GB pig quarterly report
Disease surveillance and emerging threats
Volume 22: Q2 – April-June 2018

Highlights

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Introduction and overview

This quarterly report reviews disease trends and disease threats for the second quarter of 2018, April – June. It contains analyses carried out on disease data gathered from APHA, SRUC Veterinary Services division of Scotland’s Rural College (SRUC) and partner post mortem providers and intelligence gathered through the Small Ruminant Species Expert networks. In addition, links to other sources of information including reports from other parts of the APHA and Defra agencies are included. A full explanation of how data is analysed is provided in the Annexe.

Pig disease surveillance dashboard April to June output

Diagnoses made in the second quarter of 2017 and 2018 through the GB scanning surveillance network are illustrated in Figures 1a and 1b. These can be interrogated further using the interactive pig disease surveillance dashboard which was launched in October 2017 and can be accessed from this link: http://apha.defra.gov.uk/vet-gateway/surveillance/scanning/disease-dashboards.htm

![Figure 1: GB scanning surveillance diagnoses](image)

1a April to June 2018 (total diagnoses 197) 1b April to June 2017 (total diagnoses 207)

Note that diagnoses made in low numbers are not showing and that further diagnoses in the quarter may be added if submissions made in Q2-2018 are finalised at a later date.
Surveillance details for all diagnostic submissions to the GB scanning surveillance network in the second quarter of 2018 from an enhanced dashboard are summarised in Figure 2.

Figure 2: Pig disease surveillance enhanced dashboard submission output: total diagnostic records April to June 2018 - 304

These diagnostic submissions are voluntary and subject to several sources of bias. However it is interesting to note that respiratory disease was prominent in this second quarter of 2018. The main clinical sign most commonly reported was “respiratory” in Q2-2018 (Figure 2) while in the same quarter of 2017, the three most common main clinical signs reported were “diarrhoea & GI”, “found dead” and “wasting”. This difference was also reflected in the classification of submissions by syndrome; in Q2-2017 the enteric syndrome was most common while in Q2-2018, systemic and miscellaneous then respiratory syndromes are the two most common.

As described for Q1-2018, APHA non-carcase (postal) submissions remained reduced in Q2-2018 compared to the same period in prior years, potential reasons were discussed in the Q1-2018 report (APHA 2018a). Carcase submission numbers were similar to the same period in previous four years. Submissions of carcases are more likely to achieve a diagnosis as postmortem examination with fuller diagnostic investigation is possible; for example for the first six months of 2018 for enteric syndrome, a diagnosis was made in 89% of carcase submissions and 33% of non-carcase submissions while for respiratory syndrome a diagnosis was reached in 98% and 38% of carcase and non-carcase submissions respectively. The areas offering free carcase collection to post-mortem examination sites within the APHA network were expanded in 2017 (APHA, 2017) and the availability of this service is regularly publicised.
New and re-emerging diseases and threats

Please refer to the annexe for more information on the data and analysis.

First reports of African Swine Fever in China

The risk of introduction of African Swine Fever to China was highlighted in the literature last year (Vergne and others, 2017) and the first African Swine Fever (ASF) outbreak in China was confirmed on August 3rd 2018 in domestic pigs in the north eastern Liaoning province. 


A letter on the initial emergence in China has been published (Zhou and others, 2018) and describes ASF on a 400-pig farm on which disease was active from mid-June 2018 and resulted in the death of all the pigs after a month. Information coming out of China suggests that ASF may be more widespread and APHA’s International Disease Monitoring (IDM) Team have published an updated preliminary outbreak assessment (POA) with more information on the situation likely to follow:

https://www.gov.uk/government/publications/african-swine-fever-in-pigs-in-china. At the time of writing, three China provinces have been named in association with ASF reports: Liaoning, Henan and Jiangsu but more may be affected as pigs found infected in Henan province had travelled there for slaughter from Heilongjiang, a province close to Russia in north east China and a region where expert advice had suggested disease was most likely to enter China from Russia.
Whilst this development and spread of ASF to China is of great concern, there is a closer ongoing threat of ASF nearer to the UK, as ASF persists in wild boar in Eastern and Central Europe with regular outbreaks in domestic pigs. There has been a significant and rapid increase in backyard pig outbreaks in Romania since June 2018 which is described in the recent POA update from IDM: [https://www.gov.uk/government/publications/african-swine-fever-in-pigs-in-poland-lithuania-and-latvia](https://www.gov.uk/government/publications/african-swine-fever-in-pigs-in-poland-lithuania-and-latvia) and illustrated in Figure 4.

