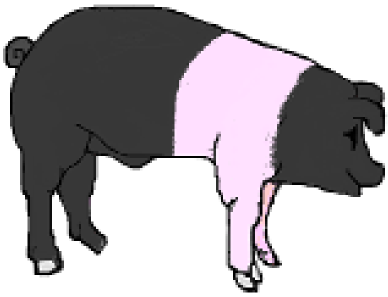
Animal & Plant Health Agency



SRUC

GB pig quarterly report

Disease surveillance and emerging threats

Volume 24: Q3 – July to September 2020

Highlights

- **African Swine Fever summary update – page 4**
- **Disease incident involving skin lesions and transient mortality – page 9**
- **Porcine reproductive and respiratory syndrome diagnoses in 2020 – page 11**
- **Upward trend in diagnostic rate of *Actinobacillus pleuropneumoniae* – page 13**
- **Novel *Mycoplasma* "*Mycoplasma haemosuis*" in Germany– page 14**
- **Review of swine enteric alphacoronavirus in China – page 15**

Contents

Introduction and overview 1

New and re-emerging diseases and threats 4

Unusual diagnoses or presentations 8

Changes in disease patterns and risk factors 11

Horizon scanning 14

References 16

Editor: Susanna Williamson,
APHA Bury St Edmunds
Phone: + 44 (0) 1284 724499
Email: Susanna.williamson@apha.gov.uk

Introduction and overview

This quarterly report reviews disease trends and disease threats for the third quarter of 2020, July to September. It contains analyses carried out on disease data gathered from APHA, Scotland's Rural College (SRUC) Veterinary Services and partner post mortem providers and intelligence gathered through the Pig Expert Group 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 available on GOV.UK:
https://www.gov.uk/government/publications/information-on-data-analysis

Pig disease surveillance dashboard outputs

Diagnoses made in the third quarter of 2020 compared to the third quarter of 2019 through the GB scanning surveillance network are illustrated in Tables 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

Table 1: GB scanning surveillance 15 most frequent diagnoses in Q3-2020 and Q3-2019

Table 1a: Fifteen most frequent diagnoses Q3-2020 (total 236)
Streptococcus suis
PRRS - pneumonia
PRRS - systemic
Rotavirus
Salmonellosis - Typhimurium
Actinobacillus pleuropneumoniae
Brachyspira pilosicoli
Colibacillosis - enteric
Mycoplasma hyopneumoniae
Pasteurella multocida pneumonia
Streptococccal meningitis
Proliferative enteropathy (*Lawsonia* sp)
Swine dysentery – *B. hyodysenteriae*
Coccidiosis
Gastric ulceration

Table 1b: Fifteen most frequent diagnoses Q3-2019 (total 249)
PRRS - pneumonia
Brachyspira pilosicoli
Rotavirus
Streptococcus suis
Swine dysentery – *B. hyodysenteriae*
Proliferative enteropathy
Streptococccal meningitis
Pasteurella multocida pneumonia
PRRS - systemic
Salmonellosis - Typhimurium
Klebsiella septicaemia
Salmonellosis: monophasic ST-like variants
Swine influenza
Colibacillosis - enteric
Colibacillosis – oedema disease

Note that diagnoses made in low numbers are not shown and that further diagnoses are likely to be added for records for submissions made in Q3-2020 which are finalised at a later date. The surveillance data for all diagnostic submissions to the GB scanning surveillance network in the third quarter of 2020 from an enhanced pig disease surveillance dashboard are summarised in Figure 1.

Figure 1: Summary data for 404 submission records in Q3-2020 (400 in Q3-2019)

