Animal & Plant Health Agency

Veterinary Investigation Diagnosis Analysis (VIDA)

Annual report 2017

September 2018

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) and to Scotland's Rural College (SRUC) Veterinary Services (SRUC VS) and has been operating since 1975.

In England and Wales during 2017 there were six APHA Veterinary Investigation Centres (VICs) as well as APHA's specialist avian centre at Lasswade in Scotland, a laboratory testing facility in Newcastle and a central research and diagnostic facility at Weybridge in Surrey. The APHA laboratory network is supplemented by five partner post-mortem examination (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; SRUC VS at St Boswells, Scotland.

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

In Scotland during 2017 there were eight Disease Surveillance Centres, administered by SRUC VS. Information about veterinary surveillance and diagnostic services offered by SRUC VS in Scotland is available here: https://www.sruc.ac.uk/info/120144/farm_animal_diagnostics

The total number of diagnostic submissions received in 2017 was 28,889. 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 produce an annual VIDA report that comprises both summary data by month for VIDA diagnoses recorded during the previous year and annual totals for the previous eight years: VIDA Annual Report 2017 (Link to Tableau)

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#!/

Livestock and wildlife disease-related threats identified are reported in the Quarterly GB Emerging Threats Reports for each species. 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 SRUC VS's Disease Surveillance Centres; hence this represents a source of bias. This clinical material includes samples of different types (e.g. blood samples, faeces, tissues) and carcases for post-mortem examination (PME). This bias is influenced by many factors, for example, 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.

VIDA diagnosis totals are intended to represent only cases of clinical disease. For APHA submissions there is no diagnosis code assigned in VIDA if the submission is not diagnostic. However, SRUC VS assign some submissions a diagnosis code meaning "DIAGNOSIS NOT APPLICABLE" (code 991) and "SCREENING – No clinical problem" (code 980).

When examining annual diagnosis figures for a particular disease, it is therefore advisable to relate them not just to the total diagnoses in that year and class, but also to exclude submissions where the diagnosis is 'not applicable' and those for "screening – no clinical problem" before comparing one year with another. Total submissions excluding 'not applicable' and 'screening' are referred to as 'diagnostic submissions'.

Avian VIDA diagnoses comments

Avian disease-related threats identified are reported in the Quarterly GB Emerging Threats for Avian Diseases Reports. More details on each threat, or potential threat, are included in the Quarterly reports which are produced by the APHA Avian 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#avian

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

Marek's disease in chickens

Although VIDA data show a decline in the diagnoses of Marek's disease in recent years, this may reflect changing patterns of submissions to APHA and SRUC VS rather than an actual decline in the disease. Correctly administered vaccines provide good protection

against the development of clinical signs in commercial chickens, but the disease is regularly seen in small and backyard flocks which are often not vaccinated. The VIDA diagnosis is based on demonstration of the characteristic lesions by histopathology. Marek's disease is also occasionally diagnosed in turkeys.

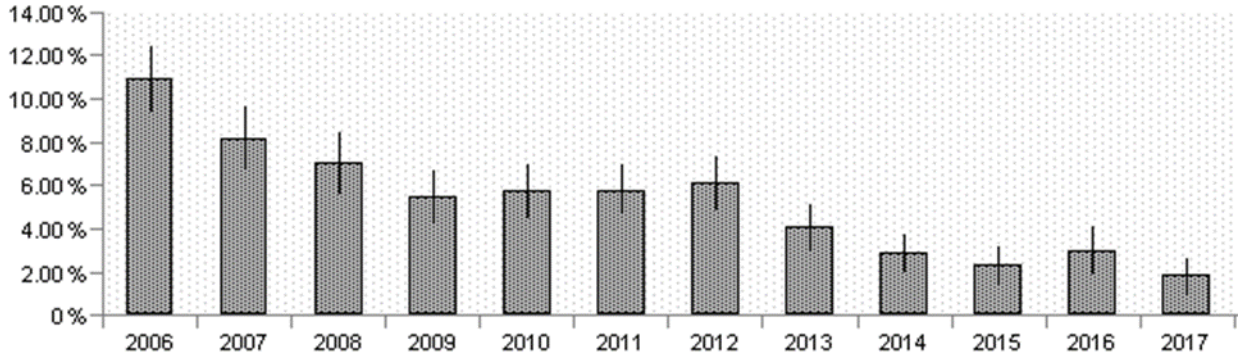

Fig 1: GB incidents of Mareks disease in Chickens as % of diagnosable submissions

Infectious bronchitis in chickens

VIDA data show a decline in the diagnostic rate for this economically important disease in 2017 but, as with Marek's disease, this may reflect changing patterns of submissions to APHA and SRUC VS compared to previous years, rather than an actual decline in the disease. Diagnosis is further complicated by the detection of live attenuated infectious bronchitis vaccine strains, which can be detected by the PCR test as well as field strains. The reduced diagnostic rate may also reflect improved control of the disease by vaccination and correspondingly there has been no significant emergence of new strains detected during the last year which might otherwise have affected the diagnostic rate.

