# GB Emerging Threats Quarterly Report

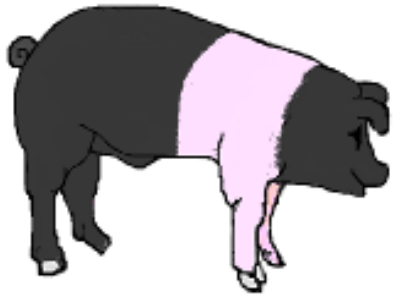
## Pig Diseases

Animal & Plant Health Agency

Safeguarding public and animal health

SRUC

**Quarterly Report: Vol 21 : Q4** **October to December 2017**



## Contents



## Highlights



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.


Department for Environment Food & Rural Affairs

The Scottish Government

Llywodraeth Cymru Welsh Government



editor: Susanna Williamson
APHA Bury St Edmunds
tel: + 44 (0) 1284 724499
fax: + 44 (0) 1284 724500
email: Susanna.williamson@apha.gsi.gov.uk

## INTRODUCTION

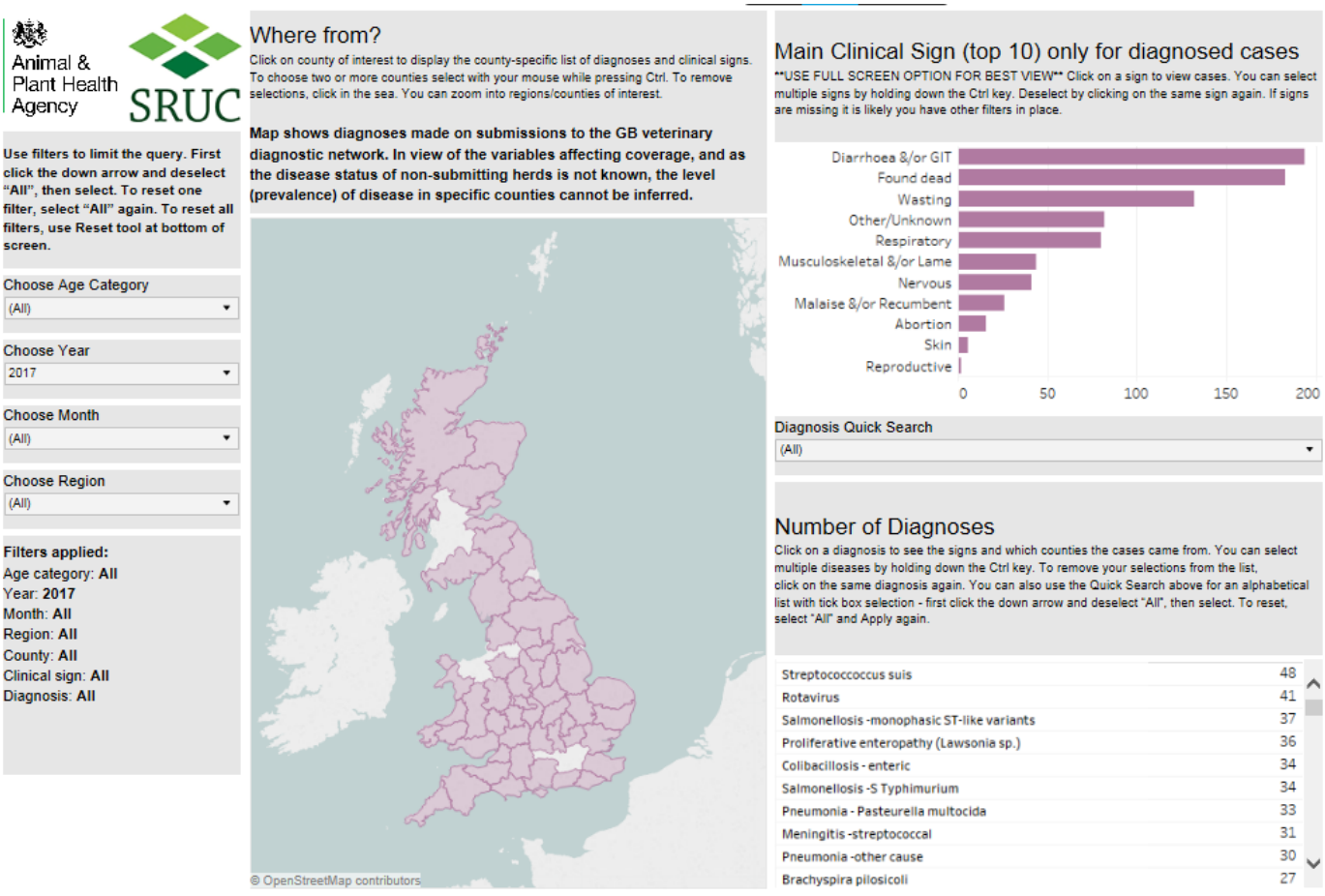
This report contains analysis of animal health and scanning surveillance data and information from APHA, SAC Consulting Veterinary Services (SAC CVS) and non-APHA partner post mortem providers (SAC CVS, University of Bristol, Royal Veterinary College, University of Surrey (four sites), Wales Veterinary Science Centre, Aberystwyth) from the fourth quarter of 2017 compared to data in previous quarters and years. The network of partner post mortem providers is developing, and the current providers and sites have commenced activity at various times between September 2014 and July 2015. The report is compiled by the APHA Pig Expert Group, and is based on diagnostic submissions as well as on surveillance data and information from other sources. It is planned for the latter two to be expanded with time as other sources of complementary information are included. These scanning surveillance activities aim to provide timely detection of animal-related new and re-emerging diseases and threats. The information contained in this report, and other linked outputs, is used by government, the livestock industry, farmers and vets to maintain awareness and take action to manage risks that may be associated with the identified threats. Further information can be found at: http://ahvla.defra.gov.uk/vet-gateway/surveillance/index.htm.

## OVERVIEW

### Pig disease surveillance dashboard 2017 output

Diagnoses made in 2017 through the GB scanning surveillance network are illustrated in Figure 1 and can be interrogated 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: Pig disease surveillance dashboard output for 2017 (extracted February 28th 2018)



More information about the GB scanning surveillance network and pig surveillance is available on these links: http://apha.defra.gov.uk/vet-gateway/surveillance/index.htm and http://apha.defra.gov.uk/vet-gateway/surveillance/seg/pig.htm.