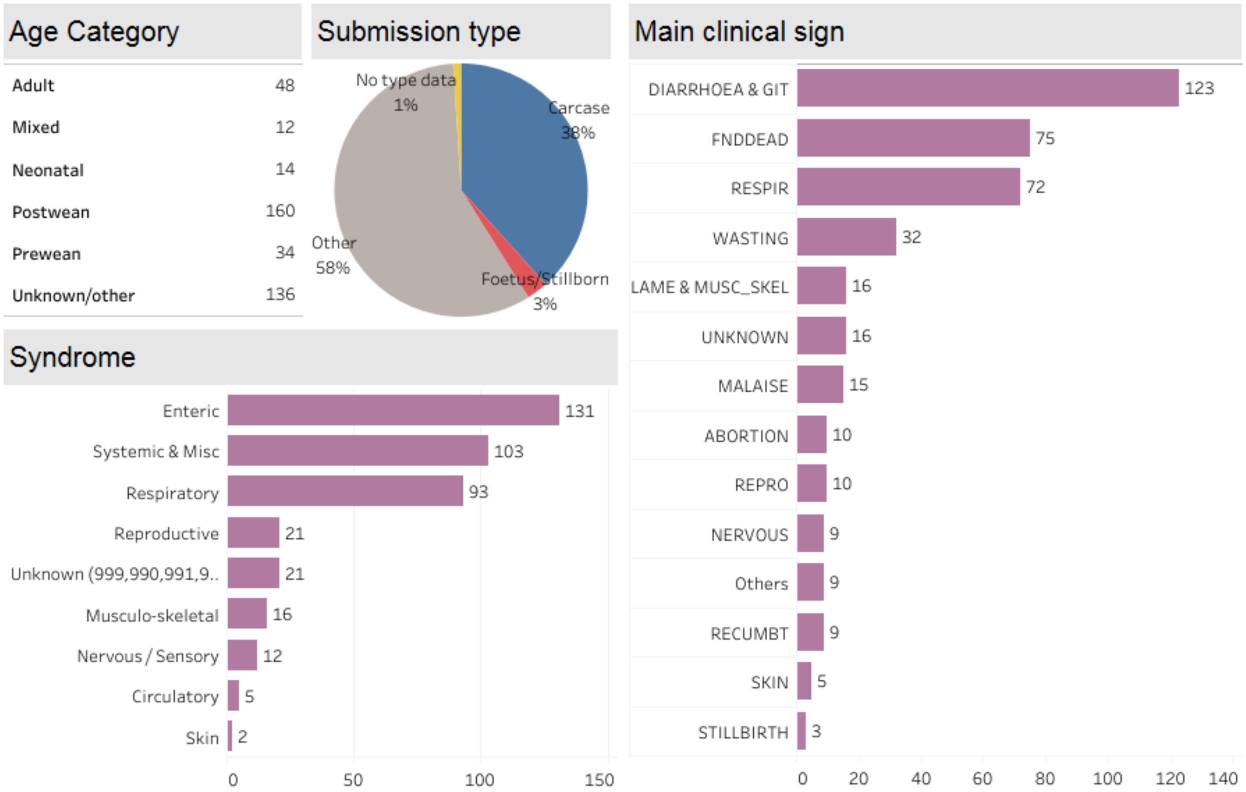


Figure 2: Summary surveillance data for carcase submissions in Q3-2020

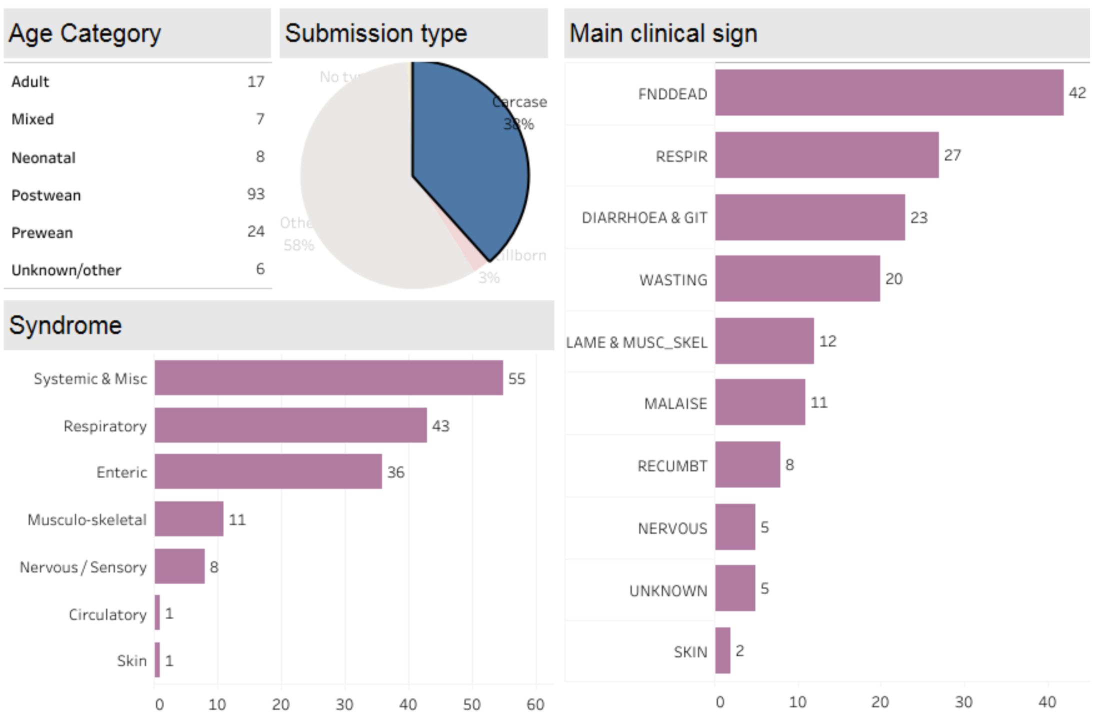
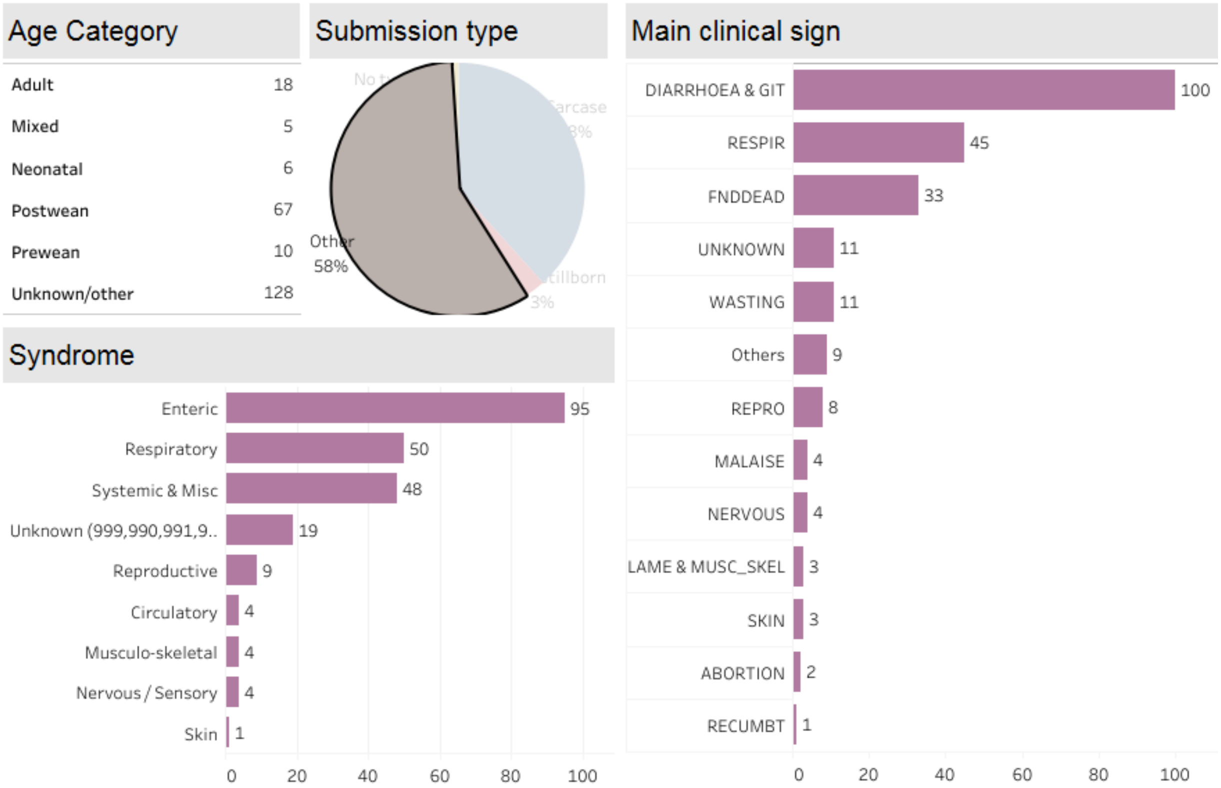


Figure 3: Summary surveillance data for non-carcase submissions in Q3-2020



In the third quarter of this year, broadly in line with Q3-2019, diagnostic submissions were most common from pigs with diarrhoea, respiratory signs or found dead, which corresponds with the disease syndromes most commonly reported; enteric, respiratory and systemic. The total number of GB diagnostic submissions for Q3-2020 was 128% of the average total number of submissions in the previous four years for Q3 although there has been a reduction in non-carcase submissions to APHA and an increase in non-carcase submissions to SRUC VS over this time period. These diagnostic submissions are voluntary and subject to several sources of bias. One of these is variation in the submission sample type between quarters and over time. The sample type influences the ability to reach a diagnosis (carcase submissions allowing fuller disease investigation), and certain disease syndromes can be more readily investigated by non-carcase submissions than others. The different disease profile of carcase submissions compared to non-carcase submissions is illustrated in Figures 2 and 3. Submission of faecal or other enteric samples to investigate outbreaks of diarrhoea is usually more straightforward than sampling to investigate systemic and respiratory disease; this is supported by the profile of non-carcase submissions (Figure 3) which shows enteric signs and syndrome to be predominant. In contrast, pigs found dead or with respiratory disease are more common in carcase submissions (Figure 2). External factors also influence submission type, and in the second quarter of 2020, in part due to the effects of the Covid-19 lockdown, carcase submissions represented 49% of submissions compared to 38% in this third quarter. Three of the five most common diagnoses in Q3-2020 are also in the top five diagnoses in Q3-2019; namely disease due to porcine reproductive and respiratory syndrome (PRRS), *Streptococcus suis*, and rotavirus (Tables 1a and b).

New and re-emerging diseases and threats

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

Summary update of African swine fever

Updated assessments continue to be published on African swine fever (ASF) in South East Asia and Oceania, and in Europe including Belgium: https://www.gov.uk/government/collections/animal-diseases-international-monitoring

One of the most significant developments in Europe during the third quarter of 2020 was Germany reporting its first case of ASF in a wild boar found dead in Brandenburg, about 6km from the German-Polish border (FLI, 2020), on September 10th. The decomposed nature of the carcase, and subsequent analyses on this boar and others found soon afterwards, suggested that ASFV was introduced into Germany in the first half of July 2020 or possibly earlier (Sauter-Louis and others, 2020). Control measures immediately implemented by Germany included intensive searches to find and remove dead wild boar in the infected zone that was established. Further ASF cases were detected in dead or sick wild boar within and outside the first infected zone established. Since the first report and until November 11th 2020, 147 confirmed cases of ASF were reported to OIE in wild boar in four core infected zones in eastern Germany. ASF was also found in late October in wild boar in a second state in east Germany, Saxony, which borders Brandenburg state to the south.

All ASF cases in Germany have been in wild boar either shot or found dead, apart from one reported as “subclinical”; no domestic pigs have been affected with ASF to date. Buffer zones of 5km around the core infected zones will be subjected to intensive shooting to create corridors free of wild boar. Fences are to be placed around these buffer zones. More permanent fences are planned at the Polish border to replace temporary fencing to prevent entry of wild boar. Poland continues to report new ASF cases in wild boar, some of which are found along the border with Germany.

Outside the core infected zones in Germany are risk zones which themselves are surrounded by a buffer zone; each zone has specific control measures (PigProgress, 2020) which follow advice from specialists of the EU Veterinary Emergency Team (EUVet). The approach reflects the developments in epidemiological understanding of ASF recently published in a review by Chenais and others (2019), which particularly describes the role of wild boar in ASF epidemiology and their impact on ASF persistence and transmission. Podgórski (2020) also provides practical recommendations for ASF control based on experiences in Poland since 2014.

