Emerging Threats Quarterly Report

CATTLE

Animal & Plant Health Agency

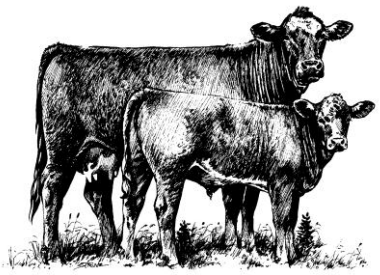
Safeguarding public and animal health

Scanning Surveillance Programme – Detecting Emerging Threats – UK Veterinary Surveillance Strategy

SRUC

Annual and Fourth Quarter Report

Date: October-December 2014



Contents

Highlights

- **Falling milk price likely to impact on surveillance**
- **Third party postmortem providers come onstream**
- **Husk: significant increase**
- ***Mycoplasma bovis* pneumonia: significant increase**

VIDA diagnoses are recorded on the APHA FarmFile database and SAC Consultancy: Veterinary Services LIMS database and comply with agreed diagnostic criteria against which regular validations and audits are undertaken.

The investigational expertise and comprehensive diagnostic laboratory facilities of both APHA and SAC C VS are widely acknowledged, and unusual disease problems tend to be referred to either. However recognised conditions where there is either no diagnostic test, or for which a clinical diagnosis offers sufficient specificity to negate the need for laboratory investigation, are unlikely to be represented. The report may therefore be biased in favour of unusual incidents or those diseases that require laboratory investigation for confirmation.

APHA VICs have UKAS Accreditation and comply with ISO 17025 standard. SAC C VS have UKAS accreditation at their central diagnostic laboratory and at the Aberdeen, Edinburgh, Perth, Ayr, Dumfries, Inverness, St Boswells and Thurso Disease Surveillance Centres which comply with ISO 17025 standard.

From September 2014 APHA contracted the services of third party Post Mortem providers. During October to December 2014, these services were provided by the Royal Veterinary College, the University of Bristol and SACCVS. These providers contribute to the VIDA diagnoses recorded on the APHA FarmFile database and comply with agreed diagnostic criteria. To achieve a VIDA diagnosis, all testing must be carried out by a laboratory with ISO 17025 accreditation.

defra – Department for Environment Food and Rural Affairs

The Scottish Government

Llywodraeth Cymru Welsh Government

INTRODUCTION

This report contains analysis of disease data from APHA and SAC Consulting: Veterinary Services (SAC C VS) of the Scottish Rural College (SRUC) from samples submitted for diagnosis to regional laboratories in the fourth quarter of 2015 compared to the equivalent quarter of previous years. It aims to identify emerging cattle disease related threats. The production of the report is underpinned by a large quantity of surveillance data and information, compiled as part of the Defra Animal and Plant Health Directorate. Further information can be found on the APHA Vet Gateway:
http://ahvla.defra.gov.uk/vet-gateway/surveillance/index.htm

OVERVIEW

Weather

On an annual basis, 2014 was the warmest year on record with many areas having wetter conditions, especially towards the east and south. Localised flash flooding occurred in July across a wide area of England.

For Q4, the GB mean temperature was 1.4^{0}C above the long term average. Rainfall for the period was below average in September for GB as a whole, and above average in October/November in Scotland and the NW and Eastern England.