## Diagnostic submission trends

Total diagnostic submissions from pigs in October to December 2017 were 9% lower than the same period in the previous two years, and 15% lower than the same period in the previous five years. There were regional differences in submission levels with those from England mainly affected by these reductions. Fewer non-carcase (postal) submissions to APHA were noted as illustrated in Figure 2a. Several variable factors influence submission rates including the economic prosperity of pig production, which is itself affected by feed and pig prices in particular, the effect of these being hard to quantify. However, discussions suggest that other contributory factors could include initiatives from pharmaceutical companies providing assistance with diagnostic testing, the increasing use of oral fluids for detection of respiratory viruses and the changing structure of some large pig veterinary practices which may decide which laboratories to use at management level.

Table 1 shows total diagnostic submissions in the whole 12 months of 2017 and, in Figure 2b, also in the previous four years. This shows a small reduction of 2% compared to the prior two years and 8% in the prior five years. There have been efforts to publicise the expansion of areas offering free carcase collection to post-mortem examination sites within the APHA network (APHA, 2017a) as this service has not often been used by pig farms.

Table 1: Annual GB Pig Diagnostic Submissions in 2017 by sample type and country

| | Carcase | | | Foetus/Stillborn | | | Other | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2017 Subs | 2017 v Prior2 | 2017 v Prior 5 | 2017 Subs | 2017 v Prior2 | 2017 v Prior 5 | 2017 Subs | 2017 v Prior2 | 2017 v Prior 5 | Subs | 2017 v Prior2 | 2017 v Prior 5 |
| **England** | 301 | 99 % | 90 % | 29 | 84 % | 82 % | 581 | 90 % | 89 % | 911 | 93 % | 89 % |
| **Wales** | 12 | 267 % | 146 % | 1 | 67 % | 38 % | 11 | 88 % | 95 % | 24 | 130 % | 107 % |
| **Scotland** | 84 | 149 % | 133 % | 11 | 367 % | 162 % | 56 | 120 % | 93 % | 151 | 142 % | 116 % |
| | **397** | 109 % | **97 %** | **41** | 105 % | **92 %** | **648** | 92 % | **90 %** | **1,086** | **98 %** | **92 %** |

Other = non-carcase/non-foetus submissions. The data in this table provides total submissions, then submissions by country and sample type for 2017 with a comparison with the previous two or previous five years' submissions.

Figure 2: Throughput of GB pig diagnostic submissions 2013-2017 2a: October to December 2b: annual

Figure 2a

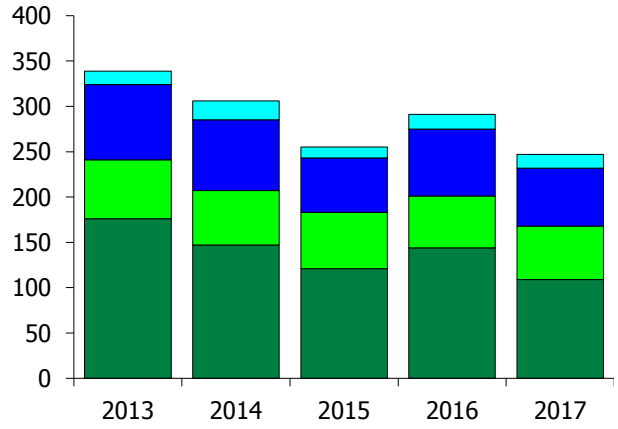
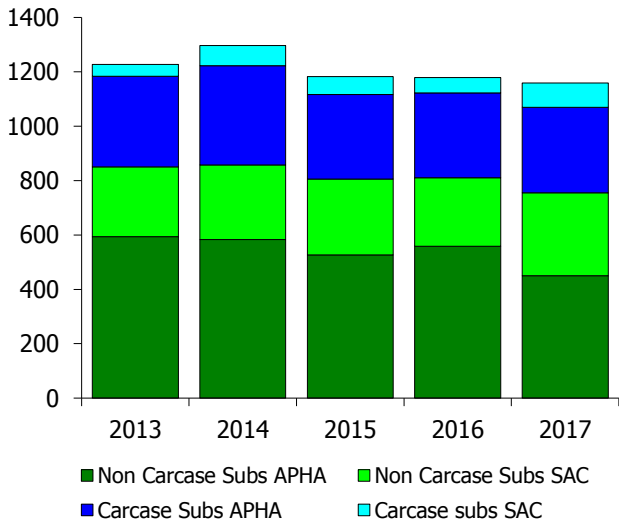



Figure 2b



Carcase submissions represented 37% of total diagnostic submissions, slightly increased compared to prior years. Diagnoses are more likely to be established from carcase submissions and the maintenance of submission levels of carcases in particular to near the levels of prior years is considered important for detection of new and emerging disease and maintenance of expertise. Most commercial pigs are attended by specialist pig veterinarians, many of whom undertake on-farm post-mortem examinations and make diagnoses on the basis of their findings, sometimes supplemented with laboratory testing on samples they collect and often without involving APHA submissions. APHA pig submissions, particularly carcase submissions, are thus already filtered and tend to be from disease outbreaks which are more severe, unusual or unresponsive, thus suited to detection of new and emerging threats. External post-mortem providers dealt with 4.8% of carcase submissions in 2017.

Each diagnostic submission is allocated a disease syndrome based on clinical history and diagnostic findings. As usual, “enteric”, “systemic and miscellaneous” and “respiratory” were the three main disease syndromes represented by submissions received in October to December 2017 at 24%, 23% and 16% of total respectively.

## 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 SAC CVS 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 2012 to 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 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) by syndrome and presenting sign

- A total of 17.6% of GB pig submissions to the fourth quarter of 2017 did not reach a diagnosis following reasonable testing. This was not significantly different from the overall DNR of 17.9% for the same period in prior years. The overall DNR rate for APHA (18.9%) for the twelve months of 2017 was not significantly different compared to 19.0% for the same period in prior years. The overall DNR rate of 15.4% for the twelve months of 2017 for SAC CVS was not significantly different compared to 14.5% for this period in prior years.