Cases of ASF in wild boar have continued across most ASF-affected countries in Europe (Figure 4). Domestic pig outbreaks of ASF have occurred in Romania, Poland, Bulgaria, Moldova, Ukraine and Russia (Figure 5). In Romania, most outbreaks in domestic pigs have been on backyard holdings, with a few commercial pig premises affected, and a large commercial pig farm has been affected in Russia.

Figure 4: ASF reported in wild boar in Europe May to October 2020 (mapped on 27-10-20)

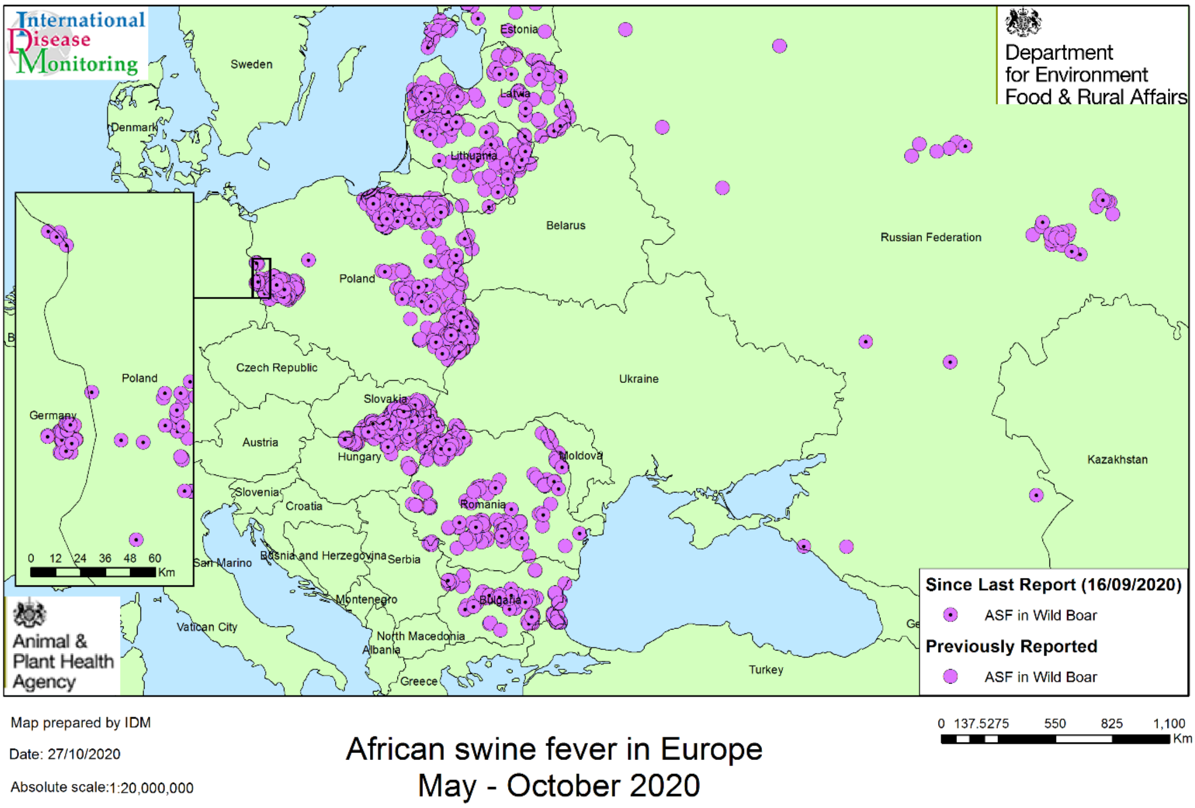
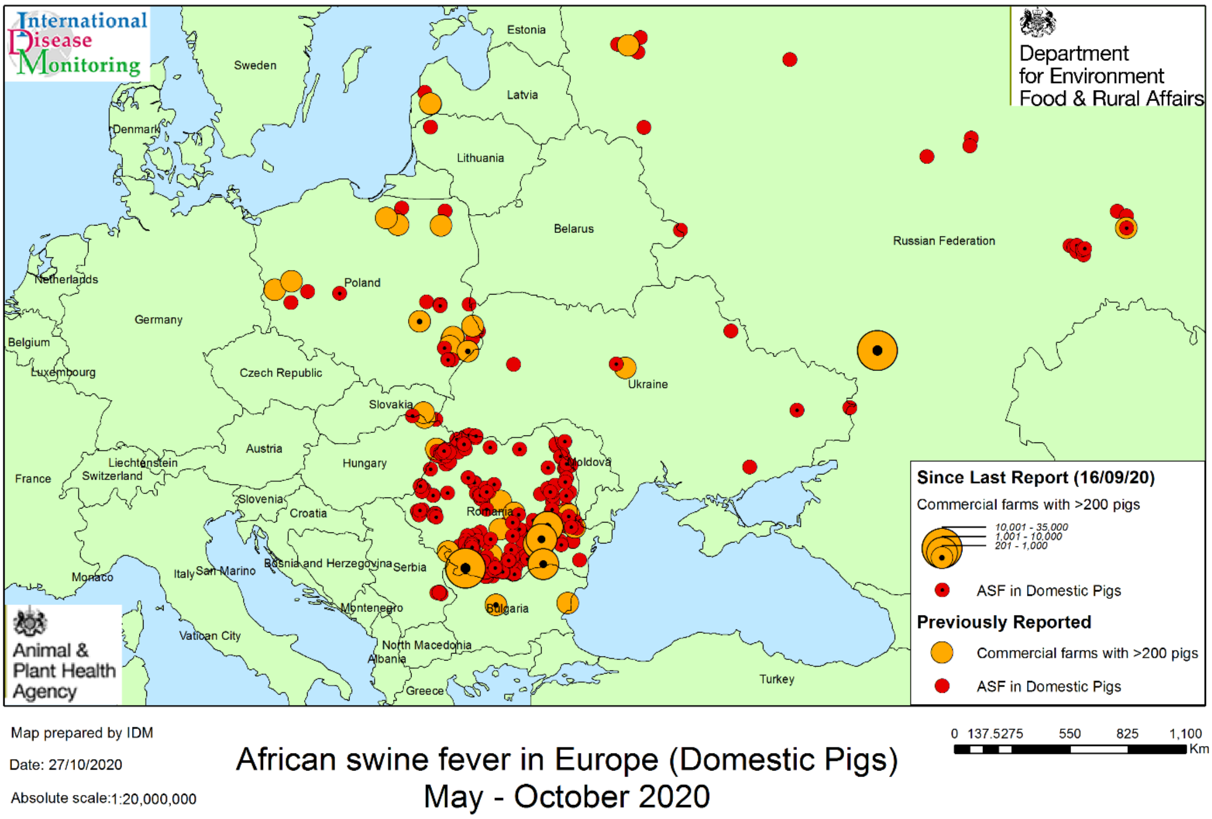


Figure 5: ASF reported in domestic pigs in Europe May to October 2020 (mapped 27-10-20)