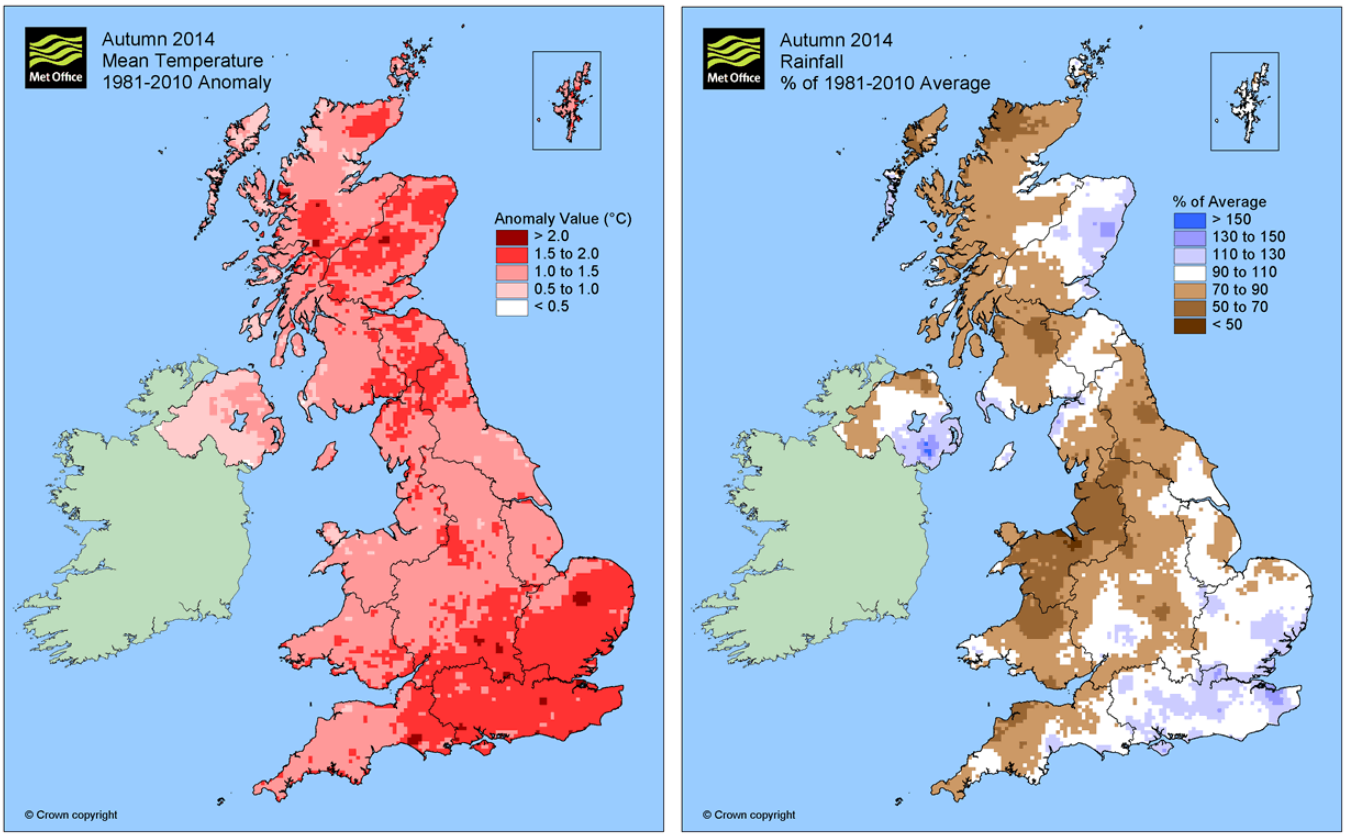


Figure 1: Mean temperature and rainfall, autumn 2014

Economics of the cattle industries

Dairy cattle

There has been significant pressure on milk prices during the quarter, with reductions seen from the majority of milk processors. This has attracted significant press coverage and comment. Firstly this is as a result of over production in the UK. Cumulative UK milk production to the end of December 2014 was 721.8 million litres higher than the same period in 2013. In addition, the reduction in world commodity prices for milk products such as skimmed milk powder, butter and cheese and the Russian ban on milk imports and reduced demand for skimmed milk powder from China are having a significant negative effect overall.
The end result is that for an increasing number of dairy farmers their cost of production exceeds the price now being paid. This is resulting in a detailed look at input costs to dairy businesses. On some farms this may have a negative effect on veterinary input and surveillance; however, for many farms the current pricing structure requires increased efficiency with technical veterinary input required to achieve this. There is therefore likely to be a correspondingly variable effect on surveillance, likely negative in the short term but more positive in the longer term.

Beef Cattle

It was widely reported that most beef farmers did not make a profit in 2014, with fixed costs being a major influence. One example is that of lowland beef suckler producers, who made a loss of £288 per cow for the year to March 2014 (EBLEX Stocktake report). This reduced profitability may have contributed to the decline in the United Kingdom beef herd reported in the Defra June census. The report stated that the number of female animals over two years old that had calved, had declined by 2.6% to 1.6 million in the 12 months since the previous June census.