- There was a significant increase in DNR to Q4 2017 compared to prior years for APHA submissions with “respiratory” as the main presenting sign syndrome. DNR was 16.7% compared to 7.2% in prior years. Eight undiagnosed cases were reviewed; two were inconclusive (likely ascariasis and likely pasteurellosis), two had been treated, one was at an inappropriate disease phase for diagnosis and overall, there were not consistent findings between them to suggest a new and emerging issue. The DNR rate for respiratory syndrome submissions to APHA for the twelve months of 2017 was not increased, being 4.0% compared to 4.7% in prior years.

- There was also a significant increase in DNR to Q4 2017 compared to prior years for APHA submissions with "skin" as the main presenting sign syndrome however the DNR cases represented just two being undiagnosed with reasonable testing. All undiagnosed cases with skin disease as a presenting sign were reviewed and there was no evidence of an emerging issue.

**Analysis of undiagnosed submissions to the GB scanning surveillance network in and up to the fourth quarter of 2017 has not revealed evidence of a new and emerging syndrome in GB pigs.**

## ONGOING NEW AND RE-EMERGING DISEASE INVESTIGATIONS

### Porcine Epidemic Diarrhoea ruled out in suspected case in finishers

Sudden onset watery diarrhoea in all pens of a group of indoor finishers in good body condition prompted the farmer to seek veterinary advice. Given the clinical signs and with no immediate explanation for the rapid onset of disease in over 50% of the pigs, the veterinary practitioner reported the case to APHA as suspect porcine epidemic diarrhoea (PED). PED is a notifiable disease in England and Scotland and it is a legal requirement that suspicion or confirmation of PED is reported promptly as detailed on the Defra website: https://www.gov.uk/guidance/porcine-epidemic-diarrhoea-how-to-spot-and-report-the-disease#if-you-suspect-ped

Faecal samples from typically affected pigs were submitted to APHA for rapid PED PCR testing and negative results were reported the next day. No pigs died and the diarrhoea resolved over the next 48 hours. One unusual feature that was noted was marked reddening of the perineum and skin contacted by the watery diarrhoea, suggesting an irritant effect, this also rapidly resolved. Bacteriology did not indicate any involvement of *Salmonella* or *Brachyspira* species in the diarrhoea and this incident may not have involved infectious disease. Fortunately this case tested negative for PED virus, however, the prompt reporting of the case by the farmer and veterinary practitioner serves as a reminder to others and enabled prompt PEDV testing. Rapid detection of any potential emerging infectious disease is key to successful control. The following information will help pig keepers and vets recognise possible PED:

- *Diarrhoea spreads rapidly in a group of pigs over a few days*
- *High proportion of pigs in a group develop diarrhoea (up to 50% or more)*
- *High mortality (30-100%) in sucking piglets if due to a virulent strain of PED*
- *Disease can affect any age of pig*
- *The diarrhoea tends to be watery*
- *Diarrhoea in older pigs is transient and they recover*
- *Sometimes pigs also show reduced appetite and lethargy and may vomit*

Diagnostic submissions from non-suspect cases of diarrhoea in pigs submitted to APHA continue to be routinely tested for PEDV on a weekly basis. None have been positive for PEDV in over 660 diagnostic submissions tested under AHDB Pork funding since June 2013. The last diagnosis of PED recorded in the GB diagnostic database (VIDA) was in 2002 on a farm in England. Further information on PEDV is available on this link: https://pork.ahdb.org.uk/health-welfare/health/emerging-diseases/pedv

Although no PED outbreaks involving virulent strains have been reported in Europe since that described in the Ukraine in 2014 (Dastjerdi and others, 2015), other PEDV strains are still actively circulating. In the USA, outbreaks continue to be diagnosed albeit at a lower level than during the emergence of the disease (AASV, 2018). Several interesting podcasts are available on-line describing US experiences with PED outbreaks https://pighealthtoday.com/pedv-still-taking-major-toll-on-us-sow-farms/. Key messages from these include:

- Outbreaks with high young piglet mortality continue to occur in breeding herds
- Herd closure, sow exposure, cleaning and disinfection, vehicle biosecurity are integral to recovery
- Need to instill awareness in pig keepers to contact vet if unusual/severe disease seen
- Still much to learn about best PEDV vaccination protocols
- Evidence for a feed source of infection in some outbreaks

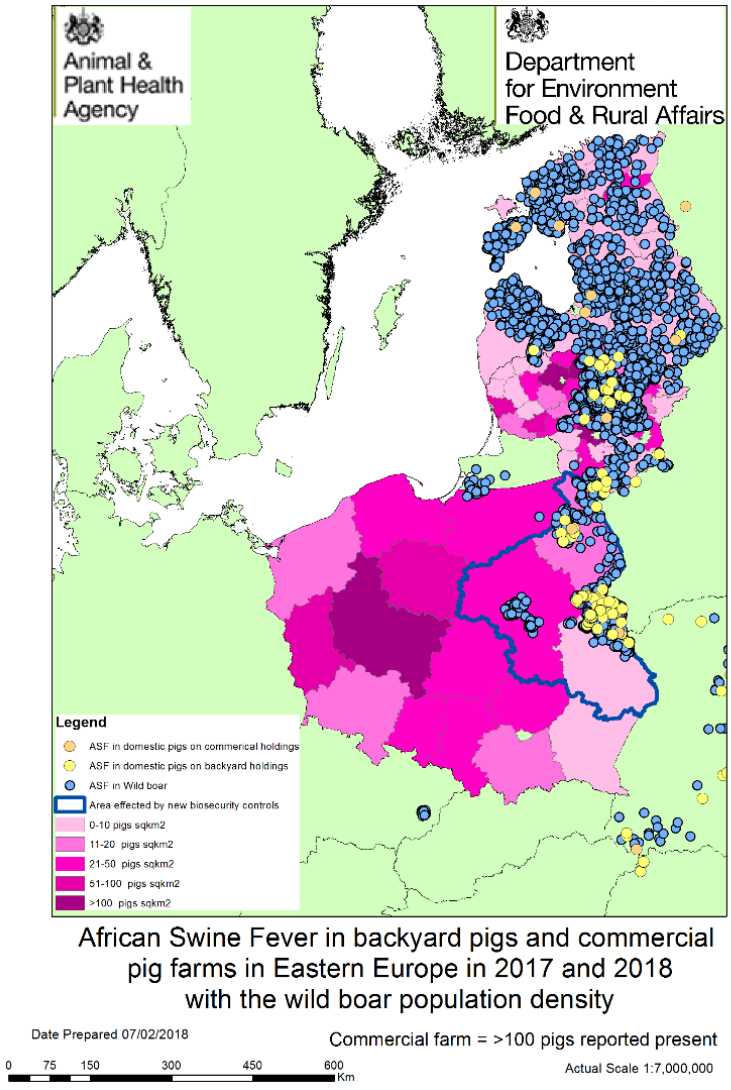
- Soyabean meal favours PEDV survival (Dee, 2017)
- PEDV survival demonstrated in feed ingredients in simulated global shipping (Dee, 2017)
- Master plan proposed for dealing with new and emerging disease outbreaks