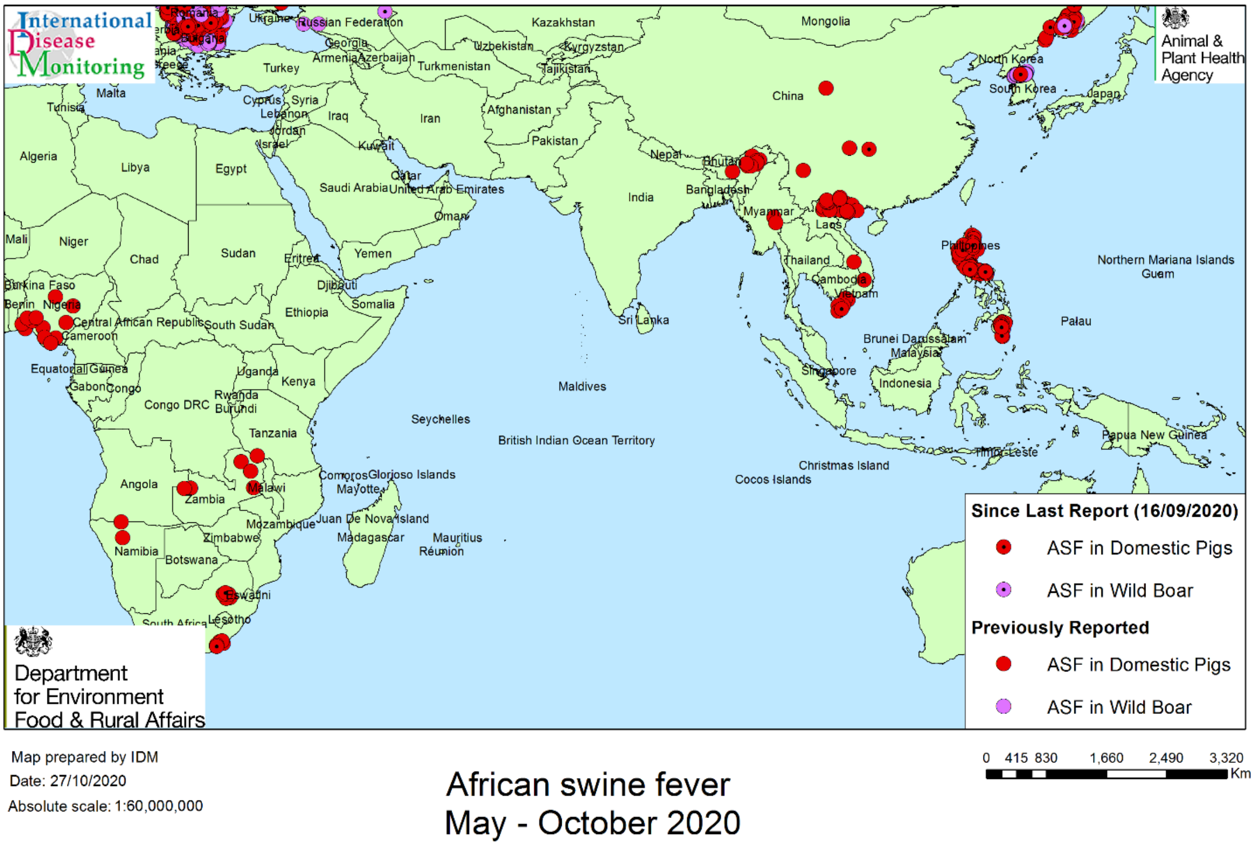


There have been no further reports of ASF cases in wild boar in Belgium since March 2020 and Belgium remains officially free of ASF in domestic pigs.

The overall risk to the UK, given the current distribution of ASF, remains at medium. Updates on the ASF situation in Europe are available at: https://www.gov.uk/government/publications/african-swine-fever-in-pigs-and-boars-in-europe

In Asia and Oceania, ASF has now been reported in China, Hong Kong, Vietnam, Cambodia, Laos, Mongolia, Myanmar, South Korea, North Korea, the Philippines, India, East Timor and Papua New Guinea since first identified in China in August 2018. The confirmation of ASF in multiple countries across Asia and Oceania, and the wide geographic range of infection found within these countries, demonstrates the potential for further spread of ASF into and within the domestic pig and wild suid populations in this part of the world. Most ASF reported in this region (Figure 6) is in domestic pigs; the situation in wild boar is less clear with few, if any, reports in wild boar in most affected countries apart from South Korea. There is concern amongst some experts that wild boar surveillance is inadequate in most countries and that undetected transmission of ASF in wild boar in Asia threatens the success of ASF control policies in the region (Vergne and others, 2020).

Figure 6: ASF cases reported in South East Asia and Africa from May to October 2020 (mapped on 27-10-20)



South Korea is an exception to this; the country has reported multiple wild boar ASF cases close to the border with North Korea detected through their surveillance activities. In early October, two new outbreaks on domestic pig farms were confirmed by South Korea, their first in domestic pigs since October 2019. The affected farms are located in the northern province of Gangwon which borders North Korea and infected wild boar are considered the most likely source of the latest outbreaks in domestic pigs.

In late October 2020, the Food and Agriculture Organization of the United Nations and World Organization for Animal Health (FAO and OIE, 2020) announced a joint "Global Control of ASF Initiative" calling for all nations and partners to join forces to combat ASF. This aligns with the major campaign begun by the European Food Safety Authority to raise awareness and help halt the spread of African swine fever: https://www.efsa.europa.eu/en/StopASF#/

Global disease reports produced monthly by the US Swine Health Information Centre are also a good source of information and these can be viewed and received by email by signing up: https://www.swinehealth.org/global-disease-surveillance-reports/

The Pig Veterinary Society sponsored a webinar on ASF in June 2020 aimed particularly at veterinarians who are less familiar with pigs. This is available to view here: https://thewebinarvet.s3-eu-west-1.amazonaws.com/Webinar_Video_2020/16Jun2020-African+Swine+Fever+%E2%80%93+what+ALL+vets+need+to+know.mp4

Information on ASF outbreaks has been disseminated to veterinary practices and Pig Veterinary Society members. The assistance of veterinary practitioners in raising awareness about ASF amongst their pig-keeping clients in UK is vital together with advising them on resolving biosecurity weaknesses to reduce the risk of introduction.

The biggest risk for ASF virus entering the UK's pig population remains pigs or wild boar eating infected pork or pork products derived from infected animals. The ASF virus can survive for months in smoked, dried and cured meats, and for years in frozen meat. The greatest risk of introduction is from meat products brought into the UK from affected countries as personal imports; the commercial trade of such products is not permitted from ASF- affected areas. Pig keepers are reminded that it is illegal to feed pigs catering, kitchen or domestic waste or meat/meat products. Providing dedicated clothing and boots for staff and visitors, limiting visitors to a minimum, and preventing outside vehicles or equipment which may be contaminated from coming on to the farm, are also all valuable procedures to reinforce. An ASF poster is available for pig keepers summarising this information:

http://apha.defra.gov.uk/documents/surveillance/diseases/african-swine-fever-poster.pdf

Images of the clinical signs and pathology of ASF are available; suspect cases must be reported promptly to APHA and this is followed by an official veterinary investigation: https://www.gov.uk/guidance/african-swine-fever and http://apha.defra.gov.uk/documents/surveillance/diseases/african-swine-fever-images.pdf

Porcine epidemic diarrhoea surveillance

Since the emergence of virulent porcine epidemic diarrhoea (PED) from mid-2013 in the USA and elsewhere, the virulent PED virus strain has only been reported on the European continent in pigs in the Ukraine. However, disease due to reportedly less virulent strains (known as INDEL strains) has been diagnosed in pigs on several continents, including countries in Europe and these continue to occur. A German 2019 outbreak was described by Karte and others (2020). The causative strain was moderately virulent and remains closely related to the INDEL strains reported previously in Europe, including Germany. The paper describes evolution in the PED virus that has given rise to a new cluster comprising recent strains from Germany, Hungary and France in 2019. The first signs of disease were in lactating sows which showed inappetence and, soon afterwards, “mushy” diarrhoea. There was no fever or sow mortality and sows recovered completely in three to four days. Their piglets, which were about 14 days old, showed diarrhoea two to three days after the sows. Three farrowing batches (sows and their litters) showed clinical signs of PED and the rise in preweaning mortality ranged from 10 to 30%. Morbidity was 60 to 90% in sows and 70 to 100% in piglets. Some weaners also showed diarrhoea and poor growth. Acute rapidly spreading diarrhoea affecting sows and piglets is thus a good signal for suspecting PED.

