Animal &
Plant Health
Agency

Veterinary Investigation Diagnosis Analysis (VIDA)

Annual report 2018

June 2019

Contents

Introduction

Source of Data

The Veterinary Investigation Diagnosis Analysis database - VIDA - contains a record of every diagnostic submission from livestock or wildlife in Great Britain made to the Veterinary Investigation Centres of the Animal and Plant Health Agency (APHA), its partner post-mortem examination (PME) providers and to Scotland's Rural College (SRUC) Veterinary Services (SAC VS), and has been operating since 1975.

In England and Wales during 2018 there were six APHA Veterinary Investigation Centres (VICs) as well as APHA's specialist avian centre at Lasswade in Scotland, a laboratory testing facility at Newcastle and a central research and diagnostic facility at Weybridge in Surrey. Wildlife surveillance is undertaken at APHA Sand Hutton. The APHA laboratory network is supplemented by five partner PME providers who work under APHA contract, namely: Royal Veterinary College, Hawkshead; University of Surrey, School of Veterinary Medicine; the Wales Veterinary Science Centre, Aberystwyth; University of Bristol Veterinary School; SAC VS at St Boswells, Scotland.

More information about the APHA network in England and Wales can be found here: http://apha.defra.gov.uk/vet-gateway/surveillance/diagnostic/national-network.htm.

In Scotland during 2018 there were eight Disease Surveillance Centres, administered by SAC VS. Information about veterinary surveillance and diagnostic services offered by SAC VS in Scotland is available here:
https://www.sruc.ac.uk/info/120144/farm_animal_diagnostics

The total number of diagnostic submissions received in 2018 was 23,449. This includes submissions for which no diagnosis code was recorded. It should be noted that a submission could have more than one diagnosis and may also comprise more than one carcase and/or other type of sample.

APHA produces an annual VIDA analysis that comprises both summary data by month for VIDA diagnoses recorded during the previous year, and annual totals for the previous eight years. Since 2017 this has been provided as a searchable dashboard on Tableau. https://public.tableau.com/profile/siu.apha#!/vizhome/VIDAAnnualReport2018/VIDAAnnualReport2018.

As well as the production of this report, VIDA is used for a wide range of *ad hoc* investigations, and for the GB disease surveillance dashboards for cattle, chickens, sheep and pigs that were launched during 2017 and 2018:
https://public.tableau.com/profile/siu.apha#!/.

Disease-related threats are reported in the Quarterly GB Emerging Threats Reports for each species including wildlife. More details on each threat, or potential threat, are included in these Quarterly reports which are produced by the APHA Species Expert Groups and include any actions taken to address identified threats. The reports can be found online: http://apha.defra.gov.uk/vet-gateway/surveillance/reports.htm.

Bias in VIDA

Submissions recorded on VIDA represent only the clinical material submitted for veterinary investigation to APHA Veterinary Investigation Centres, the non-APHA partner PME providers and SAC VS's Disease Surveillance Centres. The clinical material includes samples of different types (e.g. blood samples, faeces, tissues) and carcases for post-mortem examination (PME). Importantly, the recorded submissions are not randomly selected from livestock populations but are submitted voluntarily by private veterinary surgeons and producers; hence this introduces an important source of bias that is influenced by many factors, including the clinical presentation of a suspected disease, the level of awareness of a disease and its perceived importance, the value of the animal/s affected and the general economic climate. Particular diagnoses may also be affected by a range of factors, such as improved scientific test methods, and knowledge of these may also affect rates of submission. These factors will also usually vary differentially with time. This bias should be considered when interpreting both individual figures, and apparent trends, from VIDA data, for example, it is important that proportions of positive diagnoses reported in many plots are not interpreted as prevalence of disease in the GB animal population.

Avian VIDA diagnoses comments

Avian disease-related threats are reported in the Quarterly GB avian disease surveillance and emerging threats reports. More details on each threat, or potential threat, are included in these reports which are produced by the APHA Avian Expert Group and include actions taken to address identified threats. The reports for 2018 are found through the following link: https://www.gov.uk/government/collections/animal-disease-surveillance-reports.

Three diseases have been selected below for further analysis and comments.

Respiratory disease chickens

Respiratory disease is a significant issue in chickens, with several infectious agents potentially involved. The avian dashboard shows that in small and backyard chicken flocks the commonest identified cause in recent years is infectious laryngotracheitis (ILT) (https://public.tableau.com/profile/siu.apha#!/vizhome/AvianDashboard/Overview). The VIDA data show a marked increase in ILT diagnoses in 2018 compared to recent years (Fig 1).

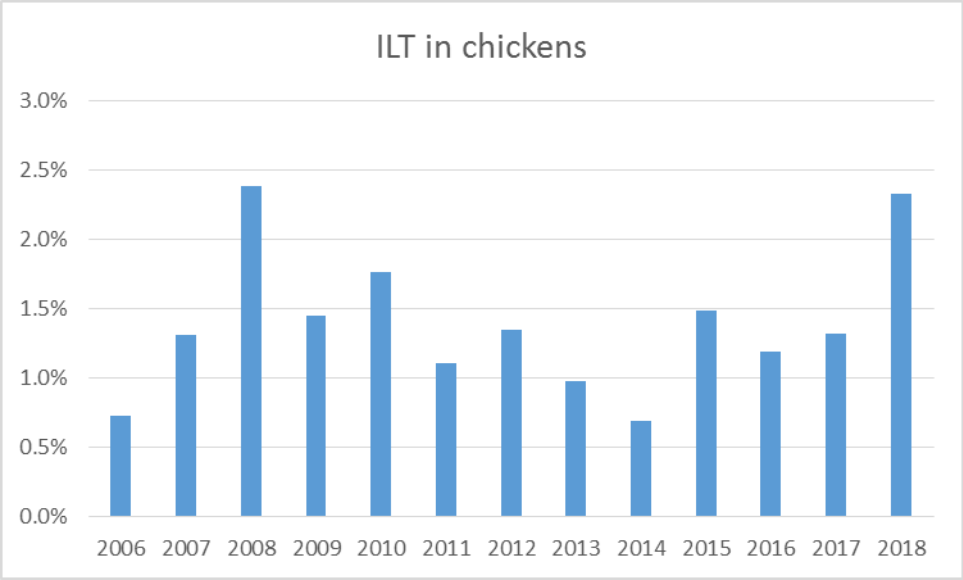

Fig 1: VIDA diagnoses of ILT in chickens as a percentage of total diagnoses in chickens for each year

The VIDA data are derived from both commercial and non-commercial (small and backyard) flocks. The increase in diagnoses of ILT in 2018 may reflect the continued expansion of the small flock sector, in which ILT can be a marker of poor biosecurity practices particularly the widespread movement of poultry between premises. The data may also reflect the continued threat posed by the disease in commercial flocks.