This spread in Romania and the continuing outbreaks elsewhere in affected countries in the region have not been associated with significant westward movement of ASF in the last two months and the domestic pigs outbreaks were within zones where the intra-community trade of live pigs or fresh or frozen pig meat is not allowed. However the continuing outbreaks emphasise the importance of vigilance in both preventing introduction of ASF to the UK and the messages about not feeding kitchen waste to pigs remain highly relevant: [https://www.gov.uk/government/news/pig-keepers-warned-not-to-feed-kitchen-scrapsto-pigs-due-to-african-swine-fever-risk](https://www.gov.uk/government/news/pig-keepers-warned-not-to-feed-kitchen-scrapsto-pigs-due-to-african-swine-fever-risk). An ASF poster is also available for pig keepers [http://apha.defra.gov.uk/documents/surveillance/diseases/african-swine-fever-poster.pdf](http://apha.defra.gov.uk/documents/surveillance/diseases/african-swine-fever-poster.pdf)
In order to raise awareness of the disease amongst pig keepers and veterinarians and assist early recognition of the disease, images of the clinical signs and pathology of ASF were compiled in conjunction with the Pirbright Institute and disseminated widely: http://apha.defra.gov.uk/documents/surveillance/diseases/african-swine-fever-images.pdf.

Penicillin resistance in Streptococcus suis isolate from aborted pig foetuses

Penicillin-resistant Streptococcus suis serotype 5 was identified in a diagnostic submission to APHA as the cause of abortion in a single sow. The penicillin minimum inhibitory concentration was 0.75μg/ml (CLSI breakpoint indicating resistance is > 0.5μg/ml) This is an unusual disease presentation due to a less common serotype of S. suis and is likely to have been a sporadic disease event. The isolate was also resistant to tetracyclines, lincomycin, tylosin and potentiated sulphonamide. There is no ongoing disease issue on the farm and minimal antimicrobial use. Free diagnostic investigation at APHA was offered should further possible S. suis disease occur on the farm. Penicillin resistance in S. suis very likely equates to resistance to betalactams (includes amoxicillin and ampicillin) and is a rare resistance in APHA S. suis isolates, not being detected in S. suis isolates from APHA scanning surveillance submissions over the period 2015-2017. Prior to that, a collaborative study reported penicillin resistance in 5% of S. suis isolates collected by APHA from 2009-2014 (Hernandez-Garcia and others, 2017). S. suis is a potential zoonosis hence there is concern from both pig health and welfare, and human health, perspectives if this type of resistance is found more widely; however laboratory confirmed reports of S. suis cases in humans are rare in the UK (1-7 each year, Public Health England 2016). Public Health England (PHE) confirmed no human S. suis cases have
been reported in England in 2018 to date. A factsheet from the Health and Safety Executive was provided to the farmer: [http://www.hse.gov.uk/agriculture/zoonoses-data-sheets/streptococcus-suis.pdf](http://www.hse.gov.uk/agriculture/zoonoses-data-sheets/streptococcus-suis.pdf). This indicates that it is important to practise good occupational hygiene, cover cuts and abrasions, use suitable disinfectant, and people who are immunosuppressed or splenectomised should avoid contact with pigs. The APHA antimicrobial resistance lead reported this finding to the Veterinary Medicines Directorate (VMD), APHA Zoonoses Team and PHE and VMD will raise it at the next Defra Antimicrobial Resistance Coordination (DARC) Group meeting.