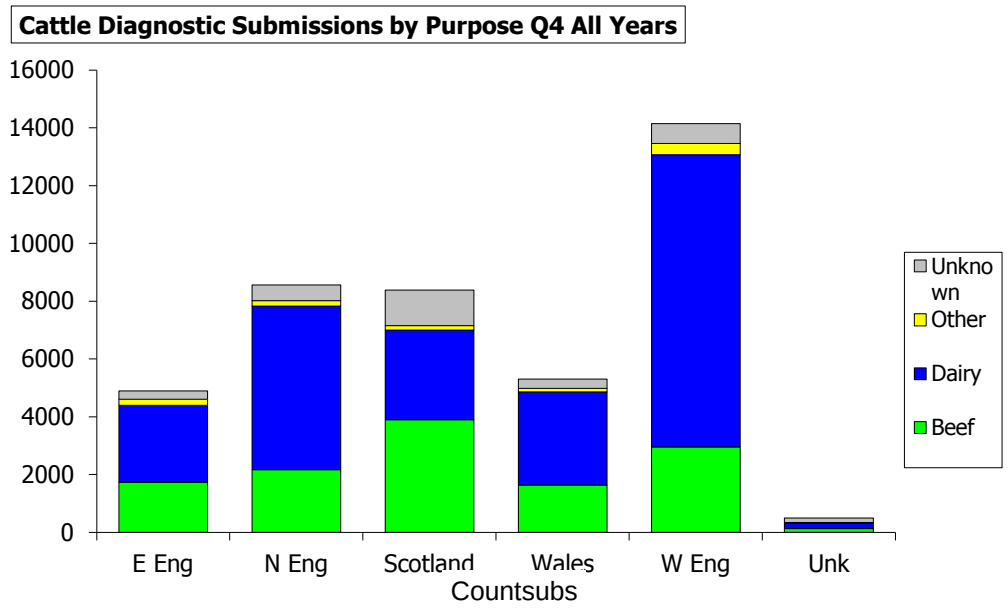
There was an improvement in price of beef from August to December; the steer deadweight price went from <332p/kg to 356p/kg in December. The number of calf registrations increased by 1.5% from January to October 2012, offering some encouragement that the long term supply may be more secure. The profitability of beef enterprises will have a direct effect on the affordability of veterinary services to this sector in 2015.

Issues and Trends:

From September 2014 AHVLA introduced additional providers of subsidised post-mortem examinations (PMEs), together with new carcase collection sites and subsidised carcase transport arrangements, to support veterinary businesses in their diagnostic work.
These include the Royal Veterinary College (RVC) serving an area of the East of England, University of Bristol serving an area of the South West England and SAC C VS St Boswells serving an area of the North East of England.
At the time of writing this report, submissions had been received at all centres, VIDA diagnostic criteria applied and incorporated into the database disease analysis review.

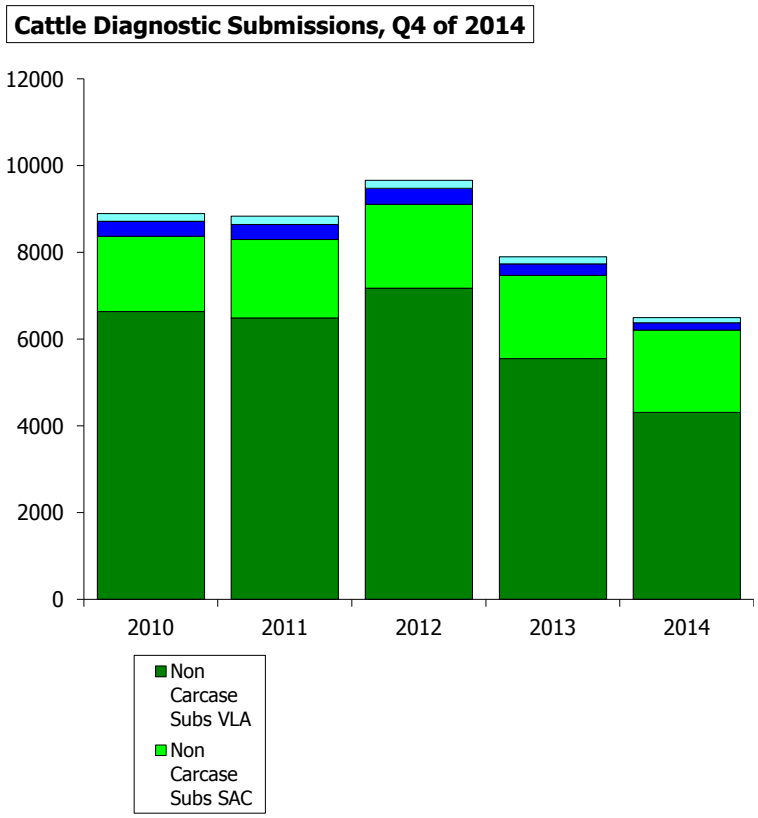
From February 2015 other providers of subsidised post-mortem examinations will commence and include the University of Surrey operating out of sites located in the North West, South West, South East, West Midlands and East of England; and with Iechyd Da providing services to practitioners in Wales and operating out of Aberystwyth.