PED due to any strain remains notifiable in England and Scotland and suspicion of disease, or confirmation of infection, must be reported (Defra, 2015; Scottish Government, 2016). The last diagnosis of PED recorded in the GB diagnostic database (VIDA) was in 2002 on a farm in England. No suspect incidents of porcine epidemic diarrhoea (PED) have been reported in England or Scotland since January 2018. Enhanced surveillance for PED continues and diagnostic submissions from cases of diarrhoea in pigs (non-suspect) submitted to APHA are routinely tested by PCR for PED virus on a weekly basis. None have been positive for PED in 1120 diagnostic submissions tested under Agriculture and Horticulture Development Board (AHDB) Pork funding from June 2013 to June 2020. The AHDB PED contingency plan has been updated and a PED exercise is planned for 2021, led by the Pig Health and Welfare Council. Further information on PED is available on this link: https://pork.ahdb.org.uk/health-welfare/health/emerging-diseases/pedv

Unusual diagnoses or presentations

Myocarditis associated with PCV3 labelling by *in situ* hybridisation

One of three 10-day-old dead pigs was found to have a non-suppurative myocarditis with PCV3 labelling by in-situ hybridisation (ISH) associated with the inflammation suggesting involvement of PCV3 with the cardiac pathology. Immunohistochemistry for PCV2 was negative. In a subsequent submission from the same farm a few days later, *Klebsiella pneumoniae* septicaemia was diagnosed and none of the submitted piglets had myocarditis, so this appears to have been a single case, and is the second submission to APHA in which a single pig has had myocarditis associated with PCV3. This case in a single pig appeared to be incidental to the disease occurring on farm. Published reports from elsewhere describe PCV3 associated with multisytemic inflammation in post-natal pigs (Phan and others, 2016). However, to date, the only disease outbreaks (as opposed to single pigs with inflammatory lesions) associated with PCV3 identified in APHA submissions have been in two different breeding herds with increased stillbirths, some with limb deformity associated with vertical transmission of PCV3, one occurring in 2014, the other in 2018 (APHA, 2019). Undertaking myocardial histopathology in all pigs submitted to APHA for post-mortem examination is being considered an option as part of enhanced PCV3 surveillance to aid understanding of the frequency of detection of this virus in association with myocardial inflammation, similar to that already undertaken on aborted and stillborn foetus submissions.

Disease incident involving skin lesions and transient mortality

An unusual clinical presentation was investigated associated with skin lesions affecting nearly half of one pen of a group of 13-week-old pigs, 75 per cent of those affected dying within the first 24 hours. Pigs found dead were submitted to APHA and had extensive brick-red “shiny” skin lesions resembling those seen with urine scald, mainly ventral in distribution (Figure 7a. Affected pigs that did not die recovered rapidly with skin lesions healing (Figure 7b).

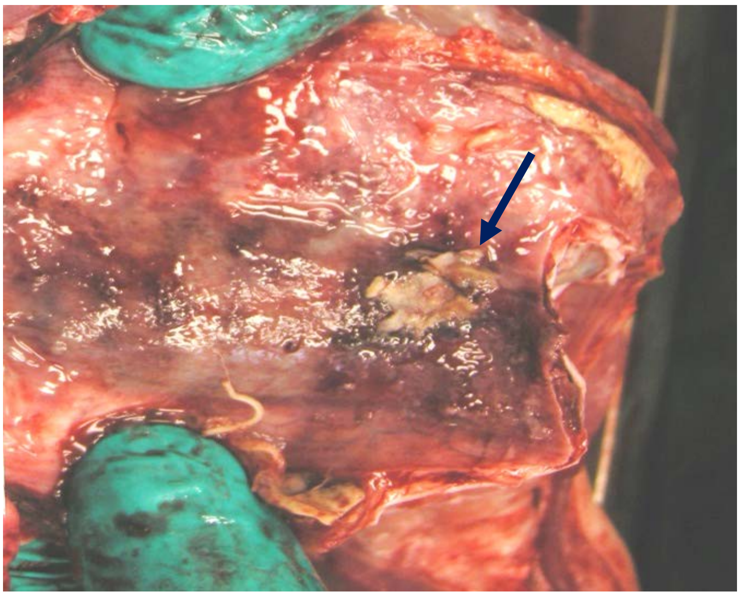
Figure 7a and 7b: Skin lesions on the day of the incident (left) and 48-60 hours later (right)

Investigation did not provide evidence to support an infectious disease or water deprivation, although the possibility of involvement of urease-producing *Escherichia coli* is being investigated. Extensive biochemical testing and histopathology have not indicated a cause and microscopic findings in the skin were consistent with a severe, acute, irritant contact dermatitis, but were aetiologically non-specific. Various acids, alkalis and salts might produce such lesions, including toxic metabolites of chemicals excreted in the urine or faeces. The water was not acidified and the pigs were receiving no treatments. Information from farm visits by the veterinary practitioner and a Veterinary Investigation Officer raised the possibility that the clinical signs may be related to pigs ingesting residual mouldy feed dislodged from the feed silo when it was refilled. Feed from the hopper of the pen with affected pigs and stomach contents from dead pigs have been sent for analysis, including for mycotoxins. The new batch of feed itself was not implicated as other pigs receiving the same feed remained unaffected. Disease involving similar skin lesions with acute transient mortality has been encountered by APHA several times in past years (APHA, 2016; APHA, 2018a) and no specific cause has been confirmed despite extensive investigations. All but one of these cases have occurred between August and October, with one in December. This case was investigated in conjunction with APHA’s toxicologist (APHA, 2020a); although the (unproven) possibility of a toxic aetiology was considered, affected pigs were not close to entering the food chain and there was no immediate threat to the public health. Comprehensive sampling at the time of incidents of this type is needed for investigations which include post-mortem examination of freshly dead pigs, biochemical testing on live affected pigs and, potentially, analysis of feed.

Tracheitis in a gilt

Although respiratory disease is a common clinical sign in pigs submitted to APHA for diagnostic investigation, tracheitis is an uncommon finding. A seven-month-old gilt affected with severe coughing was euthanased and submitted for post-mortem examination. Similar clinical signs were reported in several other gilts in the group. Treatment with antibiotics and a non-steroidal anti-inflammatory had not resulted in significant improvement. The tracheal mucosa and submucosa were markedly thickened and dark red. Several lozenge-shaped necrotic plaques were adherent to the mucosa of the proximal trachea (Figure 8). There was also pneumonia with cranioventral consolidation affecting 20 per cent of the lung mass. *Streptococcus dysgalactiae* subsp. *equisimilis* was isolated from both the lung and the tracheal lesions. This bacterium has been isolated before from an APHA case of tracheitis; whether it was primary or secondary in this case is uncertain but histopathological examination confirmed that lesions in the lung and trachea were consistent with a bacterial aetiology. No PRRSV, swine influenza virus or pathogenic *Mycoplasma* species were detected.

Figure 8: Diphtheritic plaque (arrowed) in the trachea of a gilt



Findings in this case resemble those described in North America as “Haemorrhagic tracheitis syndrome” which was highlighted in the Q2-2020 report (APHA, 2020b). Their case definition is of acute onset of a characteristic “honking” cough, usually in a low percentage of pigs aged 14 to 30 weeks old, leading to dyspnoea and, in some, to death or euthanasia. A consistent finding in affected pigs is marked oedema and haemorrhage in the tracheal submucosa causing luminal obstruction. Where lesions of tracheitis are encountered in GB pigs, images of the lesions are helpful together with full diagnostic investigation to include collection of fresh and fixed trachea and plain and charcoal swabs from tracheal lesions alongside samples for full investigation of causes of respiratory disease.

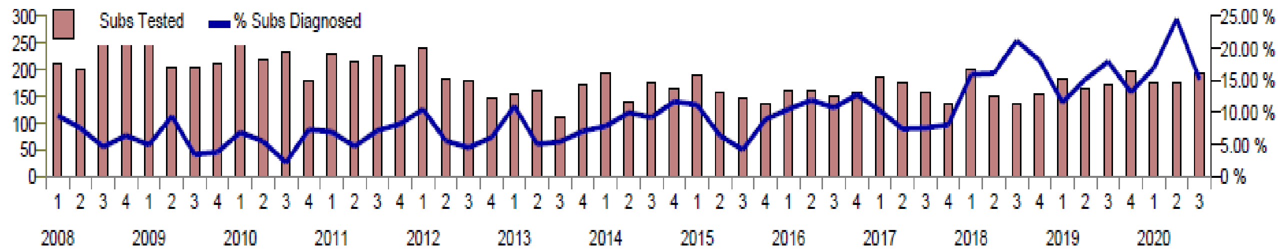
Changes in disease patterns and risk factors

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

Porcine reproductive and respiratory syndrome diagnoses in 2020

The increased diagnostic rate for porcine reproductive and respiratory syndrome (PRRS) in GB submissions seen in the first six months of 2020 was not maintained in Q3-2020 (Figure 9) although PRRS remained a prominent diagnosis in this quarter (Table 1a).