Unusual diagnoses

**Aortic haemorrhage likely due to copper deficient diet**

An interesting finding was made outside the GB scanning surveillance network which was discussed with APHA when deaths and anaemia in growing pigs of different ages were being investigated. The pigs were in a small 10-sow herd rearing pigs indoors on a barley and wheat mix, together with waste milk but without vitamin, mineral or trace-element supplementation and without use of vaccines. A number of pigs died and post-mortem examination revealed large blood clots in the pericardial sac as illustrated in Figure 5. Such cases have been seen before in growing pigs on milk diets, associated with copper deficiency. Low liver copper and selenium concentrations were confirmed in this case and it is likely that the pigs were also iron deficient. The low selenium was also significant in relation to cases of hepatosis dietetica which were also confirmed. The pigs were treated with copper and selenium and the diet is now supplemented. Suspected copper deficiency-related aortic haemorrhage was reported previously by Steenmetz and others (2014) and histological lesions were identified in blood vessel walls attributed to a defect in blood vessel elastogenesis due to a decrease in intra-molecular cross-links of the elastin polymer resulting in rupture of the vessel wall at the site of greatest pressure, in these cases just distal to the aortic valves. Interestingly, in this case there was an unusually high proportion (40%) of pigs aged 10 to 14–weeks-old with aural haematomas. Risk factors for aural haematomas such as trauma/ear biting and head shaking, due to for example mange or ear infections, were not apparent and one might speculate that they were a manifestation of hypocuprosis-induced ear blood vessel fragility; in which case, they should not occur in subsequent batches of pigs fed the supplemented diet.
Figure 5: Haemorrhage into pericardial sac likely secondary to copper deficiency – image kindly provided by Ben Strugnell, Farm Post Mortems Ltd.

Potential food safety and toxicity issues

An investigation into possible exposure of pigs to difenacoum-based rodenticide is described in the APHA Chemical Food Safety quarterly report for Q2-2018
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/732614/pub-chemfood0418.pdf. The second generation rodenticides have very long half-lives such that residues can remain in tissues, particularly liver, for many months. In brief, eight fattening pigs escaped from their pen and may have accessed bait in a box containing a difenacoum-based rodenticide. The pigs were placed under voluntary restriction and monitored. Blood samples were analysed for clotting factors and clotting metabolites. The pigs remained healthy and results provided no evidence that the pigs were likely to have been exposed to rodenticide and restrictions were lifted with the agreement of the Food Standards Agency. As an additional precautionary measure, offal from the pigs was discarded when they went to slaughter six weeks later.

Several incidents in ruminants of hemlock water dropwort (Oenanthe crocata or dead man's fingers) poisoning were diagnosed within the GB scanning surveillance network this summer. None were in pigs but this is of potential relevance to smallholder pigs which may be allowed outdoors in less controlled situations than commercial pigs, with access to a range of wild plants in woodland or rough grazing, and may encounter toxic plants such as this. Hemlock water dropwort contains a neurotoxin, oenanthotoxin, which causes seizures and death. The plant is found in damp, marshy ground and typically in ditches. The roots are more pathogenic than the stems and leaves but all can cause toxicity and
dry weather with sparse grazing may have predisposed to animals eating unusual vegetation. Livestock must be prevented from having access to these plants and images are on the link below.

http://wildflowerfinder.org.uk/Flowers/W/WaterDropwort(Hemlock)/WaterDropwort(Hemlock).htm

Changes in disease patterns and risk factors

Please refer to the annexe for more information on the data and analysis.

Genotyping of porcine circovirus 2 associated with disease outbreaks

Genotyping of porcine circovirus 2 (PCV2) involved in porcine circovirus 2-associated disease (PCVD) outbreaks was prompted by a cluster of three diagnoses in May and June 2018 at Starcross and Thirsk Veterinary Investigation Centres. These three cases were described in the July surveillance report (APHA, 2018b). One was in a small unvaccinated herd and two incidents were diagnosed in post-weaned commercial pigs supposed to be vaccinated for PCV2. In the small herd, the PCVD manifested in rapid deaths of six-week-old pigs showing jaundice due to PCVD-associated hepatitis. In the commercial pigs, the PCVD presented with primarily respiratory signs in one herd and wasting associated with colitis or pneumonia in the other, in both herds together with disease due to bacterial pathogens. When PCVD is diagnosed in vaccinated pigs, a review of compliance with vaccine storage and administration requirements and an assessment of the scale of disease are important in determining whether vaccine failure may have occurred. Where suspected, lack of vaccine efficacy should be reported to the Veterinary Medicines Directorate. Previously, issues identified include batches of pigs not having received their PCV2 vaccination and changes in timing of PCV2 vaccination (APHA, 2014). The cluster of PCVD outbreaks in Q2-2018 resulted in a small increase in the diagnostic rate for PCVD, as illustrated in Figure 6, however data is incomplete for 2018 and this may not be significant; there is no known association between the two incidents in commercial pigs.

