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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 partner Post Mortem providers. From April 2015, these services were provided by the Royal Veterinary College, the University of Bristol, University of Surrey, Wales Veterinary Science Centre 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.

INTRODUCTION
This report contains analysis of disease data from APHA, SAC Consulting: Veterinary Services (SAC CVS) division of Scotland’s Rural College (SRUC) and partner post mortem providers (SAC CVS, University of Bristol Veterinary School, Royal Veterinary College, University of Surrey, Wales Veterinary Science Centre) from samples submitted in the second quarter of 2017 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 Plant and Animal Health and Animal Health and Policy Implementation Directorates. Further information can be found at http://ahvla.defra.gov.uk/vet-gateway/surveillance/index.htm.

OVERVIEW

Issues and Trends

Weather

Fig1: Spring mean temperature and rainfall amount shown as anomalies (degree differences and %) to 1961-1990

The second quarter of 2017 was significantly warmer than recent years, which seems to be an ongoing trend. Rainfall was generally lower too, except for June in Scotland in particular. This trend towards warmer but dryer springs could impact on silage production leading to high quality but lower yields of first cut silage and possibly poorer germination of spring planted forage crops such as maize. This potential impact on crop yields and quality could have longer term influence on farm forage management but the effects on animal health are not clear.

Beef

Total UK non-dairy cattle numbers were generally slightly ahead of the same period in 2016, with the exception of slaughter-age cattle (18-24 months). Non-dairy cattle less than 12 months
of age were about 50,000 head higher than the equivalent quarter in 2016, and calf registrations of non-dairy breeds were also up (by around 3%).

AHDB reported the first price rises on 1st April, well ahead of the 'market turn' in 2016 (which was not until mid-May). Against a background of reduced supply (fewer slaughtered and lighter carcases) the trade continued to rise through the entire quarter, well ahead of the 5-year average and almost 20% higher than the same period in 2016. Cow prices have also been very good, with rising prices across the whole EU, and an ongoing weak pound.

Dairy

The milk price for April – May 2017 dipped slightly by 0.15ppl to a UK average of 26.78ppl. This may have reflected a slightly increased spring milk output; however, milk prices are rising again from August onwards and expected to rise further throughout the autumn leading to renewed confidence within the industry. Early summer grazing and silage making took place in excellent conditions with good quality grass available and silage made. Weather conditions throughout the second half of the summer have been more challenging however with wetter weather affecting the harvest and many grazing cows being housed early. This has the potential to affect animal health and welfare and also feed supplies for the coming winter.

Diagnostic submission trends

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<th>%</th>
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<th>2016</th>
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Fig 2: Carcase throughputs and diagnostic analysis, Q2 2017

Fig 2 illustrates continuing albeit slower decline in carcase submissions, and an encouraging increase in the proportion of submissions in which a diagnosis was achieved.
Fig 3: Fetus throughputs and diagnostic analysis, Q2 2017

Likewise, there is an increase in the proportion of diagnoses reached from submissions of foetuses, although numbers continue to decline.

Fig 4: Submissions from cattle holdings expressed as % in England and Wales
Fig 4 shows the ‘surveillance rate’, ie the % of holdings submitting material to the surveillance system in England and Wales. Data for Scotland are not currently available. There is ongoing concern about the low rates of submission from the north, east and southeast of England.

NEW AND RE-EMERGING DISEASES AND THREATS

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 SACCVS was harmonised from 2007. The Species Expert Group reviews trends in VIDA DNR data each quarter with the aim of providing information on potential new or emerging diseases or syndromes. ‘Prior years’ refers to pooled data for 2011-2016 for GB VIDA data.

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. When this EDS infection identifies categories of submissions where the threshold DNR has been exceeded, the Species Expert Group reviews the data to investigate further. This review may involve assessment of individual DNR submissions. Where this DNR analysis finds no evidence of a new and emerging threat or other issue, the detail of these reviews in response to thresholds being exceeded may not be reported here.

Analysis of Diagnosis Not Reached (DNR)*

There was no evidence from DNR analysis in Q2 2017 of new and emerging disease in cattle, including analysis by syndrome and presenting sign.