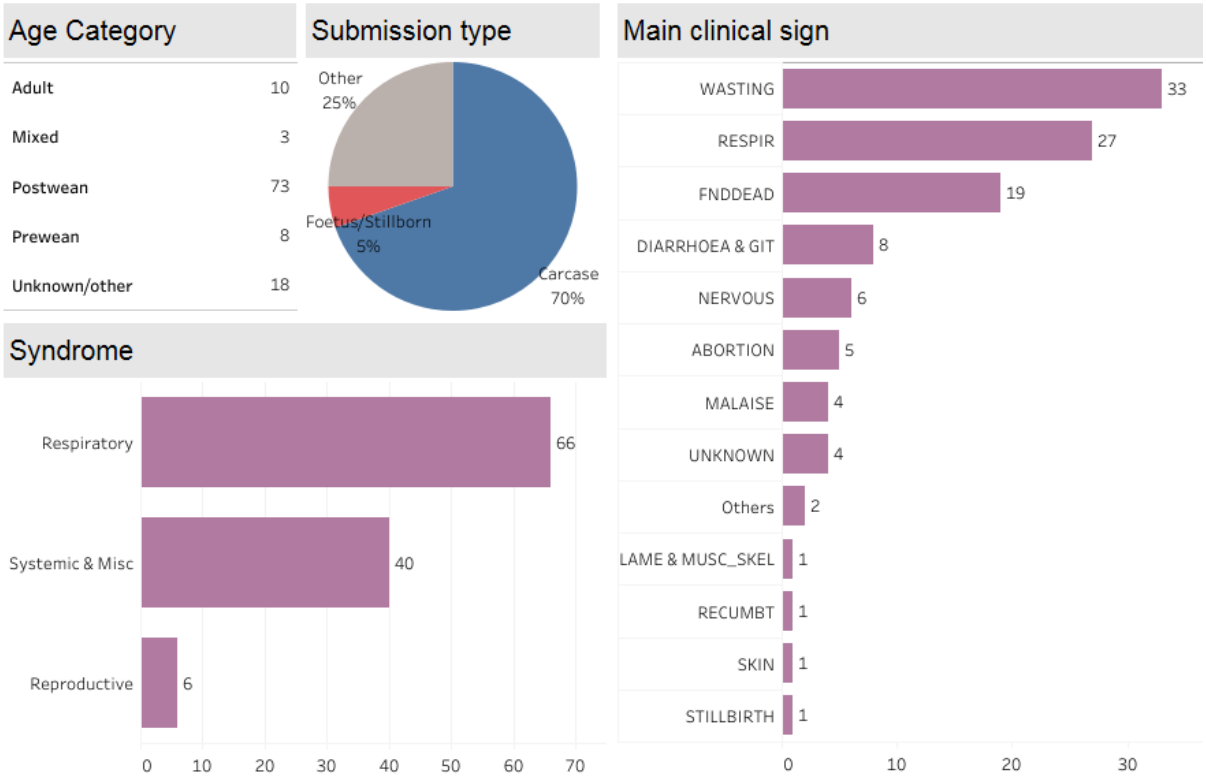
Figure 9: GB PRRS diagnoses by quarter as a percentage of diagnosable submissions



All of the incidents of PRRS diagnosed in the first nine months of 2020 were due to infection with PRRS virus-1 (PRRSV-1); no PRRSV-2 has been detected in submissions from GB pigs to date. Surveillance data associated with submissions in which PRRS was diagnosed is shown in Figure 10. Not surprisingly, diagnoses were most common in post-weaned pigs, and wasting was the most common main clinical sign reported, with respiratory signs and pigs being found dead next most common; these clinical signs are consistently the three most frequently reported in submissions diagnosed with PRRS. Some diagnoses are made in pigs reported to be vaccinated for PRRS which can be due to issues with vaccination timing in relation to PRRSV challenge and may also in part reflect the challenge posed to both field and vaccinal immunity as the genetic diversity of the PRRS virus increases, which is an issue recognised in other countries. Interactive GB pig disease surveillance and PRRS dashboards can be accessed via: https://public.tableau.com/profile/siu.apha#!/vizhome/Porcinereproductiveandrespiratorysyndrome/PRRS and

http://apha.defra.gov.uk/vet-gateway/surveillance/scanning/disease-dashboards.htm.

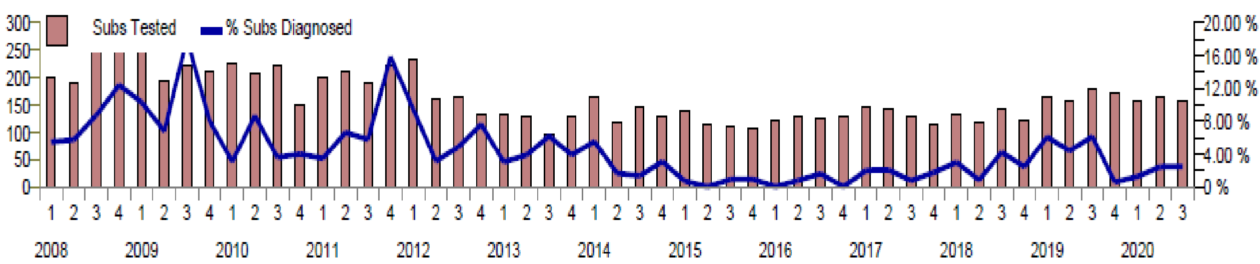
Figure 10: Surveillance data for Q1 to Q3-2020 GB submissions in which PRRS diagnosed



Swine dysentery diagnoses in GB reduced compared to 2019

Fewer diagnoses of swine dysentery (SD) due to *Brachyspira hyodysenteriae* were made in Q3-2020 compared to Q3-2019 when SD was the fifth most frequent diagnosis made (Figure 1a and 1b). SD has been identified as a priority disease for control by the pig industry, thus diagnoses of SD in GB remain a concern. The diagnostic rates in the first three quarters of 2020 were lower than those in the same period in 2019 as illustrated in Figure 12, and the actual numbers of diagnoses were also lower compared to the first nine months of 2019. However, the diagnoses recorded in VIDA in the first nine months of 2020 were made across multiple counties: Suffolk, North Yorkshire, East Riding of Yorkshire, Derbyshire, Devon, Kent, Lancashire and East Central Scotland, indicating the potential for spread of *Brachyspira hyodysenteriae* in different regions and the need to maintain biosecurity measures.

Figure 12: GB swine dysentery diagnoses by quarter as a percentage of diagnosable submissions



A case was described in the Vet Record October surveillance report (APHA, 2020c) which illustrated how the disease presentation is not always typical of SD; in this case the diarrhoea was not obviously mucohaemorrhagic, although small specks of blood were seen in a few faeces. This emphasises the importance of confirming the cause of diarrhoea in groups of pigs. The *Brachyspira* PCR provides a rapid diagnosis, while culture is important to obtain an isolate of *B. hyodysenteriae*; antimicrobial sensitivity testing and whole genome sequencing can then be progressed under APHA's funding for antimicrobial sensitivity testing and pig disease surveillance respectively, to assist veterinary practitioners' decisions about treatment of SD and epidemiological investigations to identify or rule out possible links and origins of infection. Advice on diagnostic sampling and tests can be found at:

http://apha.defra.gov.uk/documents/surveillance/sub-handbook.pdf.