The sequencing of open reading frame 2 (ORF2) of PCV2 involved in 11 cases of PCVD confirmed at APHA since 2016 showed that nine were genotype PCV2D and two were genotype PCV2B. All three 2018 PCVD cases were PCV2D. Previously, although PCV2D has been detected, it was in the minority of cases with PCV2B being predominant (Grierson and others, 2017). This shift to PCV2D is reported in pigs globally, currently there is no clear evidence that vaccine efficacy is affected. Monitoring of the diagnostic trend of PCVD and PCV2 genotype will continue.
A reassortant avian-like H1N1 (H1avN1) swine influenza A virus (SIV) strain was identified retrospectively in APHA pig scanning surveillance submissions in which swine influenza A was previously diagnosed. This H1avN1 SIV variant has been detected in three submissions to date: once each in 2012, 2014 and 2016, suggesting that it is being maintained at some level in the GB pig population. H1avN1 has been detected less often in GB pigs since the emergence of pandemic H1N1/09 in 2009. The reassortant H1avN1 variant has external proteins of avian-like H1N1 and internal genes of pandemic H1N1/09. There may be further isolates of reassortant H1avN1 yet to be identified amongst those archived from 2016 and 18 which are still being analysed. Serological tests for H1avN1 should still be able to detect antibodies to reassortant H1avN1 strains. All three reassortant isolates detected to date have been in North Yorkshire on commercial pig farms, each under different ownership and different veterinary practices. Traditional (non-reassortant) H1avN1 were also identified in 2013 and one in 2014 so there has been a mixture of reassortant and non-reassortant H1avN1 circulating in pigs. This reassortant H1avN1 has previously been detected at very low levels in mainland Europe. These findings come out of swine influenza research and other projects at Weybridge and ongoing collaborations with European counterparts. The swine influenza strains were originally detected in scanning surveillance submissions tested under the Defra-funded swine influenza surveillance project. APHA Zoonoses team and International Trade colleagues dealing with pigs have been informed. There are no major new concerns arising from detection of the reassortant H1avN1 with respect to pig or human health. This finding emphasises the value of the Defra-funded swine influenza surveillance which is provided at no charge to submitting veterinarians and tests diagnostic samples from pigs with acute respiratory disease for swine influenza virus. More details are given on this link: [http://apha.defra.gov.uk/documents/surveillance/diseases/swine-influenza.pdf](http://apha.defra.gov.uk/documents/surveillance/diseases/swine-influenza.pdf)
Summer outbreaks of *Klebsiella pneumoniae* subspecies *pneumoniae* septicaemia

One outbreak of septicaemia due to *Klebsiella pneumoniae* subspecies *pneumoniae* (Kpp) in preweaned piglets was diagnosed during April to June 2018; the diagnosis was made in June at the Bury St Edmunds VIC. Further diagnoses have since been made later in the summer and will be described in the next quarterly report. The June outbreak had the typical presentation of sudden deaths of well-grown preweaned piglets. Eight pigs around two-weeks-old from four litters, all from parity one sows, were found dead over three days on an outdoor weaner-producer unit. The unit had recorded Kpp septicaemias in a previous year. The herd had since been depopulated (for reasons unrelated to the Kpp) and the new herd had set up on a new site. Examination revealed fibrin stranding around the abdominal organs and on the visceral pleura. A moderate volume of serous fluid was detected in the pleural cavities, the lymph nodes were prominent and reddened and the spleens were enlarged (Figure 7). *Kpp* was isolated in pure growth from multiple sites from all the submitted pigs.

Figure 7: Enlarged spleen in piglet with *Klebsiella pneumoniae* subsp. *pneumoniae* septicaemia

Kpp septicaemia outbreaks have been diagnosed each year between May and September since 2011 when this disease presentation first emerged (Figure 8). The reason for the strictly seasonal occurrence is not clear but the Kpp isolates from outbreaks from 2011-2017 have been analysed and represent the same sequence type 25 strain and with similar small plasmid and virulence gene content; this strain has not been found in Kpp isolates archived at APHA from pigs prior to 2011. The majority of Kpp septicaemia outbreaks have been in East Anglia and on outdoor farms.
APHA has diagnosed between two and six outbreaks each summer since 2011 and a few farms have had outbreaks in more than one year. The case definition, based on consistent findings in all outbreaks is “Pigs found dead with lesions consistent with septicaemia and pure/predominant growths of *Klebsiella pneumoniae* subsp. *pneumoniae* isolated from internal sites in multiple pigs”. A summary of investigations of outbreaks between 2011 and 2014 was published by APHA earlier this year (Bidewell and others, 2018). No human infection is reported associated with the outbreaks. Kpp septicaemia outbreaks have been described in several other countries in recent years (Bowring and others, 2017). A disease information note is provided on the APHA gateway: http://apha.defra.gov.uk/documents/surveillance/diseases/klebsiella-vets.pdf.