Analysis of DNR by syndrome and presenting sign

* 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; coccidiosis cases where speciation was not done and Johne's cases in live sheep 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.
ONGOING NEW AND RE-EMERGING DISEASE INVESTIGATIONS

Schmallenberg virus

The recrudescence of Schmallenberg virus (SBV) in autumn 2016 continued, as the Cattle Expert Group considered was likely following late summer/autumn infection, into the spring 2017 calving period.

Fig 5: Farrington analysis of monthly cattle abortion notifications, 2016-2017

Fig 5 illustrates monthly abortion notifications to APHA from January 2016-March 2017, and includes Farrington analyses of the significance. A predicted threshold (the dotted blue line) was exceeded- ie there were more notifications than predicted- in February 2017, highlighted by the red circle. Although the analysis is principally part of brucellosis surveillance, this illustrates its value as an early warning of other potential new and emerging events. On this occasion, there were concurrent reports of congenital defects from the surveillance network (fig 6), and subsequent investigation detected SBV by PCR or serological evidence suggested its involvement.
Fig 6: Incidents of congenital abnormalities in cattle as % of diagnosable submissions SAC and APHA

There was a peak of congenital abnormalities that mirrored a similar peak when SBV was first seen in 2012 (fig 7):

Fig 7: GB incidents of congenital abnormalities as a % of diagnosable submissions in Q2

Fig 8: Distribution of SBV diagnoses, Q2 2017 (snapshot of APHA Cattle Disease Surveillance dashboard)
Fig 8 illustrates VIDA diagnoses of SBV abortion in Q2 using the new Cattle Dashboard (see https://public.tableau.com/profile/siu.apha#!/vizhome/CattleDashboard/CattleDashboard) to show the distribution of cattle cases submitted where a diagnosis had been made. These are distributed mainly in the north of England, Scottish borders, northwest Wales and eastern England, areas that were generally not involved in the previous outbreak in 2012-13. Although there is likely to be selection bias away from previously endemic areas, this suggests that cases have been seen in a wider area than previously, which could have been modulated by lack of herd immunity in those areas, wider or more intense midge activity, or a combination.

The spring calving period is now over, and the CEG is encouraging submission of samples to investigate cases of acute disease that may occur in the 2017 midge season by offering free SBV PCR testing and serology, in animals showing clinical signs of fever, milk drop +/- diarrhoea provided reasonable steps have been taken to rule out common causes of such a clinical picture, and following dialogue with a VIO.

**Salmonellosis**

As can be seen in fig 9 below, there was an increase (not statistically significant) in cases of *Salmonella* Typhimurium in Q2 of 2017:

![Fig 9: GB incidents of *Salmonella* Typhimurium, Q2 2017 in cattle](image)

Amongst these have been cases of *S* typhimurium DT104.

![Fig 10: Cases of Salmonella Typhimurium DT104 incidents 2016 - 2017 (to 30/06/17) by month](image)
Nine cases were disclosed in livestock holdings in Anglesey (North Wales) between 2016 and 2017 and one case was reported in Conwy (North Wales) in 2017. These 10 cases represent a high proportion of the total number of incidents in a particular area thus suggesting some clustering of *Salmonella* DT104 cases in livestock in time and space in North Wales. This cluster is part of a wider investigation for which enhanced surveillance has been encouraged. Fig 10 illustrates the timeline of case occurrences from 2016–June 2017. There have been human cases of *Salmonella* DT104 but the potential for any association is currently under investigation.

**Pica in dairy cows**

Pica (stone-eating), affecting up to 75% of cows, was investigated by APHA Carmarthen VIC in a grass-based, spring-calving, dairy herd. Pica was seen in April at approximately 4 weeks post turnout. Nutrition was based on grazed grass with concentrate at 4kg/day for cows and 3.5kg/day for heifers. Dry cow feeding consisted of grass silage/haylage and free-access dry cow minerals. Differentials including nervous ketosis, dietary deficiency of bulk, fibre, phosphorus, cobalt or salt were considered. Pica can also be a learned/habitual behaviour. Based on blood results and intake/requirement calculations it was suspected that phosphorus status may be marginal for some cows but that hypophosphataemia was unlikely to be the only cause. Exceptional winter grass-growth this year resulted in very high covers in the first grazing round with cows struggling to graze down to the optimum residual. A drop in butterfats that coincided with the most severe period of pica suggested that subacute ruminal acidosis and/or the metabolic effect of high levels of rumen degradable protein may have been involved. The characteristics of lush spring grass such as low dry matter, low structural fibre and high rumen degradable protein, were thought to have contributed to a digestive/metabolic disturbance that manifested as pica.