Antimicrobial sensitivity testing undertaken on *B. hyodysenteriae* isolates in 2020 revealed one of those tested to have a minimum inhibitory concentration (MIC) for tiamulin of 8 µg/ml. This is the first *B. hyodysenteriae* isolate tested at APHA in several years to have a tiamulin MIC above the clinical breakpoint (>4 µg/ml). This finding emphasises the important of alternative interventions (e.g. all-in, all-out management systems; cleaning and disinfection; partial and total depopulation leading to eradication) for control of swine dysentery to prevent the development of wider antimicrobial resistance and spread of resistant *B. hyodysenteriae*. Whole genome sequencing of this isolate identified it as being multilocus sequence type ST 251 which includes a group of isolates, several of which have been identified each year from 2017 to 2020, predominantly in submissions from pigs in the northeast of England. Some of these have shown reduced sensitivity (raised MIC values) to tiamulin, although MICs have not been above the clinical breakpoint.

Advice on swine dysentery, its control and information about the pig industry's Significant Diseases Charter can be found on these links:

http://pork.ahdb.org.uk/health-welfare/health/swine-dysentery/
https://pork.ahdb.org.uk/health-welfare/health/significant-diseases-charter/
http://apha.defra.gov.uk/documents/surveillance/diseases/swine-dysentery.pdf
www.nadis.org.uk/disease-a-z/pigs/swine-dysentery/

Upward trend in diagnostic rate for *Actinobacillus pleuropneumoniae*

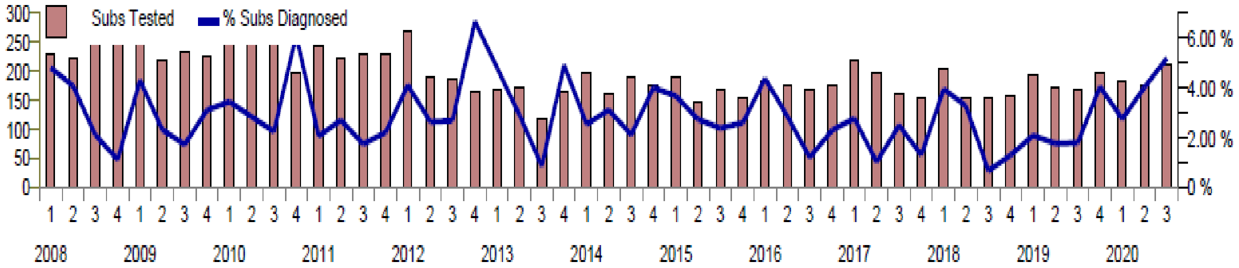
An upward trend in the diagnostic rate of disease due to *Actinobacillus pleuropneumoniae* (APP) in GB was noted in the second and third quarters of 2020. In Q3 the diagnostic rate was the highest since Q4-2012 (Figure 13). The clinical sign reported most frequently in submissions in which APP was diagnosed in 2020 was pigs being found dead and respiratory signs were the next most commonly reported.

Thirteen of the 23 diagnoses in 2020 were made in carcase submissions which allow full diagnostic testing and identification of concurrent disease. APP was the primary pathogen in the majority of cases and respiratory virus infections (PRRS and/or swine influenza) were detected as likely primary pathogens in just two of the cases. Two isolates in 2020 from different premises have shown ampicillin resistance (APHA, 2020a), however APP isolates cultured at APHA in Q3-2020 were sensitive to this antimicrobial.

This trend in the diagnostic rate of APP will be kept under review. A useful summary of disease due to APP is at this link:

https://www.nadis.org.uk/disease-a-z/pigs/actinobacillus-pleuropneumonia/

Figure 13: GB APP diagnoses by quarter as a percentage of diagnosable submissions



Antimicrobial resistance surveillance

The Veterinary Medicines Directorate UK Veterinary Antibiotic Resistance and Sales Surveillance Report for 2019 has been published (UK-VARSS, 2020). Chapter 4 (Clinical Surveillance of Antibiotic Resistance) includes information on antimicrobial sensitivity test results for bacterial pathogens of relevance to pig health. These were isolated through Government-funded scanning surveillance and antimicrobial resistance surveillance project activities from carcases or other diagnostic samples submitted by private veterinary practices and partner post-mortem providers to APHA from pigs in England and Wales. Penicillin resistance in *Streptococcus suis* was not detected in 2019 following resistance to this antimicrobial in a single *S. suis* isolate in 2018 as described previously (2018b). Swine dysentery isolates showing clinical resistance to tiamulin were not detected in 2019.

Horizon scanning

Novel *Mycoplasma “Mycoplasma haemosuis*” in Germany

A publication by Stadler and others (2020) described a disease outbreak in fattening pigs on a single farm in southern Germany which was characterised by skin pathology (urticaria, haemorrhagic diathesis), inappetance, anaemia and high fever in 30% of the pigs two weeks after their arrival on farm. Affected pigs responded well to treatment with oxytetracycline and non-steroidal anti-inflammatory drugs. PCR testing on the blood of affected pigs and the spleen of one dead pig identified a porcine haemoplasma species. Phylogenetic analyses based on the 16S rDNA sequence showed 99% identity to a novel porcine *Haemoplasma* (‘Candidatus *M. haemosuis*’) species which was recently described in China and Korea. In China, this organism was detected by PCR in the blood of approximately 25% of the pigs tested, all of which appeared healthy (Fu and others, 2017).

This is the first report of ‘Ca. *M. haemosuis*’ in pigs outside Asia and also the first report of its association with disease, the clinical signs of which have similarity to those of *Mycoplasma suis* which is widespread in pig populations globally. The *Mycoplasma* PCR primers used diagnostically at APHA has been checked against the ‘Ca. *M. haemosuis*’ sequence and, theoretically, should produce an amplicon allowing its detection. ‘Ca. *M. haemosuis*’ positive material is being sourced to verify this.

Review of swine enteric alphacoronavirus in China

A review of current knowledge about swine enteric alphacoronavirus (SeACoV) was published recently (Yang and others, 2020). The report of the first detection of SeACoV in 2017 was included in a previous quarterly report (APHA, 2018c). To date, detection of SeACoV has been reported in pigs in two Provinces of China. There have not been reports from elsewhere to indicate it has spread in the manner of some other porcine coronaviruses such as PEDV, however this pathogen merits ongoing review of any new findings. The publication of the review coincided with one describing the ability of SeACoV to infect human cells, inferring its zoonotic potential (Edwards and others, 2020). Whether the *in vitro* findings described correlate to *in vivo* susceptibility, or to transmissibility, is not known. The fact that there is not necessarily direct correlation between *in vitro* and *in vivo* virus infectivity was made in a paper about severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), a betacoronavirus. That paper described *in vitro* susceptibility of porcine cells to SARS-CoV-2 without domestic pigs being susceptible to experimental *in vivo* infection (Meekins and others, 2020), both findings also reported by others. It is understandable that there is renewed interest in other coronaviruses including SeACoV and consideration of the potential for cross-species transmission.

Straw bedding shortage concerns

Concern was reported in the livestock industry media about straw shortages developing in certain regions and increases in straw prices in autumn 2020. The wet winter of 2019-20, followed by the prolonged dry spring and August heatwave this year have affected straw yields. Several livestock species including pigs may be affected if there is a shortage of good quality bedding. Farmers cutting back the amount of straw used for bedding on farms may increase the degree of faecal contamination of housed animals. This would raise the risk of disease, particularly those diseases spread by the faecal-oral route, especially in younger animals. An increased risk of opportunist infection of the reproductive tract in sows giving birth is also associated with dirty bedding and reduced or soiled bedding can also adversely affect the management of respiratory disease. Farmers may seek to find alternative types of bedding such as waste paper, or recycled wood shavings and the livestock industry (AHDB and other) has provided advice on alternative bedding materials. An update of APHA's 2018 information note on bedding shortage includes links to that advice:
http://apha.defra.gov.uk/documents/surveillance/diseases/bedding-shortage-info-jan18.pdf.

The National Farmers Union (NFU) have relaunched the fodder bank: https://www.nfuonline.com/about-us/our-offices/east-anglia/east-anglia-news/nfu-fodder-bank-relaunches-to-support-farmers/.