Erysipelas in chickens

Erysipelas is a sporadic disease of chickens and other poultry including turkeys and geese. The disease (caused by infection with *Erysipelothrix rhusiopathiae*) shows a seasonal peak in the autumn and the onset of cold, wet weather may be a contributory factor resulting in increased exposure or susceptibility of free range poultry, in particular, to the disease. The VIDA data (Fig 2) reflect the sporadic nature of the disease, with variation from year to year in the number of incidents recorded.

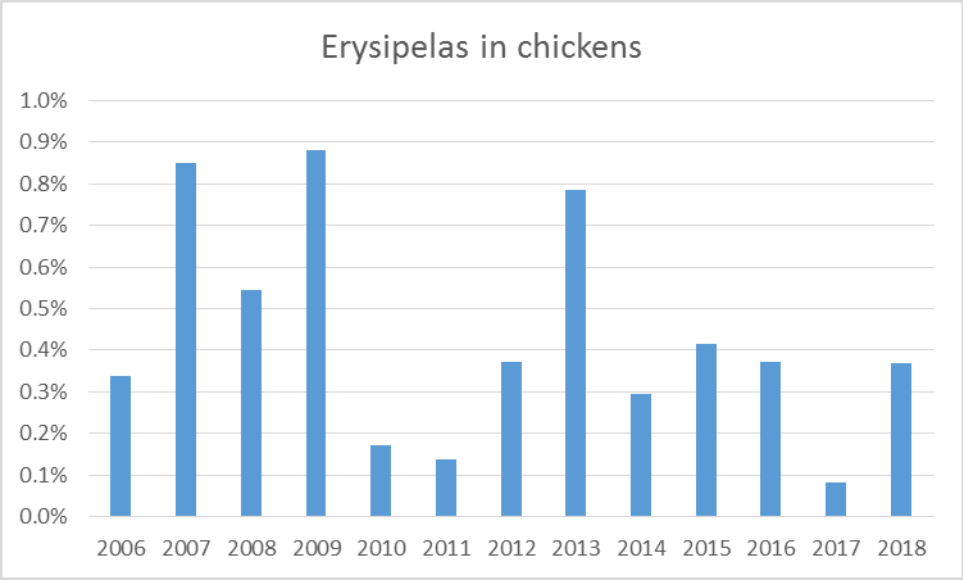

Fig 2: VIDA diagnoses of erysipelas in chickens as a percentage of total diagnoses in chickens for each year

Marek's disease in chickens

Although VIDA data show a decline in the diagnoses of Marek's disease in recent years (Fig 3), this may reflect changing patterns of submissions to APHA and SAC CVS rather than an actual decline in the disease. Correctly administered vaccines provide good protection against the development of clinical signs and are widely used in commercial chickens, but the disease is regularly seen in small and backyard flocks which are often not vaccinated. Marek's disease is the commonest diagnosis recorded in small and backyard chicken flocks on the avian dashboard. The diagnosis is based on the gross pathology supported by demonstration of the characteristic lesions by histopathology. Marek's disease is also occasionally diagnosed in turkeys.

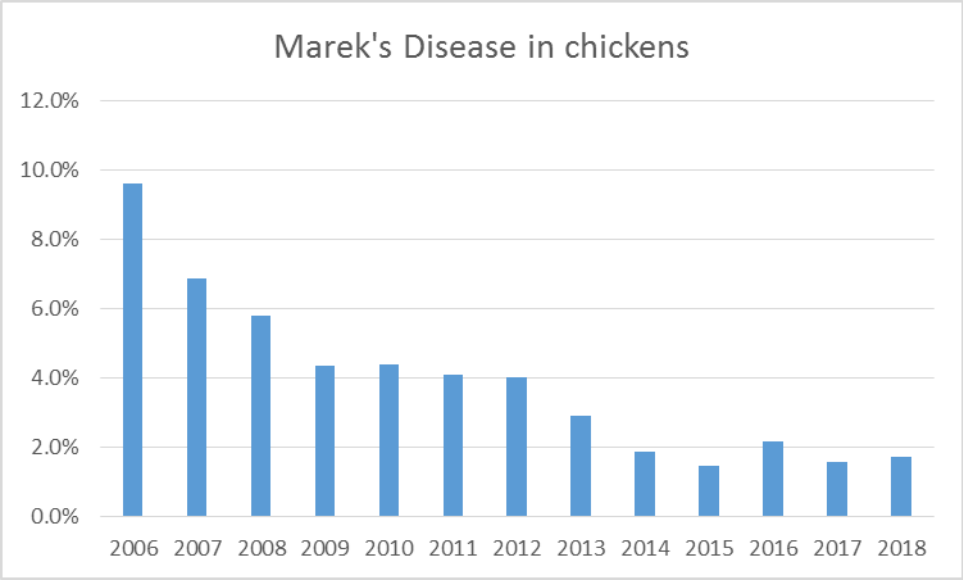

Fig 3: VIDA diagnoses of Marek's disease in chickens as a percentage of total diagnoses in chickens for each year

Cattle VIDA diagnoses comments

Cattle disease-related threats are reported in the Quarterly GB Emerging Threats for Cattle Diseases Reports. More details on each threat, or potential threat, are included in the Quarterly reports which are produced by the APHA Cattle Expert Group and include any actions taken to address identified threats. The reports are found through the following link: https://www.gov.uk/government/collections/animal-disease-surveillance-reports.