Diagnostic submissions



All Years	Unknown	Other	Dairy	Beef	Sum:
Eastern England	288	212	2,654	1,740	**4,894**
Northern England	542	197	5,661	2,167	**8,567**
Scotland	1,222	158	3,110	3,893	**8,383**
Wales	318	125	3,228	1,635	**5,306**
Western England	687	390	10,109	2,961	**14,147**
Unknown	149	21	189	132	**491**
Sum:	**3,206**	**1,103**	**24,951**	**12,528**	**41,788**

Fig 2: Cattle diagnostic throughputs by region comparing Q4 in all years



	Non Carcase Submissions			Carcase Submissions			
Oct-Dec	VLA	SAC	Total	VLA	SAC	Total	GrTotal
2014	4,313	1,899	6,212	163	122	285	6,497
2013	5,549	1,920	7,469	264	164	428	7,897
2012	7,173	1,937	9,110	365	187	552	9,662
2011	6,489	1,810	8,299	344	193	537	8,836
2010	6,640	1,734	8,374	342	180	522	8,896

Fig 3: Cattle diagnostic submissions, Quarter 4, by year[1]

[1]Please note that 'VLA' or 'AHVLA' in this and other tables refers to submissions in England and Wales entered in the APHA FarmFile database from APHA Investigation Centres and 3rd party post-mortem providers. 'SAC' refers to submissions to SAC CVS in Scotland.

Submission numbers fell in Q4 of 2014 compared to previous years, for both carcase and non-carcase submissions. For example, non-carcase submissions to APHA in 2014 were 56% of those in 2012, and carcase submissions in 2014 were 45% of those in 2012. For the same criteria SAC non-carcase submissions were unaffected, and carcase submissions fell to 65% over the same period. A number of factors could have influenced the fall in submissions: generally good weather meant good growing conditions and grazing, leading to lower disease levels; the industry could be adapting to the Surveillance 2014 changes; a downward pressure on both milk and beef prices could further reduce submissions if sustained for a period. The expansion of surveillance options for farmers (introduction of additional post-mortem providers and expanded (and in some areas free) carcase collection may help to mitigate this threat.

SCANNING SURVEILLANCE FOR NEW AND EMERGING DISEASES IN CATTLE

Monitoring the trends in diagnoses of known diseases cannot, by definition, detect either new diseases or changes in endemic diseases that would prevent a diagnosis from being reached (for example a change in the pathogen that compromised the usual diagnostic test). Such new or emerging diseases would probably first be detected by observation of increased numbers of submissions for clinical and/or pathological syndromes for which a diagnosis could not be reached in the normal way. Submissions for which no diagnosis is reached (DNR) despite testing deemed to allow reasonable potential for a diagnosis to be reached are regularly analysed to look for increases in undiagnosed disease which could indicate the presence of a new or emerging disease. Undiagnosed disease submissions are summarised broadly by the clinical presentation of disease and, once this has been determined by further investigation, the body system affected. Both groups are investigated and trends in the levels are compared over time.

Data recording by APHA and SAC was harmonised from 2007. In this report GB data from the third quarter of 2014 are compared with the data from the equivalent quarter in 2013 and have also been compared with pooled data for the five previous years.

Supplementary analysis of APHA DNR data is also undertaken using an early detection system (EDS). This uses a statistical algorithm to estimate an expected number of DNR reports and a threshold value. If the current number of DNR reports exceeds the threshold (i.e. exceedance score>1), this indicates that the number of reports is statistically higher than expected.

Analysis of Diagnosis Not Reached (DNR)*

In Q4 of 2014 the EDS detected a significant **decrease** in reporting of submissions with the presenting sign 'respiratory' and 'systemic' in which no diagnosis was achieved.

No potential new and emerging diseases were detected by DNR analysis in the 4th quarter of 2014.