References

APHA (2016). Incident of pig mortality with skin lesions. Vol 20: Q4 page 6-7 https://webarchive.nationalarchives.gov.uk/20200806092835/https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/601597/pub-survrep-p0416.pdf

APHA (2018a). Skin lesions with mortality incident in growing pigs. GB pig quarterly report: Disease surveillance and emerging threats. Volume 22: Q2 – April-June 2018 page 6-7 https://webarchive.nationalarchives.gov.uk/20200808034106/https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/761794/pub-servrep-p0718.pdf

APHA (2018b). Penicillin resistance in Streptococcus suis isolate from aborted pig foetuses. GB pig quarterly report: Disease surveillance and emerging threats. Volume 22: Q3 – July to September 2018 page 5-6 https://webarchive.nationalarchives.gov.uk/20200808032035/https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/738912/pub-survrep-p0418.pdf

APHA (2018c). Novel bat-derived enteric virus in pigs in China. GB pig quarterly report: Disease surveillance and emerging threats. Volume 22: Q1 – January to March 2018 p11 https://webarchive.nationalarchives.gov.uk/20200808033353/https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/714048/pub-survrep-p0118.pdf

APHA (2019). Porcine circovirus 3-associated disease. GB pig quarterly report: Disease surveillance and emerging threats. Volume 23: Q3 – July to September 2019 page 6 https://webarchive.nationalarchives.gov.uk/20200804132201/https://www.gov.uk/government/publications/pig-gb-disease-surveillance-and-emerging-threats-report-2019

APHA (2020a). Other incidents - FSI 2020-036. Chemical Food Safety quarterly report July to September 2020 page 9 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/935568/pub-chemfood0320.pdf

APHA (2020b) Haemorrhagic tracheitis syndrome investigations in North America. GB pig quarterly report: Disease surveillance and emerging threats. Volume 24: Q1 – January to March 2020 page 14-15 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/889984/pub-survrep-p0120.pdf

APHA (2020c). Diarrhoea and wasting due to *Brachyspira* species in finisher pigs. Disease surveillance in England and Wales, October 2020. Veterinary Record 187, 390-394. https://veterinaryrecord.bmj.com/content/187/10/390

Chenais, E., Depner, K., Guberti, V. et al. (2019). Epidemiological considerations on African swine fever in Europe 2014–2018. Porcine Health Management 5, 6 https://doi.org/10.1186/s40813-018-0109-2

Defra (2015). Porcine epidemic diarrhoea: how to spot and report the disease. www.gov.uk/guidance/porcine-epidemic-diarrhoea-how-to-spot-and-report-the-disease

Edwards, CE., Boyd L. Yount, Rachel L. Graham, Sarah R. Leist, Yixuan J. Hou, Kenneth H. Dinnon, Amy C. Sims, Jesica Swanstrom, Kendra Gully, Trevor D. Scobey, Michelle R. Cooley, Caroline G. Currie, Scott H. Randell, Ralph S. Baric (2020). Swine acute diarrhea syndrome coronavirus replication in primary human cells reveals potential susceptibility to infection. Proceedings of the National Academy of Sciences Oct 2020, 117 (43) 26915-26925; https://www.pnas.org/content/117/43/26915

FAO and OIE (2020). Global control of African swine fever: A GF-TADs initiative. http://www.gf-tads.org/asf/the-global-initiative-for-the-control-of-asf/en/

Friedrich-Loeffler-Institut (2020). First case of African swine fever in a wild boar in Germany https://www.fli.de/de/aktuelles/kurznachrichten/neues-einzelansicht/erster-fall-von-afrikanischer-schweinepest-bei-einem-wildschwein-in-deutschland/ accessed 10-09-20

Fu, Y., Shi, T., Xu, L., Wei, W., Lu, F., Zhang, X., Yuan, X., Li, J., Lv, J., & Fang, W. (2017). Identification of a novel *Hemoplasma* species from pigs in Zhejiang province, China. The Journal of Veterinary Medical Science, 79(5), 864–870. https://doi.org/10.1292/jvms.16-0545

Karte, C., Platje, N., Bullermann, J. et al. Re-emergence of porcine epidemic diarrhea virus in a piglet-producing farm in northwestern Germany in 2019. BMC Vet Res 16: 329 https://doi.org/10.1186/s12917-020-02548-4

Meekins DA, Morozov I, Trujillo JD, Gaudreault NN, Bold D, Carossino M, Artiaga BL, Indran SV, Kwon T, Balaraman V, Madden DW, Feldmann H, Henningson J, Ma W, Balasuriya UBR, Richt JA. (2020). Susceptibility of swine cells and domestic pigs to SARS-CoV-2. Emerg Microbes Infect. 9:2278-2288. doi:10.1080/22221751.2020.1831405. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7594707/

Phan, Tung Gia, Federico Giannitti, Stephanie Rossow, Douglas Marthaler, Todd Knutson, Linlin Li, Xutao Deng, Talita Resende, Fabio Vannucci and Eric Delwart. (2016) Detection of a novel circovirus PCV3 in pigs with cardiac and multi-systemic inflammation. Virology Journal 13:184 https://virologyj.biomedcentral.com/articles/10.1186/s12985-016-0642-z

PigProgress (2020). Germany’s plan to be ASF-free again. Nov 6, 2020 https://www.pigprogress.net/Health/Articles/2020/11/Interview-Germanys-plan-to-be-ASF-free-again-660754E/?utm_source=tripolis&utm_medium=email&utm_term=&utm_content=&utm_campaign=pig_progress

Podgórski T. (2020). African swine fever (ASF) in wild boar populations - research results and recommendations for control. Mammal Research Institute, Polish Academy of Sciences. https://ibs.bialowieza.pl/en/wp-content/uploads/sites/2/2020/09/Raport_ASF_IBS-PAN_ENG_final.pdf

Sauter-Louis C., Hendrik Forth J., Probst C., Staubach C., Hlinak A. and others (2020). Joining the club: First detection of African swine fever in wild boar in Germany. Transboundary and Emerging Diseases First published: 21 October 2020 https://doi.org/10.1111/tbed.13890

Scottish Government (2016). The Specified Diseases (Notification) Amendment (Scotland) Order 2016. http://www.legislation.gov.uk/ssi/2016/41/contents/made

Stadler, J., Ade, J., Ritzmann, M., Hoelzle, K., Hoelzle, LE. (2020) Detection of a novel haemoplasma species in fattening pigs with skin alterations, fever and anaemia. Veterinary Record 187: 66. https://veterinaryrecord.bmj.com/content/187/2/66

UK-VARSS (2020). Chapter 4: Clinical Surveillance of Antibiotic Resistance. Veterinary Antibiotic Resistance and Sales Surveillance Report (UK-VARSS 2019). New Haw, Addlestone: Veterinary Medicines Directorate. www.gov.uk/government/publications/veterinary-antimicrobial-resistance-and-sales-surveillance-2019

Vergne T., Guinat C., Pfeiffer D. (2020). Undetected Circulation of African Swine Fever in Wild Boar, Asia. Letter in Emerging Infectious Diseases 26: 2480-2482

Yong-Le Yang, Jia-Qi Yu, Yao-Wei Huang (2020). Swine enteric alphacoronavirus (swine acute diarrhea syndrome coronavirus): An update three years after its discovery. Virus Research 285: 198024 ISSN 0168-1702 https://doi.org/10.1016/j.virusres.2020.198024

Statement regarding use of this material

The material in this report has been compiled by the Animal and Plant Health Agency (APHA) Surveillance Intelligence Unit in collaboration with the APHA Surveillance and Laboratory Services Department.

The report is available on GOV.UK at: https://www.gov.uk/government/collections/animal-disease-surveillance-reports.

Any enquiries regarding this report should be sent to APHA's Surveillance Intelligence Unit by emailing SIU@apha.gov.uk.

More information about scanning surveillance reports is available on APHA's Vet Gateway at http://apha.defra.gov.uk/vet-gateway/surveillance/index.htm.

APHA is an executive agency of the Department for Environment, Food & Rural Affairs, and also works on behalf of the Scottish Government and Welsh Government.