Three diseases have been selected by the APHA Cattle Expert Group for further analysis and comments.

Bovine abortion diagnoses

The APHA's GB Cattle Disease Surveillance Dashboard (Dashboards) has been used to generate the data displayed in Figure 4 below. This illustrates the most frequent bovine abortion diagnoses recorded in VIDA from the GB surveillance network in the years 2017 and 2018.

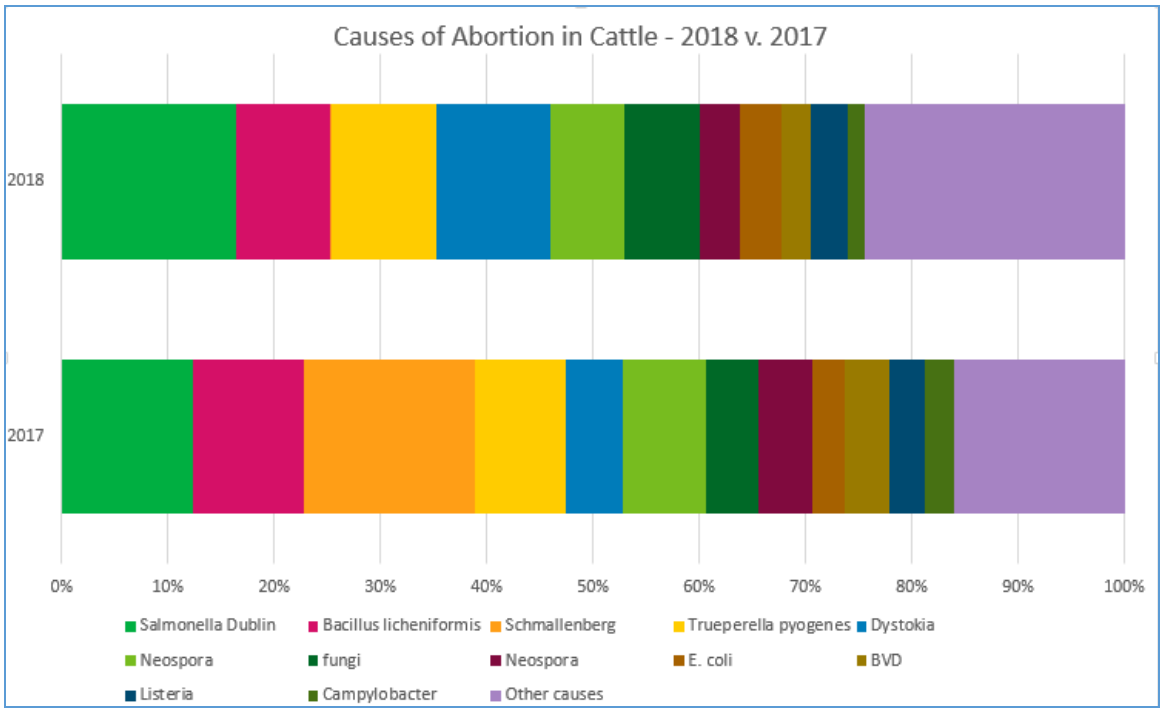

Fig 4: Bovine abortion diagnoses in GB, 2017 and 2018 (VIDA)

The commonest cause of abortion in cattle diagnosed during 2017 was Schmallenberg virus, reflecting a wave of infection that spread across parts of GB in 2017 (see below). This declined in 2018, leaving *Salmonella* Dublin as the commonest cause

Schmallenberg virus (SBV) was identified in the UK as a new and emerging pathogen of cattle and sheep in 2012, as part of the Europe-wide spread of this midge-borne Orthobunyavirus. Since then detection of SBV declined in GB as in Europe, with few or no cases in cattle and sheep 2014 and 2015. SBV is considered endemic and is not a notifiable disease in the UK. However, reports from mainland Europe of recrudescence during 2016 were followed by reports from GB of congenital deformities in lambs and calves (Figure 5), and subsequent investigation detected SBV by PCR or serological evidence suggested its involvement.

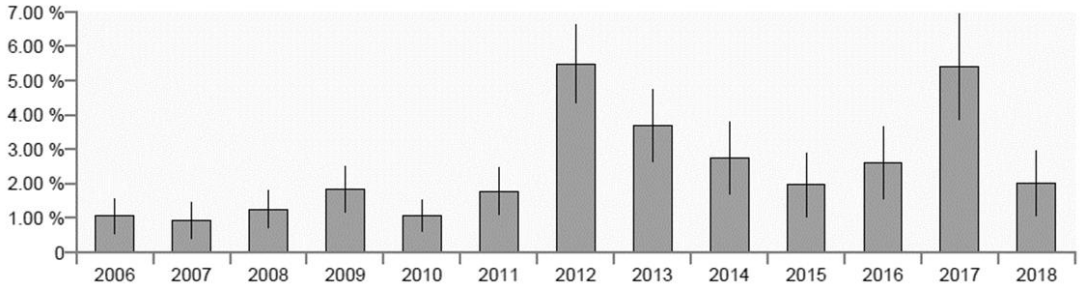

Fig 5: GB incidents of congenital abnormalities in cattle as % of diagnosable submissions in the second quarter, for the years 2005-2018 (VIDA)

There was a peak of incidents of congenital abnormalities in cattle recorded in VIDA that mirrored a similar peak when SBV was first seen in 2012. The level of incidents returned to a lower level in 2018. The screenshot of the cattle dashboard (Figure 6 below) shows the distribution of diagnoses of SBV abortion in the second quarter (April-June) of 2017, a particularly good period to illustrate the geographic spread.