There were several publications on PEDV in Preventive Veterinary Medicine. Perri and others (2018) described the investigation through a case control study in Canada which identified potentially contaminated feed as a significant risk factor for PED viral introduction to Canadian pig farms in 2014. Toyomaki and others (2018) looked at farms affected in the early stages of PED emergence in Japan to identify management, waste disposal and biosecurity practices as risk factors for PEDV introduction in different pig herd types.

## Westward spread of African Swine Fever in Poland

An update on African Swine Fever (ASF) in Eastern Europe was published in December (Defra, 2017). Outbreaks of ASF have now been reported in Romania, Czech Republic, Poland, Lithuania, Latvia, Estonia, Ukraine and Russia. The most significant issues in the last quarter are the continued detection of multiple ASF cases in wild boar further west and north in Poland. The cases occurring near Warsaw are in fact in an area of fairly low wild boar density and lower commercial pig farm density as shown in Figure 3. The blue line represents the area in Poland within which there are extra ASF disease control measures including depopulation of backyard pigs. In northern Poland there has been recent cross border spread in wild boar from Kaliningrad, Russia which is of particular concern as this is into an area of significantly higher wild boar density. An increase in wild boar cases of ASF has also been reported in Lithuania.

Figure 3: ASF in the Baltic States and Poland in 2017-18



In the Czech Republic, the outbreak of ASF in wild boar has been limited to a small region in Ziln and indications are that the controls (which includes fencing of high risk area, intensive wild boar culling and testing in high and low risk areas, location and testing of dying wild boar) have been effective. Over 200 wild boar have tested positive for ASF, all within the infected high risk zone.

ASF has re-occurred in Romania and Moldova. Two backyard farm outbreaks were reported in North East Romania and two in Moldova which has also had a few wild boar cases. Russia and Ukraine continue to report outbreaks in domestic pigs. A geographical jump occurred into pigs in Kalingrad which is thought likely to be the source of infection for the detection of ASF in wild boar in Poland across the border there as described above. There are also more reports of cases in wild boar in the province in Ukraine near the border with Hungary, Slovakia and Romania and countries bordering Ukraine have enhanced wild boar surveillance and border checks.

The risk of ASF introduction to the UK pig population was raised from very low to low. The main risk lies in illegal feeding of pork or pork products to pigs and this prompted another phase of the illegal waste feeding campaign https://www.gov.uk/government/news/pig-keepers-warned-not-to-feed-kitchen-scraps-to-pigs-due-to-african-swine-fever-risk and further targeted communications are planned. There are several posters and signs warning farm staff and the public about the risk of feeding meat and meat products to pigs available from AHDB Pork: https://pork.ahdb.org.uk/health-welfare/health/emerging-diseases/african-swine-fever/.

### Piglet septicaemia due to *Klebsiella pneumoniae*

APHA authors published a paper on *Klebsiella pneumoniae* subsp. *pneumoniae* (Kpp) septicaemia outbreaks in pigs (Bidewell and others, 2018) summarising the findings in cases diagnosed from 2011-2014. The outbreaks are strictly seasonal between May and September each year and have occurred each year from 2011 to 2017. They mainly present as sudden deaths of well-grown pre-weaned pigs from 10-days-old on outdoor breeding units, mostly in East Anglia, although diagnoses have been made in the South West and North Eastern regions. All outbreaks involved Kpp sequence type 25 strain with particular molecular features. No archived Kpp isolates of porcine origin pre-dating 2011 were identified as this emerging Kpp ST25 strain. This demonstrates the value of retaining pathogens as an archived resource for future emerging disease investigations. Further details are in previous APHA pig disease surveillance reports and there is information for vets and farmers on this link: http://ahvla.defra.gov.uk/documents/surveillance/diseases/klebsiella-vets.pdf

## UNUSUAL DIAGNOSES

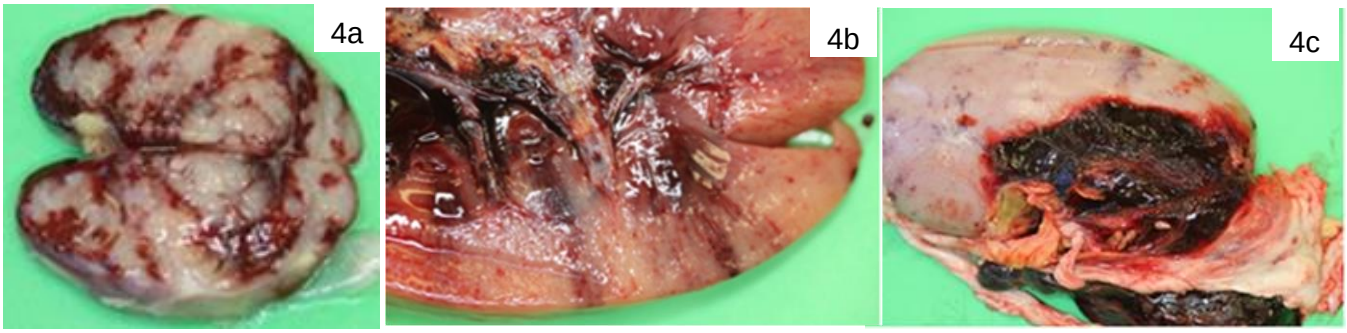
There were a number of unusual diagnoses or presentations this quarter; details of these have been included in monthly APHA or SAC CVS reports; http://ahvla.defra.gov.uk/vet-gateway/surveillance/reports.htm. These are kept under review to assess whether they justify initiation of emerging disease investigations.