* When a VIDA diagnostic code is assigned to a specific submission, the decision has to be made if it meets the stated diagnostic criteria. If the criteria are not met, it is marked as "Diagnosis Not Reached" or DNR. If it is a DNR, the next step is then to decide if this was due to limited testing or if reasonable testing had been done. If it is deemed that reasonable testing had been done, there may be reasons why a diagnosis could not be reached and this should be recorded and can include inappropriate disease phase, treatment, inconclusive results, or other reasons. Typical examples of such submissions include pneumonia cases which were examined later in the course of disease or where antibiotic treatment occurred where the test results may be inconclusive. However, in some cases there is no apparent reason to explain why a diagnosis could not be reached and these are the submissions, if present in significant numbers, which may indicate new and emerging disease.

ON-GOING NEW AND EMERGING DISEASE INVESTIGATIONS

Jejunal Haemorrhage Syndrome

This condition, affecting cattle over two years of age, occurs sporadically and has been recognised worldwide and in GB since the late 1990s. Affected cattle, mainly dairy cows, show signs of acute abdominal pain with a rapid and profound drop in milk production, anorexia, recumbency and high mortality (over 80% in affected animals). Pathological findings are distinct, with a section of the jejunum of the small intestine being distended, purple-red with an often large blood clot in the lumen and within the wall of the affected gut sometimes with ulceration. The cause has yet to be determined, and SAC CVS has undertaken increased surveillance of this condition in order to try to determine this.

Targeted surveillance for this disease has been extended to include the whole of GB and is expected to run until at least spring of 2015.

CHANGES IN DISEASE PATTERNS AND RISK FACTORS

This section of the report gives information on occurrence of selected diseases. The data originate from submissions and are summarised and presented according to the diagnosis reached and assigned as a VIDA code. Our charts show the number of diagnoses (numerator) as a proportion of the number of submissions in which that diagnosis was possible (denominator), for all of GB, England & Wales and for Scotland. The bars indicate the 95% confidence limits. Note that the y-axis scale of the charts varies and therefore care must be taken when comparing individual charts.

Salmonellosis

There were 404 reports of *Salmonella* from cattle during 2014 which was a 21% decrease relative to 2013 (514 reports) and an 18% decrease relative to 2012 (491 reports). *S.* Dublin continued to be the most commonly isolated serovar, responsible for 68% of incidents compared to 73% in 2013. Despite the overall fall in bovine *Salmonella* reports, there was an increase in reports of *S*. Mbandaka (47 incidents; 12% of all reports vs. 40 incidents; 8% of all reports in 2013). However there was a decrease in reports of *S.* Typhimurium (19 vs. 25 incidents), *Salmonella* 4,5,12:i:- (7 vs. 13 incidents) and *S.* Enteritidis (1 vs. 3 incidents), although reports of *Salmonella* 4,12:i:- increased marginally (5 vs. 3 incidents); see Tables 3a-6 for phage types. There were also single reports of *S.* Infantis and *S.* Virchow, which were both from diagnostic submissions. In addition, there were six reports of *Salmonella* 61:k:1,5,(7), which is considered to be sheep-adapted, compared with only one report during 2013 and none in 2012. Five of the reports in 2014 were from diagnostic submissions in which diarrhoea was a presenting sign; the other submission had no presenting signs recorded. Several of the other less frequently reported serovars isolated in 2014, such as *S*. Agama, *S*. Kottbus and *S*. Newport, are associated with badgers.