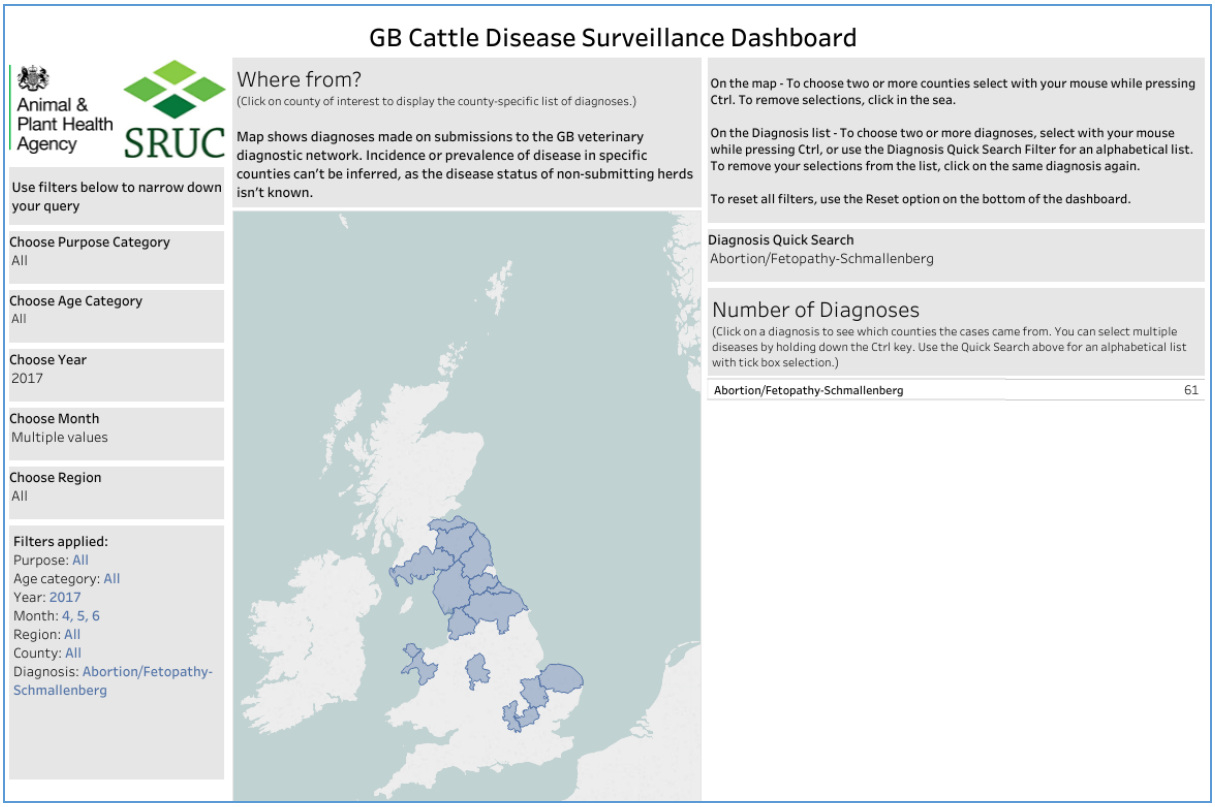

Fig 6: Distribution of SBV diagnoses, Q2 2017 (VIDA)

This use of VIDA data is important when we consider the differential diagnoses for congenital abnormalities, which includes the notifiable disease Bluetongue serotype 8 (BTV-8). Congenital defects considered to be due to BTV-8 have been reported in mainland Europe since late 2018.

Mycoplasma bovis

The percentage incidents of *Mycoplasma bovis* as a cause of bovine respiratory disease has been increasing over recent years (Fig 7), and there is growing concern about this disease and how to manage it especially at a time when there is increasing pressure to minimise the use of Critically Important Antibiotics.

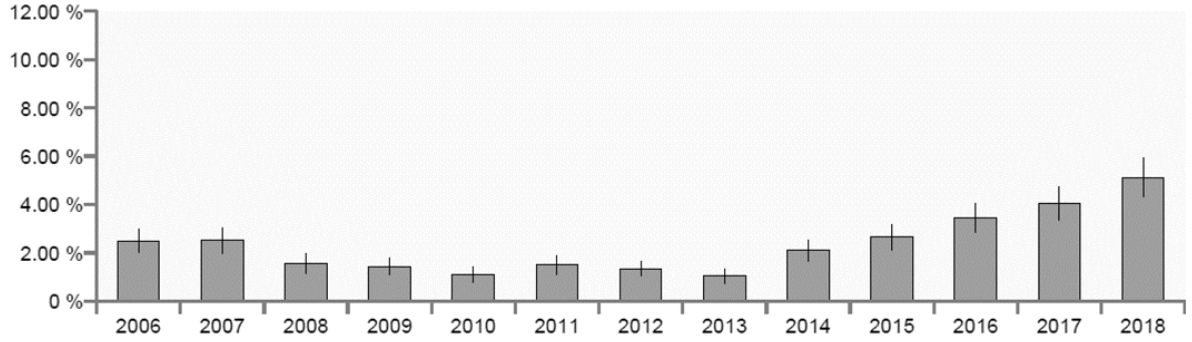

Fig 7: Annual GB Incidents of *Mycoplasma bovis* respiratory disease expressed as % of diagnosable submissions, 2006-2018 (VIDA)

The Cattle Expert Group has produced a paper outlining current knowledge and knowledge gaps in the UK (http://apha.defra.gov.uk/documents/surveillance/diseases/ceg-mbovis-oct18.pdf).

Next steps are to develop a research programme to address the gaps and develop novel control methods.

Pig VIDA diagnoses comments

Pig disease-related threats are reported in the Quarterly GB Emerging Threats for Pig Diseases Reports. More details on each threat, or potential threat, are included in the Quarterly report(s) which are produced by the APHA Pig Expert Group and include actions taken to address identified threats. The reports are found through the following link: https://www.gov.uk/government/collections/animal-disease-surveillance-reports.