### Sporadic haemorrhagic diathesis in a single pig

An eight-month-old minipig was submitted to investigate the cause of malaise and inappetance. The problem began two weeks earlier with an episode of epistaxis. This was followed by progressive development of anaemia, haematuria and tachycardia during which the pig remained non-pyrexic. Terminally, haemorrhages were present on visible mucous membranes. The companion pig was not affected. Post-mortem examination confirmed profound anaemia and widespread haemorrhages on serosal and mucosal surfaces, and in the trachea, abdomen, lungs, lymph nodes and kidneys (Figure 4). The clinical and pathological features meant that swine fevers were not suspected but consideration of the possibility of swine fevers should form part of the initial diagnostic assessment of such cases. Other potential causes of sporadic cases of haemorrhagic diathesis in pigs include septicaemia/endotoxaemia with disseminated intravascular coagulation, exposure to anticoagulants, ruminant pestivirus infection, idiopathic thrombocytopenia, bone marrow suppression, coagulation defects and porcine reproductive and

respiratory syndrome virus (PRRSV) infection. Laboratory investigation has not yet indicated the cause in this case, but PRRSV, bovine virus diarrhoea virus infection and thrombocytopenia (e.g. acquired immune-mediated) were not involved. A case series of sporadic haemorrhagic disease in pigs was described by Bidewell and others (2012) and guidelines for diagnostic investigation of haemorrhagic disease in pigs have been provided.

Figure 4: Haemorrhagic diathesis in single pig: lymph node (4a) and kidney (4b and 4c)




## Endocarditis and septicaemia due to *Streptococcus gallolyticus* infection

*Streptococcus gallolyticus* has been isolated from cases of either septicaemia/meningitis or endocarditis in seven pig diagnostic submissions between 2015 and 2017. Two linked cases were described in a previous 2016 pig surveillance report (APHA, 2016) and the occurrence of further cases has since been kept under review. In the septicaemia/meningitis cases, the organism was isolated in pure growth while growth was pure in only one of three endocarditis cases.

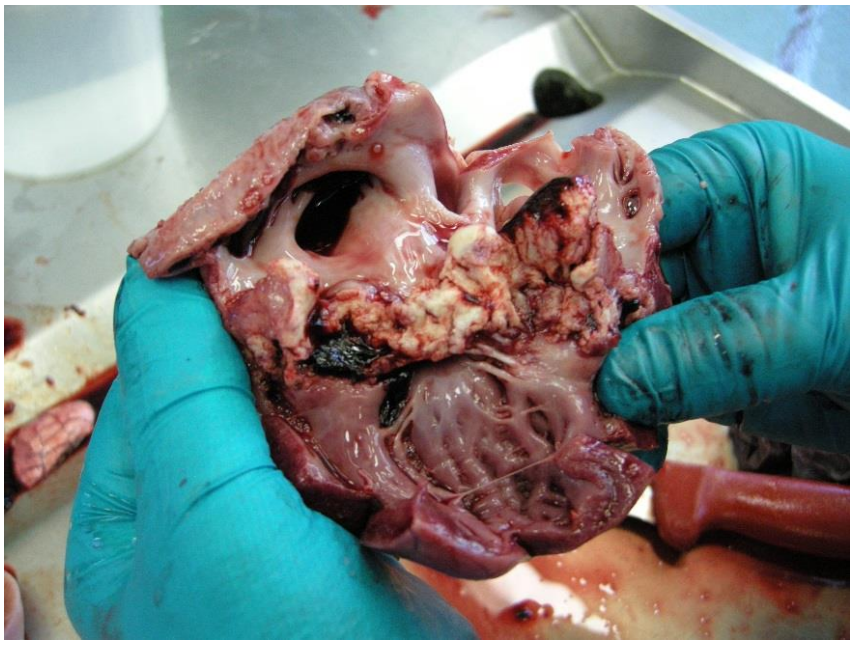


Figure 5: Vegetative valvular endocarditis lesions due to *Streptococcus gallolyticus*

This organism was formerly known as *S. bovis* biotype 1 and has been isolated from sporadic cases of endocarditis (Kongsted and others, 2016) and septicaemia in pigs elsewhere. These cases, one of which is shown in Figure 5, serve as a reminder that not all endocarditis in pigs is due to erysipelas or *Streptococcus suis*.

## 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.

### Outbreak of porcine reproductive and respiratory syndrome in naïve finishers

An outbreak of porcine reproductive and respiratory syndrome (PRRS) was diagnosed on a large unvaccinated indoor finisher unit. There was high morbidity, marked lethargy and inappetence, with respiratory disease, ongoing low level mortality and some sudden deaths. Submitted pigs all had pneumonia and generalised lymph node enlargement; one also had fibrinous pleurisy. The high morbidity and prolonged nature of the disease outbreak on this farm was considered to reflect the naïvety of the pig population on the premises and pigs leaving the source nursery were confirmed to be seronegative for PRRS. Another factor affecting the disease presentation and contributing to the mortality was concurrent disease, mainly pasteurellosis and multiple cases of fatal haemorrhage from gastric ulcers, as sequelae to PRRS. Severe, acute and subacute, multifocal to coalescing, necrotising and fibrino-suppurative pneumonias were identified in some of the pigs, from which *Pasteurella multocida* was isolated. The gross pathology of these lung lesions is illustrated in Figures 6a and 6b. This case highlights the complex clinical presentation and intercurrent disease that can occur as a result of PRRS virus (PRRSV) introduction into a naïve herd, as well as the value and importance of prompt veterinary investigation. During the initial stages of this investigation the suspicion of Aujeszky's disease (AD) was also reported. Samples were collected for official laboratory testing and no evidence of AD virus was detected. The pigs began to recover from about three weeks after the onset of disease. Cumulative mortality at the unit, which is usually between 1 and 1.5% for a batch, reached around 5%. The ORF5 gene sequence of the PRRSV detected showed close similarity to several sequenced in England in 2016 and 2017. The veterinary practitioner involved is investigating possible sources of PRRSV infection for the affected farm.