Fasciolosis: Quarter 4

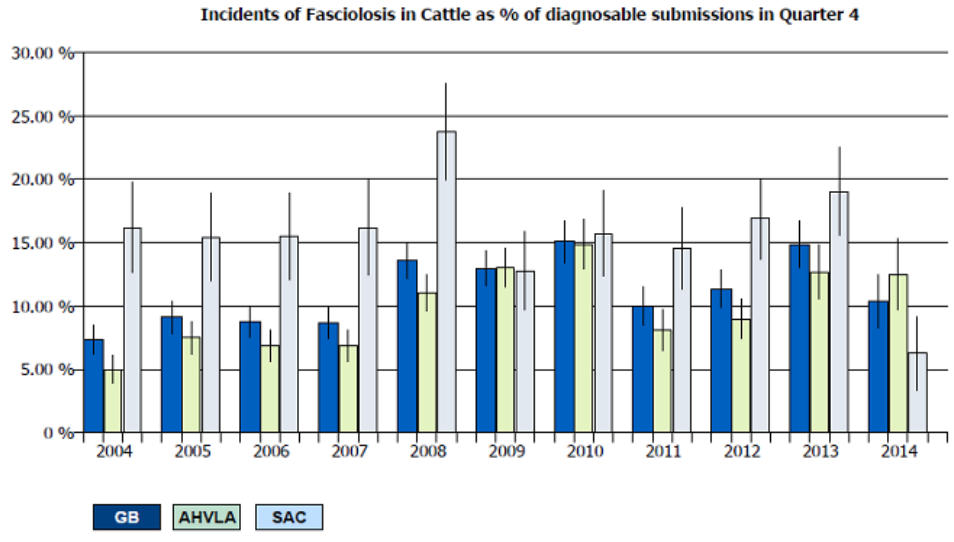


Fig 4: Incidents of fasciolosis as % of diagnosable submissions, Q4

There was a significant fall in percentage diagnosis of fasciolosis in Scotland. Likely reasons for this include better awareness of the disease through recent training events, more effective

treatment and a drier summer. In addition, improvements in the accuracy of recording the results of diagnostic samples and exclusion of monitoring samples may have contributed.
It was also a drier summer in Scotland, as in most parts of the United Kingdom. Rainfall has a direct effect on the life cycle, and dry summers mean that there are less infective metacercariae on the pasture by the autumn (Taylor 2012).

Annual incidence

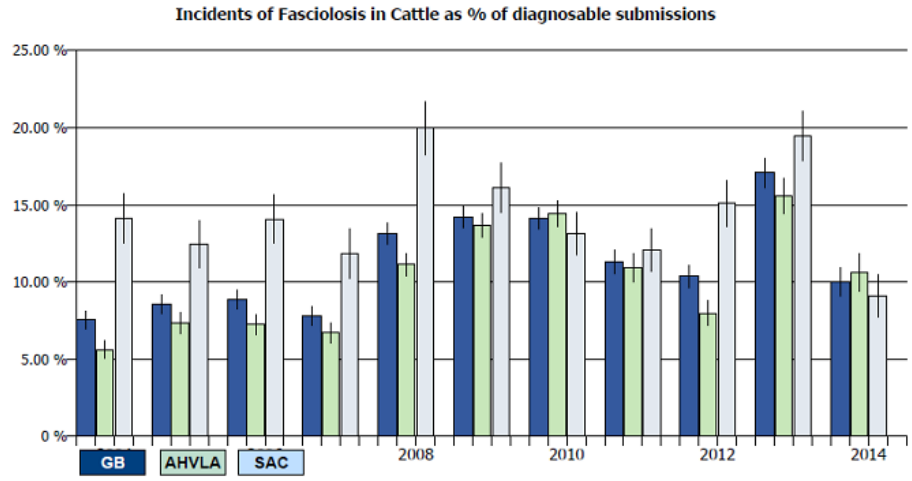


Fig 5: Annual incidents of fasciolosis as % of diagnosable submissions, 2014

There was a significant fall in the annual incidence of fasciolosis; the reasons for this trend are similar to those given above for Scotland, and in the reports for the second and third quarter.