Three diseases have been selected by the APHA Pig Expert Group for specific comment.

Porcine respiratory and reproductive syndrome (PRRS)

Porcine reproductive and respiratory syndrome (PRRS) is an economically important disease of pigs that occurs world-wide. It was first seen in Great Britain (GB) in 1991. Since then it has become one of the most important endemic diseases targeted for control in GB pigs. Diagnoses of PRRS recorded in VIDA are due to PRRSV-1. PRRSV-2 has not been detected in GB pigs to date. The VIDA diagnostic rate has increased over the last decade as shown in Figure 8, reflecting field reports from veterinary practitioners attending pigs. This may, in part, reflect the relative increased importance of PRRS as a disease issue since porcine circovirus-2 associated disease has come under control. However, more recently it is also likely to reflect both the increasing diversity of the virus over time which can affect the efficacy of vaccine and field immunity, as well as efforts to reduce antimicrobial use in pigs and recognition of PRRS as a driver of bacterial disease through its immunomodulatory action. An interactive PRRS dashboard available on line via this link with more details about PRRS diagnoses made from 2012 to 2018:

https://public.tableau.com/profile/siu.apha#!/vizhome/Porcinereproductiveandrespiratorysyndrome/PRRS.

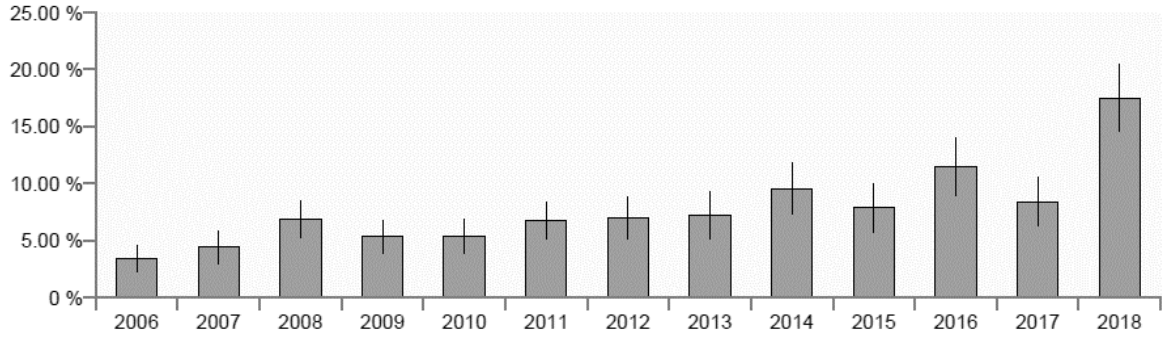

Fig 8: Annual GB incidents in PRRS in pigs as % diagnosable submissions

Salmonellosis

The incidents recorded in VIDA reflect diagnoses of disease in pigs due to salmonellosis, and do not include isolations of *Salmonella* from pigs not associated with disease which are reported elsewhere (https://www.gov.uk/government/publications/salmonella-in-livestock-production-in-great-britain-2017).

The diagnostic rate in Figure 9 shows that salmonellosis is consistently a common diagnosis, with a slight downward trend in the diagnostic rate since 2015. The interactive GB pig disease surveillance dashboard indicates that, overall for diagnostic submissions between 2012 and 2018, salmonellosis due to different serotypes together represented the most frequent diagnosis in GB pigs recorded in VIDA https://public.tableau.com/profile/siu.apha#!/vizhome/PigDashboard/Overview..

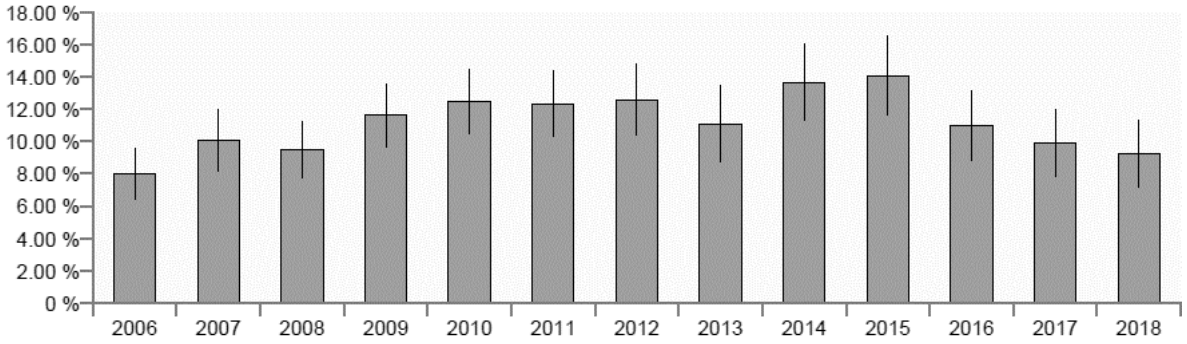

Fig 9: Annual GB incidents of salmonellosis in pigs as % diagnosable submissions

The increased diagnostic rate over a period from 2009 to 2015 is likely, in part, to have been influenced by the emergence of monophasic *Salmonella* Typhimurium-like variants in pigs as it did in other species, and these have come to be the most common serotypes identified in salmonellosis incidents diagnosed in pigs, alongside *Salmonella* Typhimurium.

Advice on *Salmonella* Typhimurium control in pigs, based in part on APHA research findings, is provided in an information note: http://apha.defra.gov.uk/documents/surveillance/diseases/salmonella-typhimurium-pig.pdf.

Recent information on surveillance of the antimicrobial sensitivity in *Salmonella* isolated from pigs is provided by the Veterinary Medicines Directorate: https://www.gov.uk/government/publications/veterinary-antimicrobial-resistance-and-sales-surveillance-2017.