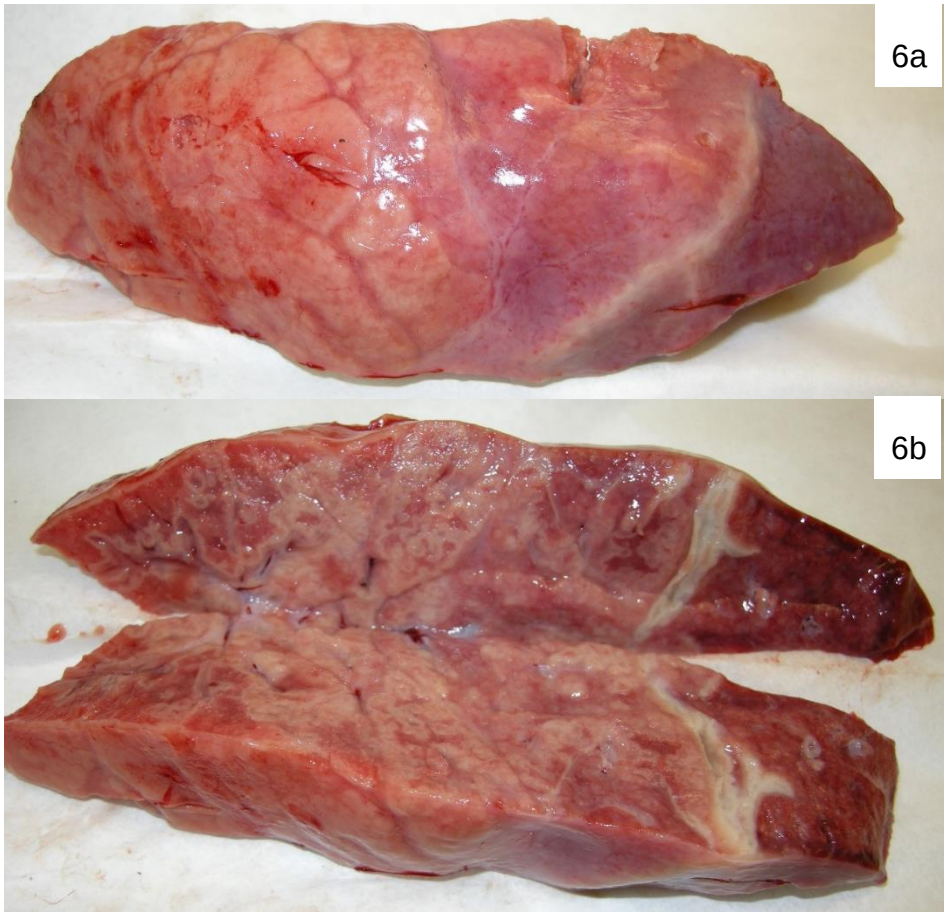



Figure 6: Pneumonic lung from a pig with PRRS and *Pasteurella multocida* infection (6a); the same portion of lung incised to reveal coalescing necrotising lesions (6b)

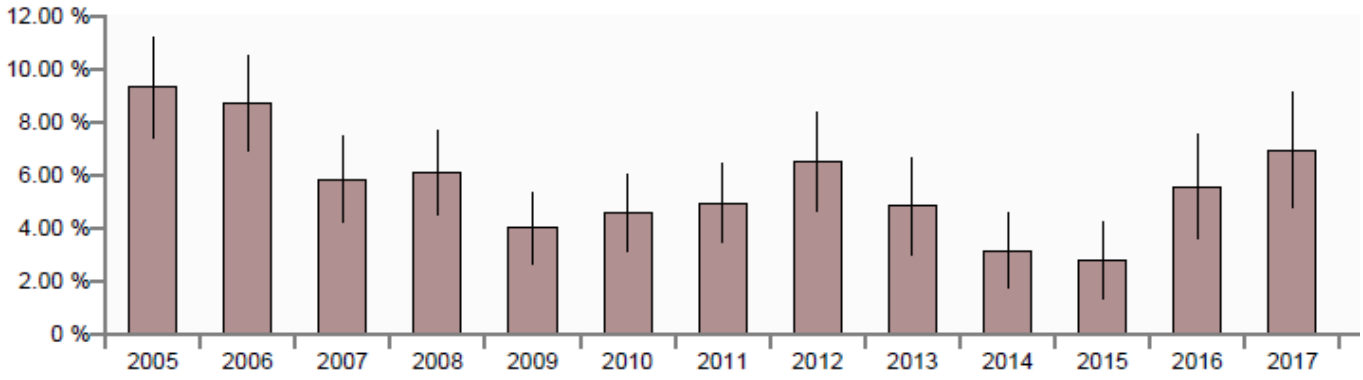
UK ORF5 sequence analysis of PRRSV detected in GB in 2017 continues to show increasing virus diversity, but no evidence of new virus clades to suggest that there have been new virus introductions into GB from outside the country. Features of PRRS diagnoses were reviewed in a recent surveillance focus article (Williamson and others, 2018).

Although it is recognised that increasing PRRSV diversity can affect the efficacy of field and vaccinal immunity, the timing of vaccination in relation to likely exposure to field challenge is also very important especially as protective immunity to PRRSV takes at least three weeks to develop after primary infection or vaccination. An interesting recent research paper assessed vaccination of pigs at one-day-old in field conditions (Jeong and others, 2018) and the results supported consideration of early vaccination where early post-weaning challenge is anticipated.

## Increased diagnostic rate of *Lawsonia intracellularis*-associated disease

*Lawsonia intracellularis*-associated disease was diagnosed on 39 occasions in 2017, on seven occasions with other concurrent diagnoses. The last two years have seen a rise in the GB diagnostic rate as shown in Figure 7 as GB incidents of *Lawsonia intracellularis*-associated disease expressed as % of diagnosable submissions. Seasonality data (not shown) indicates that each quarter in 2017 has a higher diagnostic rate than the previous. Given the current efforts to refine and reduce antimicrobial use on pig farms, further investigation is to be undertaken to obtain the opinions of veterinarians attending pig farms about possible reasons for this apparent rise in the diagnostic rate.