Figure 8: Month of diagnosis of *Klebsiella* species septicaemia outbreaks 2011-2018

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**Actinobacillus pleuropneumoniae** isolate detected bearing Apx1 toxin gene

As part of investigation into an increase in Q1-2018 in the VIDA diagnostic rate of disease due to *Actinobacillus pleuropneumoniae* (APP) (APHA, 2018c), APP isolates archived since January 2016 were analysed for their Apx toxin gene content. Apx1 toxin gene was detected in one of 36 isolates, from the lung of a pig with typical APP lesions submitted to APHA in August 2017. Isolates with Apx1 toxin gene of APP are found in serotypes 1, 5, 9, 10, 11 and 14. Virulence is multifactorial in APP and is influenced by exotoxin production and other factors. In general, serovars producing Apx1 are considered to be more virulent and to cause higher mortality in pigs, especially when in combination with Apx2. Serotype 9 (which produces Apx1 and Apx2) was reported historically in UK pigs (McDowell and Ball, 1994), but testing between 1995 and 2015 in England and Wales did not detect serotypes producing Apx1, and serotype 8 was predominant (O’Neill and others, 2010; Li and others, 2016) while in Scotland, one serotype 9 isolate was identified in 2012 on a single occasion (APHA, 2012). In Europe, serovar 9 is prevalent in the Netherlands, Spain, France and Germany. The other archived APP isolates tested had either Apx2, or Apx2 with Apx3, toxin genes, as is usual for GB APP isolates. The rise in the diagnostic rate for disease due to APP in January to March 2018 is likely to have reflected seasonal factors and no unusual patterns of antimicrobial resistance were noted in the isolates. The Apx1 toxin gene-bearing isolate was from a 17-week-old pig in a small (40-sow) herd and disease was not reported to be unusually severe. It is possible that serotype(s) of APP with Apx1 toxin gene have remained in discrete, small parts of the UK pig population at a very low level since they were last detected prior to 1995. Serotyping is in progress and periodic toxin typing of future APP isolates will be undertaken.
Parasitic pneumonia due *Metastrongylus apri*

GB diagnoses of parasitic pneumonia in pigs showed a rise for the 12 months to the end of June 2018 with seven diagnoses, spread across each quarter, compared to an average of three in prior years. One diagnosis was in farmed wild boar and the other six in commercial pigs aged nine to 18 weeks. There were additional diagnoses in five of the cases. In the two cases where parasitic pneumonia was the only diagnosis made, the main clinical sign reported was “respiratory”. It is important that the lower airways are opened and inspected during post-mortem examinations of pigs with respiratory disease or pathology so that this lungworm is detected as illustrated in Figure 9.

Figure 9: *Metastrongylus apri* worms in lower airways of a pig's lung

Abortions suspected to relate to hot weather

Abortions induced by hyperthermia in association with the hot weather was suspected to have resulted in 20 abortions in one group of 45 sows at 10 weeks gestation. Sows had been moved in a group from indoor accommodation to farrow outdoors shortly before the incident. Crusting of pinnae believed to be caused by solar damage was reported in the affected sows but they were otherwise well. The placentae and foetuses in multiple litters submitted appeared grossly unremarkable. The tentative diagnosis of abortion induced by hyperthermia was based on discussion with the submitting veterinarian, together with the clinical and epidemiological history and climatic conditions in association with the laboratory results, which did not detect infectious causes of abortion (PRRSV, *Leptospira*, bacterial pathogens). The abortion event was short-lived and only affected one sow group, which supports the suspected diagnosis. The welfare of the pigs in the recent hot weather had been considered in advance of this incident and plenty of good wallows were available. There are anecdotal reports of similar abortion events associated with sunburn in pigs in previous years. There is advice on addressing the adverse effects of hot weather...
Streptococcus suis serotype trends

During Q2-2018, for the first time in over a decade, *Streptococcus suis* serotype 2 was not the predominant serotype isolated from pigs in APHA diagnostic submissions in the quarter as shown in Table 1. This change in profile may be a transient effect and/or reflect more diagnostic investigations in younger pigs in which disease due to *S. suis* serotype 1 is mainly seen, reflecting efforts to reduce antimicrobial use. In some cases, *S. suis* isolates were required for autogenous vaccine production. The *S. suis* serotype 1 incidents were in either preweaned or recently weaned pigs except in one case which was in a six-week-old pig with porcine circovirus 2-associated disease. The profile of *S. suis* serotypes isolated will be kept under review.