Porcine circovirus-2 associated disease

Porcine circovirus-2 associated disease (PCVD) includes post-weaning multi-systemic wasting syndrome and other disease presentations associated with PCV2. PCVD emerged in GB pigs from 1999 and spread nationwide becoming a significant limitation to pig health and productivity until PCV2 vaccines became available from 2007. Since then, widespread PCV2 vaccination of the commercial GB pig herd has effectively controlled disease with a reduction in the diagnostic rate as shown in Figure 10. PCVD incidents are now relatively infrequent and mainly involve situations where the herd is not vaccinated, or the vaccination regime has not been correctly implemented for a group of pigs. Periodic genotyping is undertaken on confirmed PCVD cases and most PCVD diagnosed in GB pigs has involved typical PCV2b with some cases since 2011 found to be associated with the more recently emerged PCV2 variant known as PCV2d. This PCV2 genotyping was described in a publication (Grierson and others, 2017. Veterinary Record 182: 22 https://veterinaryrecord.bmj.com/content/182/1/22).

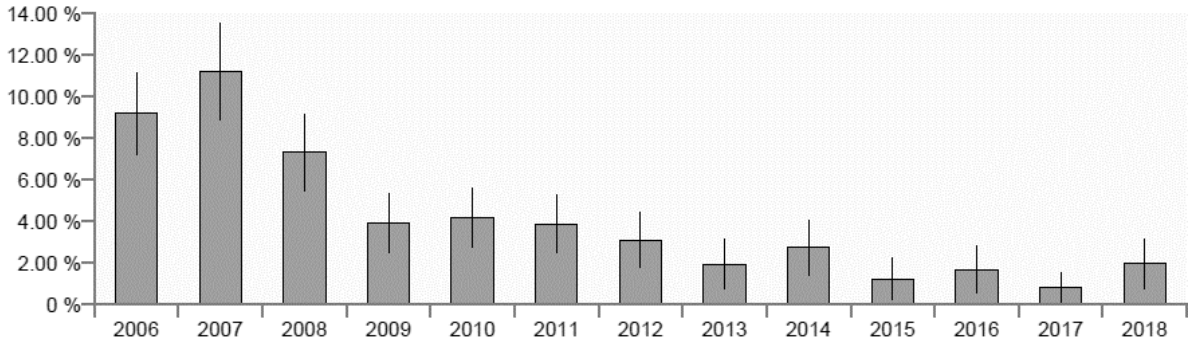

Fig 10: GB incidents of PCVD in pigs as % of diagnosable submissions

Small Ruminant VIDA Diagnoses comments

Sheep and Goat disease-related threats are reported in the Quarterly GB Emerging Threats for Small Ruminant (SR) Diseases Reports. More details on each threat, or potential threat, are included in these Quarterly reports which are produced by the APHA SR Expert Group and include any actions taken to address identified threats. The reports

are found through the following link: https://www.gov.uk/government/collections/animal-disease-surveillance-reports.

Three topics have been selected by the APHA SR Expert Group for further comment.

Liver Fluke

Liver fluke disease has increased in GB in recent years spreading eastwards into previously fluke-free areas. Milder winters and wetter summers are thought to favour the parasite *Fasciola hepatica* and the intermediate host the mud snail ***Galba** truncatula*.

There are two VIDA codes one for acute infections and the other for chronic infections. Acute infections cause sudden death due to haemorrhage in the liver caused by migrating larvae. Chronic infections result in poor body condition sometimes leading to death. The incidence of fasciolosis is highest in years when rainfall is above average during the summer.

Economic losses are due to poor production and reproductive performance and rejection of livers at abattoirs.

Triclabendazole (TCBZ) is a widely used flukicide in sheep because of its activity against the early immature stages of fluke. Lack of efficacy of TCBZ against liver fluke was reported for some years and resistance was confirmed in 2011. The prevalence of TCBZ resistance is not known but its presence is a threat to the farming of sheep in wetter areas of the UK where liver fluke is endemic**.**

The weather can have a significant impact on the incidence of liver fluke. Figure 11 shows how the disease cases seen reduce considerably in the summer months. The incidence of acute fluke in 2018 was reduced and is probably as a result of the prolonged dry and hot weather during the early summer across the country leading to reduced survival of metacercariae on pasture and diminishing snail numbers due to drying up of the wet mud microhabitats preferred by *Galba truncatula*. In comparison the summers of 2016 and 2017 were wetter than the average although not as wet as 2012 where the highest number of cases of liver fluke were recorded.

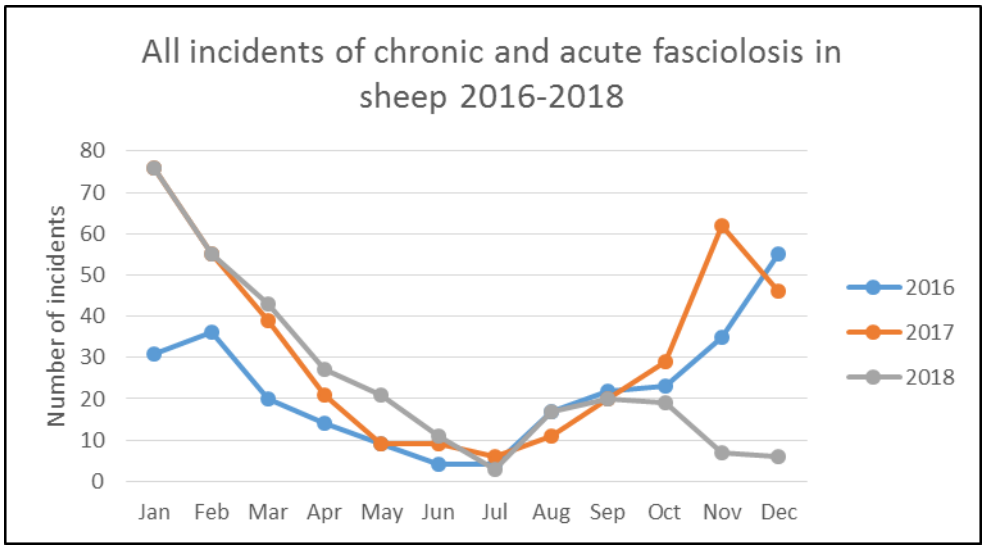

Fig 11: All VIDA recorded incidents of chronic and acute fasciolosis in GB 2016 - 2018

