programme it is best to carry out a biosecurity risk assessment for the premises to facilitate a better understanding of the aims of the scheme. This can be done independently or using the biosecurity module on the MyHealthyHerd.com website. General biosecurity should include an assessment of the cattle, people and other animals associated with a particular farm. In addition to this, a disease-specific risk assessment should be performed to check the status of disease risk, vaccine, surveillance and control.

Summary

A wide range of cattle health schemes are currently available in the UK, encouraged by the AHWS and the pump-priming delivered by the CHI. They represent an opportunity for health, welfare and economic improvement in the industry by facilitating the process of farm health planning. The vet–farmer partnership is key to delivering these schemes through focused veterinary risk assessment and risk management.

The British Limousin Cattle Society (BLCS) announced that, from May 1, 2011, herds selling at nominated Premier collective society sales will have to be members of, and adhering to the terms of a CHeCS licensed herd health scheme. Between 6500 to 7000 UK herds are currently engaged with some form of BVD monitoring, control and eradication. The Great Britain Cattle Health And Welfare Group (GHAWG) is engaged with coordinating a variety of BVD control projects across England. Progress is being made with UK cattle health through health schemes, but significant challenges remain.

References

Bennett, R.M., Christiansen, K. & Clifton-Hadley, R. S. (1999) Direct costs of endemic diseases of farm animals in Great Britain. *Veterinary Record* 145, 76-77