Husk

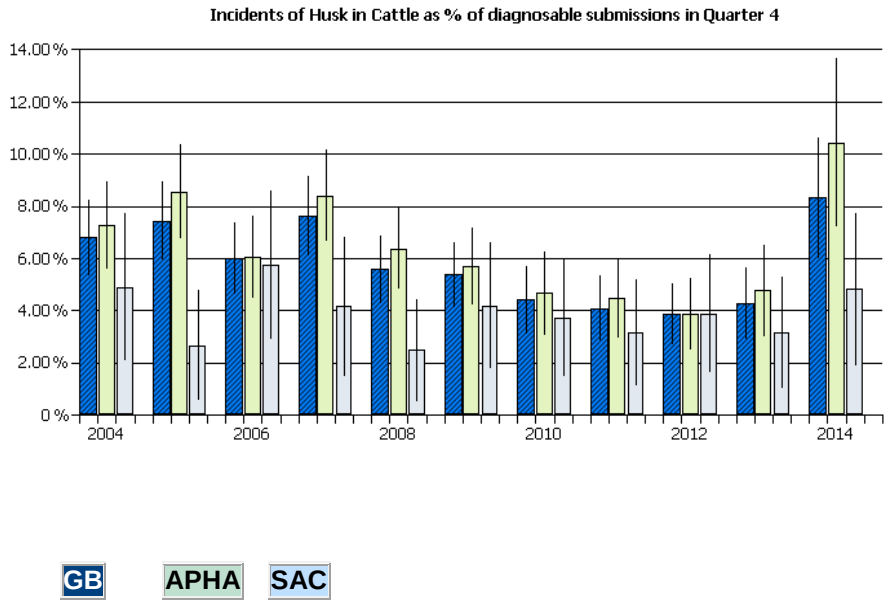


Fig 6: Incidents of parasitic bronchitis as % of diagnosable submissions, Q 4

There was a significant increase in the % diagnosis of bovine lungworm infection (Husk) in the fourth quarter of 2014 compared to the same quarter of the previous year in GB and England and Wales but not in Scotland. This is likely to be due to a combination of the relatively warm autumn together with rain after a dry period allowing a good hatch and prolonged survival of worms further into the fourth quarter. There were several cases of respiratory disease in adult cattle at grass in which the primary concern of the PVSs was IBR with lungworm not always considered as a differential diagnosis, which led to significant morbidity and in some cases mortality. This suggests that awareness of lungworm as a major cause of respiratory disease in grazing cattle may not be as high as perhaps it should be.

Mycoplasma bovis

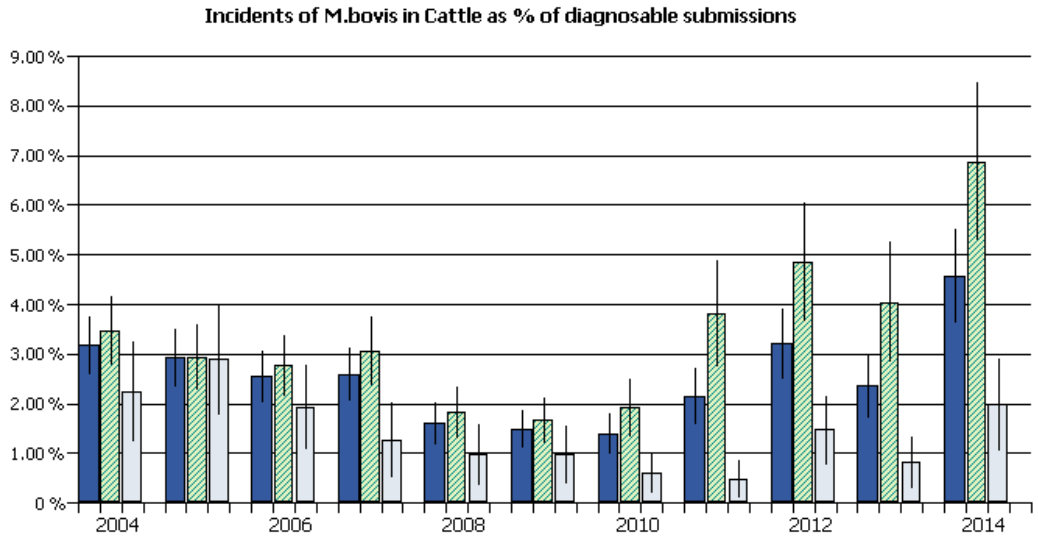


Fig 7: Incidents of *Mycoplasma bovis* pneumonia as % of diagnosable submissions, 2014

A significant increase in % diagnosis of *Mycoplasma bovis* pneumonia was seen in GB (dark blue) and England and Wales (green) but not Scotland (light blue) in 2014 compared to 2013. The increase may at least partly be due to increased awareness (likely due to recent training events) of this organism as part of the calf pneumonia complex resulting in increased testing.

This increase is of concern due to the potential for significant clinical disease, associated welfare effects, loss of productivity and financial implications. *Mycoplasma bovis* is frequently difficult to treat with antibiotics due to its lack of a cell wall and ability to form biofilms; there are no commercially available vaccines in the UK. The organism is most likely to be introduced to a herd by the purchase of an infected animal (which may be asymptomatic). Within herd spread then occurs via shedding from external mucous membranes including nose, eyes, vagina and rectum and in milk. Once *Mycoplasma bovis* has entered a herd it is very difficult to eradicate and thus efforts should be made to avoid its introduction.