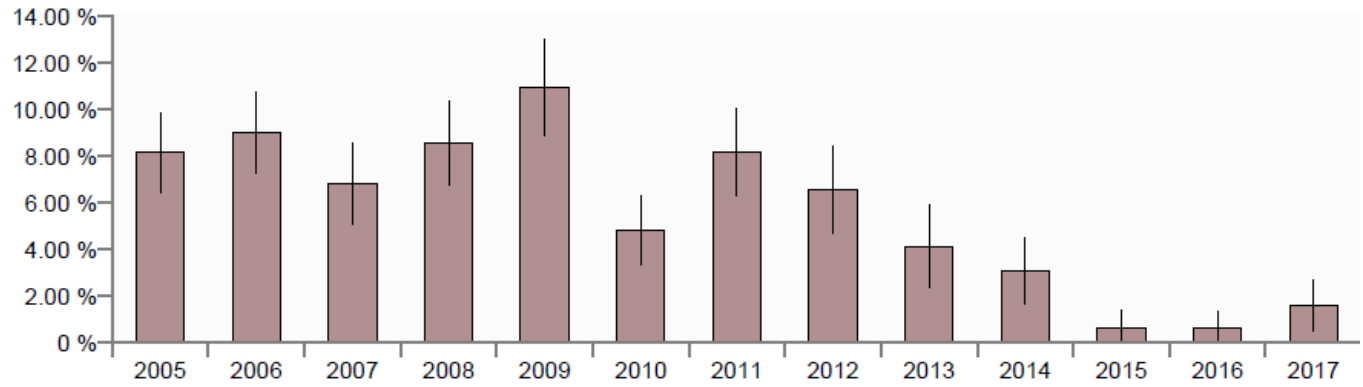
Figure 7: GB incidents of *Lawsonia intracellularis*-associated disease as % of diagnosable submissions 2005-2017




## Slight upward trend in swine dysentery cases in 2017

Diagnoses of swine dysentery in 2017 recorded in VIDA involved six holdings in England and were made in submissions from pigs in North Yorkshire, York and Humberside, East Anglia and Cheshire. Figure 8 shows the slight uplift in the annual diagnostic rate of swine dysentery in 2017.

Figure 8: GB incidents of swine dysentery as % of diagnosable submissions 2005-2017



In 2016, there were swine dysentery diagnoses recorded in VIDA in submissions from a total of three holdings which were in South or North Yorkshire. Where *Brachyspira hyodysenteriae* isolates were available for testing from the 2017 cases, antimicrobial minimum inhibitory concentrations (MICs) were assessed at no charge as part of antimicrobial surveillance and no isolates were detected where the MIC was above the clinical break point. The development of resistance of *Brachyspira hyodysenteriae* to antimicrobials commonly used in the control of swine dysentery is a recognized risk, particularly in situations where medication is used long-term. Control of swine dysentery using alternative interventions (all-in, all-out management systems; cleaning and disinfection; and partial and total depopulation leading to eradication) is vital to prevent the development of wider antimicrobial resistance.

AHDB Pork have been promoting awareness of the Significant Diseases Charter amongst producers and encouraging them to sign up and declare diseases like swine dysentery, should they be diagnosed. The Charter is an extension of the earlier Swine Dysentery Producers Charter which came into being in 2009 in response to significant spread of swine dysentery and increased diagnostic rate at that time. The initiative provided on-line advice about swine dysentery which is available on this link: https://pork.ahdb.org.uk/health-welfare/health/swine-dysentery/

## HORIZON SCANNING

### Porcine circovirus 3 infection

The last APHA pig disease surveillance report (APHA, 2017b) described the detection of a novel porcine circovirus, porcine circovirus type 3 (PCV3) in samples from both healthy pigs and pigs with a variety of disease presentations from several countries including the US, China, Italy, Poland and the UK. Evidence suggests that PCV3 is widespread in pigs globally but until there has been more systematic evaluation of the virus in diseased and healthy pigs, and experimental infections, there is still uncertainty regarding how significant a role PCV3 plays in porcine disease and this has been emphasised in some publications (Franzo and others, 2018). No experimental infections with PCV3 have been reported and no zoonotic concern is reported. Archived sample sets in GB pigs which are available for possible PCV3 testing, funding allowing, are being identified.

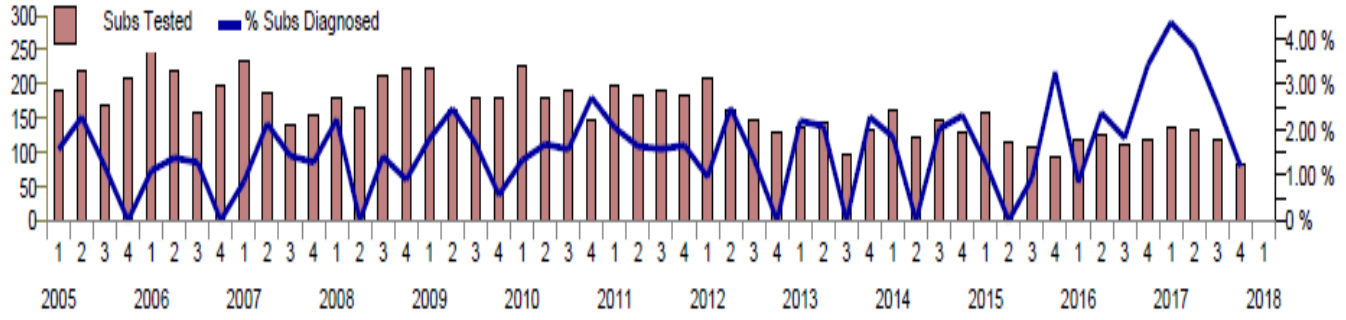
### Vesicular disease due to Senecavirus A persists in the USA

Vesicular disease outbreaks associated with Senecavirus A in pigs have been reported in the Americas and parts of Asia, for example, China and Thailand, as detailed in several APHA pig disease surveillance reports since last half of 2015. Since an upsurge of cases in 2015, vesicular disease has remained active in the US with an industry website reporting that some Midwestern states have had more outbreaks in 2017 than were seen for the whole of the US in 2015 when 200 outbreaks were reported (https://www.agweb.com/article/be-extra-cautious-with-senecavirus-a/). The message to pig keepers and veterinarians here is that cases of vesicular disease must be reported as suspect notifiable disease to APHA promptly in order to investigate the possible involvement of notifiable vesicular disease viruses, in particular foot and mouth disease virus https://www.gov.uk/government/collections/notifiable-diseases-in-animals. Only after ruling out the presence of notifiable disease, would testing for Senecavirus A be allowed. A diagnostic PCR is available at the Pirbright Institute for use in this scenario for detection of a SVA-associated vesicular disease outbreak.