The grass surplus was managed by pre-mowing in the second grazing round with surplus paddocks cut for silage. Partial wilting is likely to have increased dry matter intakes. Grazing/cutting grass to the ideal height is also important for regrowth and grass management for the rest of the season. Pica rates had declined to 5-10% by July.

**UNUSUAL DIAGNOSES**

**Epidermolysis bullosa**

Two Simmental cross calves aged two and three days were euthanased and submitted for postmortem examination. Both the calves had variably extensive loss of hair and reddened skin on the lower portion of the legs, affecting all 4 legs in one calf and 3 legs of the second calf. The calves also had minor mucosal lesions within the oral cavities including ulceration of gingivae (fig 12). Histopathology described the skin and oral lesions as severe multifocally extensive ulcerative and suppurative dermatitis and stomatitis. The gross appearance of the lesions and the histopathological features closely resembled the description of *epidermolysis bullosa*. This condition is a congenital disease which is presumed to be associated with a genetic mutation. The same diagnosis was made in 25 of 72 affected calves which were sired by a single Simmental bull in Ireland in 1987 (Bassett 1987). In 2010, six Simmental cross calves on three farms, and two Holstein Friesian calves on a fourth farm, were described as being affected by APHA and other surveillance partners (Foster and others 2010).
Fig 12: L: reddening and loss of hair of the lower portion of the leg of a Simmental cross calf attributed to epidermolysis bullosa R: gingival ulceration in a calf with lesions of epidermolysis bullosa

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 of the charts varies and therefore care must be taken when comparing individual charts.

Blackleg

Clostridial myositis caused by Clostridium chauvoei (‘Blackleg’) was reported by all Veterinary Investigation Centres and many partner post-mortem providers, and this was reflected in a typical seasonal increase in VIDA diagnoses in animals typically affected- ie young weaned animals at grass. Although a well-recognised condition, this increase should be noted especially as there are extremely effective vaccines available, so this is an avoidable loss.

Abomasitis and abomasal bloat

The University of Bristol Farm Animal Pathology Service reported on a severe abomasal bloat problem resulting in the death of over 20 calves in association with other enteric pathogens. It was considered that underlying drivers were likely to be managerial such as feeding large quantities of milk, use of high osmolality milk replacer, or poor hygiene. Other centres reported similar situations, with large volumes of colostrum being fed and poor hygiene being reported. This potential trend was discussed by the CEG, and a potential collaborative study with several institutions and a major milk replacer provider was discussed.
HORIZON SCANNING

Bluetongue

Fig 12: BTV in Europe since April 2017

France has reported 4 outbreaks of BTV-8 in Loire, Saône and Ain regions all in cattle. There is still no information or evidence for disease circulating widely in the north of the country and therefore the risk to the UK has not substantially increased.

France has also reported 49 outbreaks of BTV-4 in Corsica. Twelve were in sheep and 37 in cattle. Of the 61 cattle which were affected (from ~1900 susceptible) there were no deaths; from
84 sheep affected, (out of 4,100 susceptible) there were 9 deaths. Vaccination against several serotypes is mandatory in Corsica, which is a restricted area for BTV-1, 2, 4, 8 and 16. Italy has reported three cases of BTV-1 and one of BTV-4 in August.

For information on bluetongue and the vaccine availability in GB, see the latest materials recently posted on line by the National Farmer’s Union (NFU) at www.nfuonline.com/bluetongue and the latest information to encourage BTV vaccination by the Joint Action against Bluetongue (JAB) campaign.

REFERENCES