The Cattle Expert Group has contributed to the production of information notes on this topic by the Cattle Health and Welfare Group (CHAWG). These have been distributed widely within industry to enable potential cattle purchasers to make informed decisions on health status. Work is also underway to identify current knowledge gaps regarding *Mycoplasma bovis* and its wider effects particularly in adult cattle.

UNUSUAL DIAGNOSES

A three month old suckler calf was presented for postmortem examination. In the week prior to the submission the calf had exhibited lacrimation and difficulty breathing, with protrusion of the

tongue. The calf was from a group of 28 cows with calves at foot which had been housed three weeks earlier. Thoracic auscultation was unremarkable and the animal was not pyrexic but there was corneal opacity. The calf was euthanased as it deteriorated over a few days and failed to respond to supportive treatment.

No gross pathology of significance was identified postmortem. Histopathological examination of the brain revealed bilaterally symmetrical gliosis and Wallerian degeneration oriented on the spinal tract of trigeminal nerve at the obex and rostral medulla, together with gliosis in the nucleus of the spinal tract of the trigeminal nerve.

The anatomical distribution of the neurodegeneration, targeting the spinal tract of the trigeminal nerve, is very unusual. The lesions of the trigeminal innervation explain the tongue protrusion. The absence of angiocentric encephalitis ruled out malignant catarrh (caused by ovine herpesvirus-2) and the lesions did not indicate bacteraemic localisation. Centripetal migration by bovine herpesvirus-1 (BoHV-1, the cause of IBR) from the upper respiratory/pharyngeal region was considered, since infection targets the spinal tract of trigeminal nerve; however, the neuropathology in this case was different, in particular the absence of an inflammatory reaction, the lack of involvement of the solitary tract, and the symmetry of the lesions.

Immunohistochemistry for BoHV-1 revealed no labelling. Absence of BoHV-1 in the CNS does not rule out the possibility of herpesviral ganglionitis as it is possible that the lesions are secondary to trigeminal ganglionitis rather than centripetal spread of BoHV-1. Injury to corneal innervation in humans results in 'neurotrophic keratopathy', and it is possible that the trigeminal injury observed is predisposing to corneal lesions in this case.

Targeted screening of animals in the herd was recommended to further investigate for BoHV-1 infection.

HORIZON-SCANNING – OTHER RISKS IDENTIFIED

3D Disease

A syndrome with the key signs of drooling and diarrhoea leading to death has been reported by graziers in the Mossgiel/Hay/Ivanhoe area of New South Wales, Australia. Cases were first reported in 2006 and again in 2009 and 2013. The following is reported by the NSW Government:

"Combined losses across all properties where 3D syndrome has been investigated is in the hundreds though not all deaths were due to 3D syndrome. Samples have been tested for exotic viruses and all tests have been negative. The pattern of disease seen on affected properties and the extensive range of testing for infectious agents indicates that it is not caused simply by the presence of a transmissible/infectious agent. At this stage the cause of disease has not been identified. It is most likely that there are multiple causal factors. These factors are most likely to include plants within the paddock (but not a straightforward toxicity). As there is no evidence that the disease is being spread from property to property, there is no reason to place restrictions on the movement of cattle on account of 3D syndrome.

On affected properties, owners have reported:

- Mild illness initially- "off colour"
- Off feed
- Prefer to lie down
- Drooling
- Diarrhoea

- Deaths- generally 1-5 days after first noting sick; some longer
- Nearly all affected died
- Generally little struggling prior to death
- Stock in good condition
- Cattle feel hot and if temperature measured, increased (41-42°C)
- Cattle affected- 3D syndrome typically occurs in cattle 5 months or older"

Schmallenberg Virus

Reports were received from surveillance colleagues in continental Europe of viraemia and seroconversion to Schmallenberg virus particularly in young dairy cattle being screened before export. This could present a very low risk of importation of viraemic animals into GB, and a higher risk of importation of animals carrying deformed foetuses. The Cattle Expert Group reported this risk to the industry sector body, and is producing an advisory note for industry bodies to disseminate.

Bluetongue 4

BTV4 has spread through wide areas of eastern continental Europe through the autumn, as far west as Hungary, in areas where northern Palaearctic midge species predominate. A mild winter could lead to overwintering, with the potential for further western spread via vectors and animal movements.

Reference

Taylor MA (2012) Emerging parasitic diseases of sheep.
Veterinary Parasitology **189**(1) 2-7.