### Potential issues in vitamin E and A supply

There is a current crisis in the market for vitamins A and E as a results of two main factors; closure of some Chinese manufacturing because of new pollution controls, and a fire in a major factory in Germany. World supply of a number of vitamins can no longer meet demand and a number of vitamin prices are affected of which vitamins A and E are most affected at present. Diets of rapidly growing animals fed supplemented concentrate feed are potentially most at risk. The increased diagnostic rate for vitamin E/selenium associated disease (mulberry heart and hepatosis dietetica) noted in the first quarter of 2017 was not related to this issue and has not continued into later quarters of the year as shown in Figure 9.

Figure 9: Seasonality of GB incidents of vitamin E/selenium-associated disease 2005-2017




Pig nutritionists are very aware of the issue and advice on the situation for Pig Veterinary Society members was placed in the member's section of the Society's website. The numbers and rate of vitamin E/selenium-associated disease diagnoses, and any unusual age occurrence or disease presentation, will be kept under review in scanning surveillance submissions as they represent a signal of the potential adverse effects on pig health and welfare that could occur if dietary supplementation of vitamin E becomes marginal or inadequate.

## Straw bedding shortage in the UK

Communications have highlighted potential livestock forage shortages in parts of the UK, principally of concern to ruminant enterprises. However, the concurrent straw bedding shortage is also of concern to pig keepers. Where straw is in short supply, prices are likely to rise and farmers might cut back the amount of straw used for bedding on farms. A reduced amount of bedding increases the amount of faecal contamination of animals. This will raise the risk of disease, in particular enteric disease with neonatal and post-weaned pigs being at most risk. Reduced bedding can also adversely affect the management of respiratory disease. Using less bedding may also result in dirtier animals which can affect their suitability for presentation at abattoirs. Farmers may seek alternative types of bedding such as waste paper, or recycled wood shavings, and the issues to consider when considering alternative bedding materials were highlighted in an information note: http://ahvla.defra.gov.uk/documents/surveillance/diseases/bedding-shortage-info-jan18.pdf which also has links to further industry advice.

## REFERENCES

AASV (2018). Porcine epidemic diarrhoea virus – what's new this week? https://www.aasv.org/Resources/PEDv/PEDvWhatsNew.php accessed February 27th 2018

APHA (2016) Emerging Threats Quarterly Report, Pig Diseases Vol. 20: Q4: page 6. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/601597/pub-survrep-p0416.pdf

APHA (2017a). APHA Briefing Note 01/17 Extension of free carcase collection areas in England for diagnostic post mortem examinations http://ahvla.defra.gov.uk/documents/ov/Briefing-Note-0117.pdf

APHA (2017b) Emerging Threats Quarterly Report, Pig Diseases Vol. 21: Q3: page 13 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/664134/pub-survrep-p0317.pdf

Bidewell C; Williamson SM; Whitaker K; Wessels ME; Barnett J; Scholes SFE; Gaudie CM 2013 Sporadic cases of multiple haemorrhages in pigs. Pig Journal 68, 90-94.

Bidewell Cornelia A., Susanna M. Williamson, Jon Rogers, Yue Tang, Richard J. Ellis, Liljana Petrovska, Manal AbuOun (2018). Emergence of *Klebsiella pneumoniae* subspecies *pneumoniae* as a cause of septicaemia in pigs in England. Published: February 22, 2018 http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0191958

Dastjerdi A, Carr J, Ellis RJ, Steinbach F, Williamson S. (2015). Porcine Epidemic Diarrhoea Virus among Farmed Pigs, Ukraine. Emerging Infectious Disease 21(12): 2235-2237. https://dx.doi.org/10.3201/eid2112.150272

Defra (2017). African Swine fever in Eastern Europe. Updated Outbreak Assessment #12. December 2017 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/664464/asf-europe-update12.pdf

Dee S. What are the feed risks from biologics? (2017). Feed: Commanding New Focus. 48th American Association of Swine Veterinarians' Annual Meeting. 2017; 3-5

Franzo Giovanni, Matteo Legnardi, Claudia M. Tucciarone, Michele Drigo, Francini Klaumann, Mascha Sohrmann and Joaquim Segalés (2018). Porcine circovirus type 3: a threat to the pig industry? Veterinary Record 182: 83

Kongsted H., Salomonsen C., Haugegaard S. (2016). Unusual pathogens – Case reports of four rare findings. Poster PO-PF3-011 in Proceedings of the 24th International Pig Veterinary Society Congress and 8th European Symposium of Porcine Health Management page 268

Jeong Jiwoon, Seeun Kim, Kee Hwan Park, Ikjae Kang, Su-Jin Park, Siyeon Yang, Taehwan Oh, Chanhee Chae (2018). Vaccination with a porcine reproductive and respiratory syndrome virus vaccine at 1-day-old improved growth performance of piglets under field conditionsVeterinary Microbiology, 214, pp. 113-124

Perri, A.M., Zvonimir Poljak, Cate Dewey, John C.S. Harding, Terri L. O'Sullivan (2018). An epidemiological investigation of the early phase of the porcine epidemic diarrhea (PED) outbreak in Canadian swine herds in 2014: A case-control study. Preventive Veterinary Medicine 150 (2018) 101–109

Toyomaki, H., Satoshi Sekiguchi, Yosuke Sasaki, Masuo Sueyoshi, Kohei Makita (2018). Factors associated with farm-level infection of porcine epidemic diarrhea during the early phase of the epidemic in Japan in 2013 and 2014. Preventive Veterinary Medicine 150 (2018) 77–85

Williamson, S. Frossard, J-P. and Thomson, J. (2018). PRRS diagnoses in Great Britain 2016/17 Veterinary Record 182: 133-135