Respiratory disease in sheep

The VIDA codes listed under body system "respiratory" include:

Interstitial pneumonia NOS
Laryngeal chondritis
Nostril Fly Infestation
OPA (Jaagsiekte)
Parasitic pneumonia
Pneumonia dt Mannheimia spp (formerly Pasteurella haemolytica)
Pneumonia dt Mycoplasma ovipneumoniae
Pneumonia dt Pasteurella multocida
Pneumonia NOS

The diagnostic codes highlighted in yellow have been selected by the SR Expert Group as important diseases. They are monitored each quarter and year to evaluate trend analysis. Trends are noted in the quarterly reports. In preparing data for these reports the denominator used is a count of submissions on which diagnosis for a particular disease might have been made, referred to as "diagnosable submissions". Diagnoses can then be expressed as a proportion of diagnosable submissions and thus can be compared across the years. The results of this detailed trend analysis can be seen in the quarterly reports (Link on page 2).

The VIDA code Pneumonia NOS (Not Otherwise Specified) describes Pneumonia not associated with any listed agent (e.g. *Mycoplasma, Mannheimia*), or an unidentified infectious agent or some other cause. The cause can be recorded in a comments field

however if the cause is not determined then it is recorded as Diagnosis Not Reached (DNR). The comments are monitored so that if a condition appears frequently and may warrant monitoring then a new VIDA code can be created.

Cause of pneumonia NOS include some pathogens for example *Trueperella pyogenes, Bibersteinia trehalosi* and other bacterial agents. It also includes histological confirmation where a bacteria may not have been isolated on cultures.

The percentage of VIDA diagnoses made for the respiratory diseases selected by the SR Expert Group in GB in 2018 is shown in the pie chart Fig 12

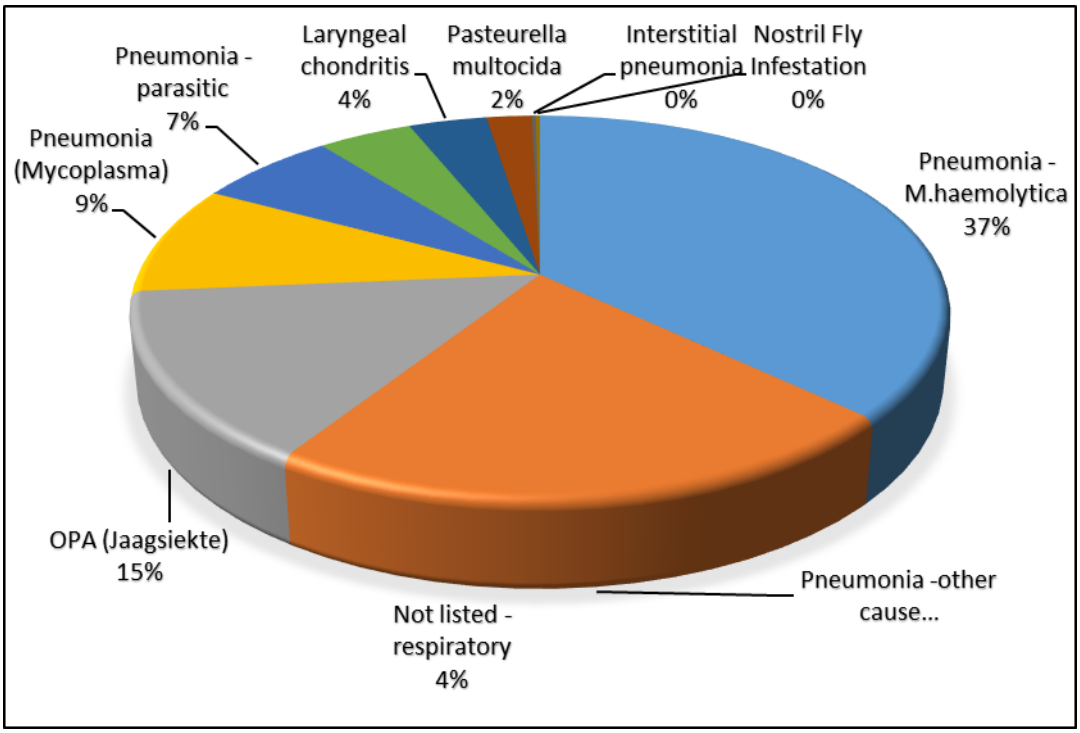

Fig 12: VIDA codes and % diagnosed listed under body system "respiratory" for GB 2018

Enteric diseases

The VIDA codes listed under body system "enteric" include:

Abomasitis NOS
Acute fasciolosis
Benzimidazole (BZ) anthelmintic resistance Suspected/Confirmed
Chronic fasciolosis
Clostridium perfringens B disease
Clostridum perfringens C disease
Clostridium perfringens D infection

Coccidiosis
Colibacillosis - enteric
Colibacillosis - Enteric - K99 +ve
Cryptosporidiosis
Intestinal torsion - Intestinal Haemorrhage Syndrome/Red Gut
Johne's Disease
Levamisole (LEV) anthelmintic resistance Suspected/Confirmed
Macrocylic lactone (ML) anthelmintic resistance Suspected/Confirmed
Mandibular and Dental Abnormalities
Parasitic gastroenteritis (PGE)
PGE - Haemonchosis
PGE - Nematodirosis
Rotavirus disease
Rumen fluke infection
Ruminal acidosis
Ruminal bloat
Watery mouth

The diagnostic codes highlighted in yellow have been selected by the SR Expert Group to be monitored to evaluate trend analysis and is undertaken for each quarter and by year and are reported on in the SR Quarterly reports.

Fig 13 shows the VIDA codes and % diagnosed listed under body system “respiratory” for GB 2018. Parasitic gastro-enteritis is consistently the most common VIDA finding for sheep.