Table 1: *Streptococcus suis* isolates from APHA diagnostic submissions

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Lawsonia intracellularis - survey of practitioners

Following an increase in the annual diagnostic rate of *Lawsonia*-associated disease in submissions to the GB surveillance network in 2016 and 2017 (APHA, 2017b), a survey (survey monkey UK) of practitioner members of the Pig Veterinary Society (PVS) was undertaken to find out if these data reflected the situation in the field, and if so, the practitioners’ opinions on possible reasons. The survey report was circulated to PVS members, with a summary:

“Twenty seven PVS practitioner members responded, 18 of whom spend 50-100% of their time working with pigs. Nearly 60% have perceived a degree of increase in *Lawsonia*-associated disease in the last two years (Figure 10) and most of these respondents had confirmed disease by laboratory testing in at least some of the cases seen.

Figure 10: Percentage responses of veterinarians to survey question “Have you perceived more *Lawsonia*-associated disease in the last two years”
The most common reason selected for the increase in *Lawsonia*-associated disease was changes in antimicrobial use, with the second most common reason being increased use of diagnostics to aid more specific disease control. Disease was reported to have been successfully controlled in most cases, however recurrence in subsequent batches was reported and, in a few, only a partial response was seen although the comments indicate some of these may have been more complex disease situations. Over 60% of respondents suspected they were seeing an increase in certain diseases in relation to changes in antimicrobial use, necessitating additional interventions to control them, with the comments mentioning Glässers, *Streptococcus suis* and respiratory diseases most often. Only 20% of respondents thought that they were seeing certain diseases at greater frequency in relation to changes in antimicrobial resistance.”

The increasing GB diagnostic rate for *Lawsonia*-associated disease seen during 2017 which prompted the survey has not continued for the first six months of 2018 (Figure 11) but this will be kept under review.

Figure 11: Seasonality of GB incidents of *Lawsonia*-associated disease 2006-2018

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**Horizon scanning**

**Senecavirus A update**

A useful update summarising information available on Senecavirus A (SVA) and vesicular disease outbreaks ongoing in the USA associated with infection with SVA was provided in Pig Progress (Yoon, 2018). The disease due to SVA is mild and short lived and the impact on pig health and welfare is not considered to be significant. However, concern arises due
to the close similarity to notifiable vesicular diseases, including foot and mouth disease, of the vesicular manifestation of SVA which has not been detected in UK pigs. The message to pig keepers and veterinarians in the UK is that cases of vesicular disease must be reported promptly as suspect notifiable disease to APHA in order to investigate the possible involvement of notifiable vesicular disease viruses, in particular foot and mouth disease virus. Anyone wishing to report suspicion of notifiable disease in England should call the Defra Rural Services helpline on 03000 200 301. In Wales the contact telephone number is 0300 303 8268 while in Scotland the local APHA Field Services office should be contacted. Only after ruling out the presence of notifiable disease, would testing for Senecavirus A be undertaken. A diagnostic PCR is available at the Pirbright Institute for use in this scenario for early detection of an SVA-associated vesicular disease outbreak.

References


APHA (2017a). APHA Briefing Note 01/17 Extension of free carcase collection areas in England for diagnostic post mortem examinations


https://veterinaryrecord.bmj.com/content/183/5/149


Annexe

VIDA diagnoses are recorded on the APHA FarmFile database and SRUC 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 SRUC Veterinary Services 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. SRUC Veterinary Services has 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 and SRUC Veterinary Services. 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.

This report contains analysis of disease data from APHA, SRUC Veterinary Services division of Scotland’s Rural College (SRUC) and partner post mortem providers (SRUC Veterinary Services, University of Bristol Veterinary School, Royal Veterinary College, University of Surrey, Wales Veterinary Science Centre) from samples submitted in the first quarter of 2018 compared to the equivalent quarter of previous years. It aims to identify emerging small ruminant 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://apha.defra.gov.uk/vet-gateway/surveillance/index.htm.

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 SRUC Veterinary Services 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 2008 - 2017 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 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.

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.