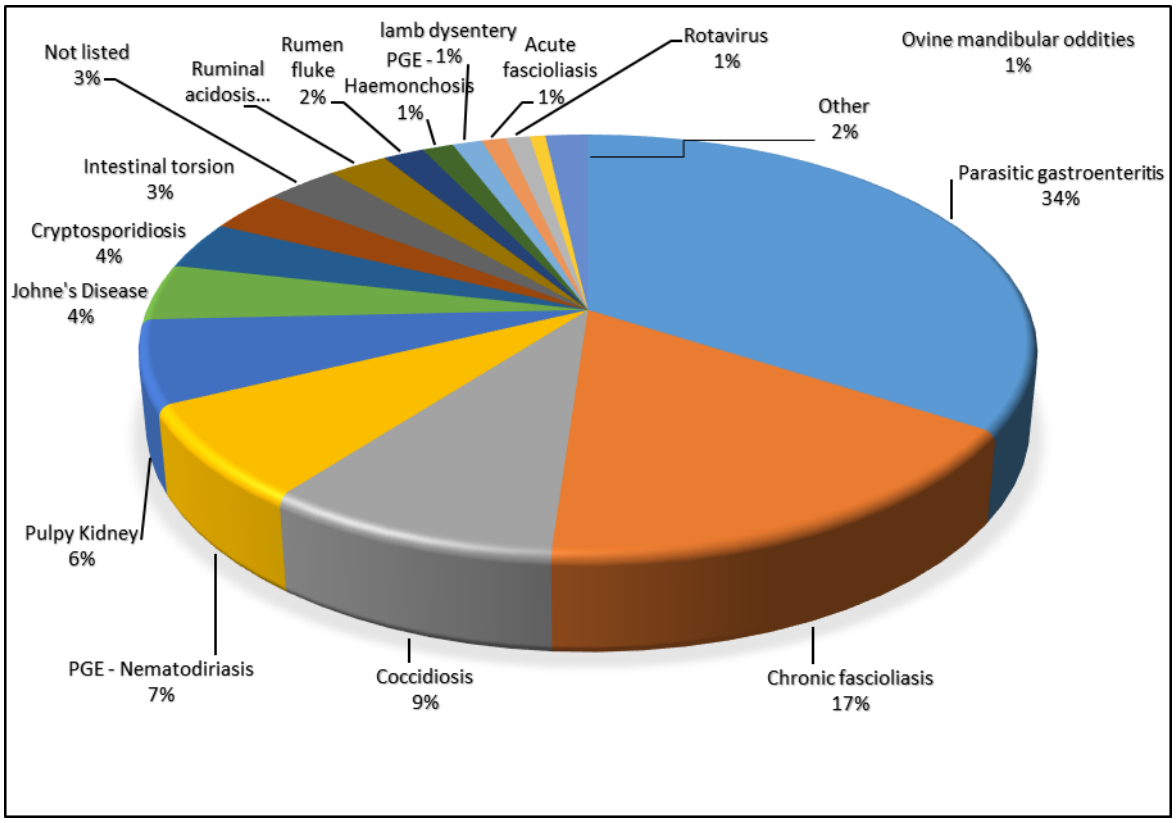

Fig 13: VIDA codes and % diagnosed listed under body system "enteric" for GB 2018

Common diseases of goats

While submissions from goats arrive at APHA from across the country there appear to be more from the south of England, South West Wales and Lancashire and may relate to larger goat milking flocks in these regions.

The highest number of cases occur in the VIDA category "Enteric" and the four most common diseases diagnosed are *Clostridium perfringens* Type D (Pulpy Kidney), Johnes disease, Coccidiosis and Parasitic Gastroenteritis (PGE). These common diseases are shown in Fig 14. as a percentage of total diagnostic submissions 2015-2018

As for sheep, PGE is the most commonly diagnosed disease in goats. Adult goats do not develop immunity like cattle and sheep, thus pastures can easily become contaminated. As there are no anthelmintics with marketing authorisation for use in goats, any product must be used under "cascade" principles.

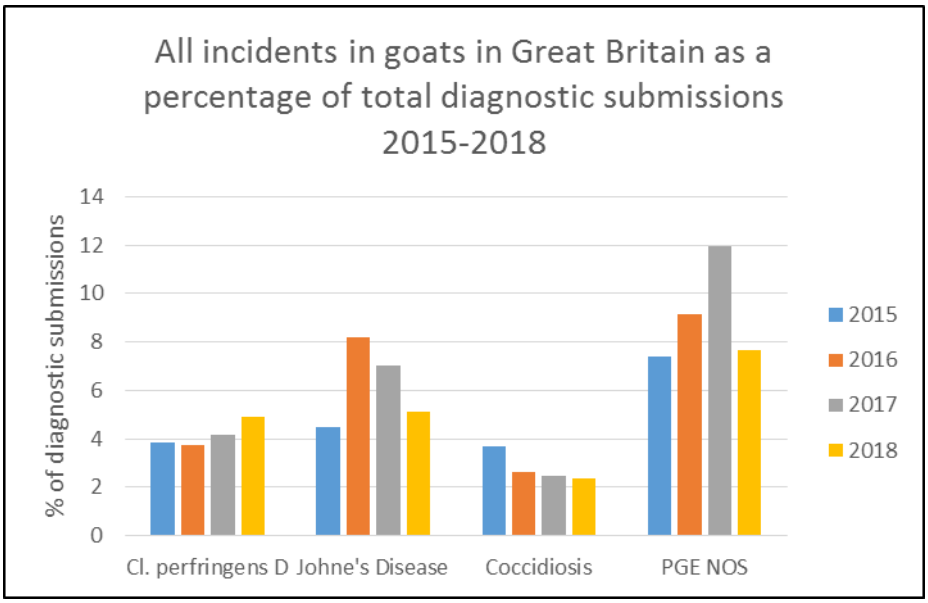

Fig 14: All incidents in goats in Great Britain as a percentage of total diagnostic submissions 2015-2018

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

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.