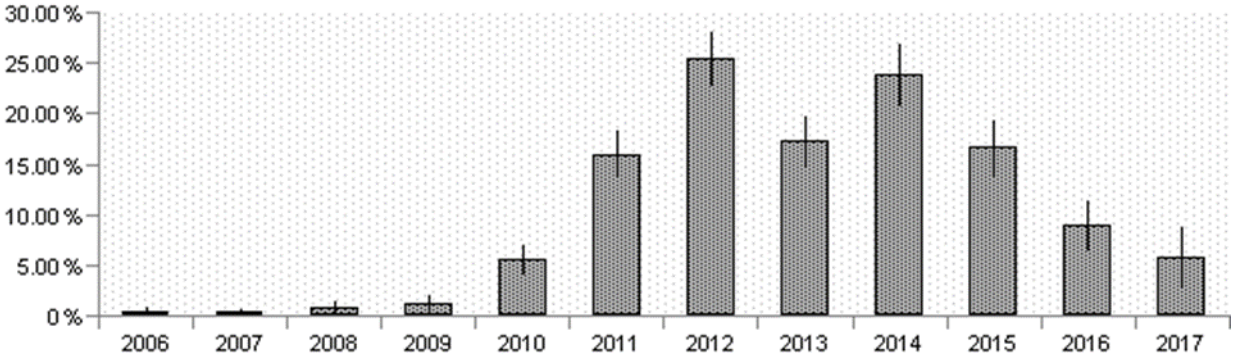

Fig 2: GB incidents of Infectious Bronchitis in Chickens as % of diagnosable submissions

Colibacillosis in chickens

Colibacillosis remains one of the commonest diseases of chickens and other farmed poultry. The term covers disease produced by *Escherichia coli* and includes four VIDA codes: 120 (coligranuloma), 121 (colibacillosis - enteric), 123 (colisepticaemia) and 868 (egg peritonitis/salpingitis complex). Colisepticaemia and egg peritonitis/salpingitis are

commonly recognised manifestations of *E. coli* disease in poultry. Another common manifestation, yolk sac infection/omphalitis (code 810) is not included because it can often be caused by bacteria other than *E. coli*. The increase in percentage incidents of colibacillosis in 2017 (following smaller increases in 2014-2016) demonstrates the continued importance of the disease both in commercial poultry and in small and backyard chicken flocks.

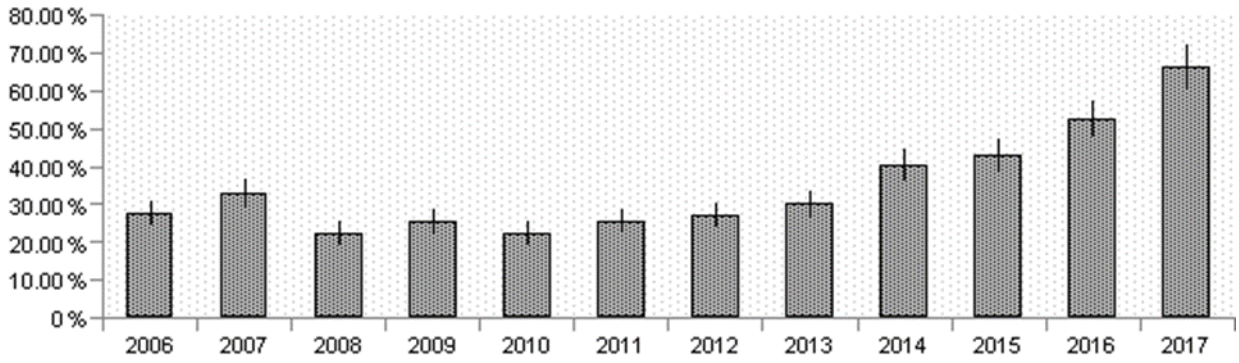

Fig 3: GB incidents of Colibacillosis in Chicken as % of diagnosable submissions

Cattle VIDA diagnoses comments

Cattle disease-related threats identified 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#cattle

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 (https://public.tableau.com/profile/siu.apha#!/vizhome/CattleDashboard/CattleDashboard) has been used to generate the data displayed in Figure 4 below. This illustrates the top 10 bovine abortion diagnoses recorded in VIDA from the GB surveillance network in the years 2016 and 2017:

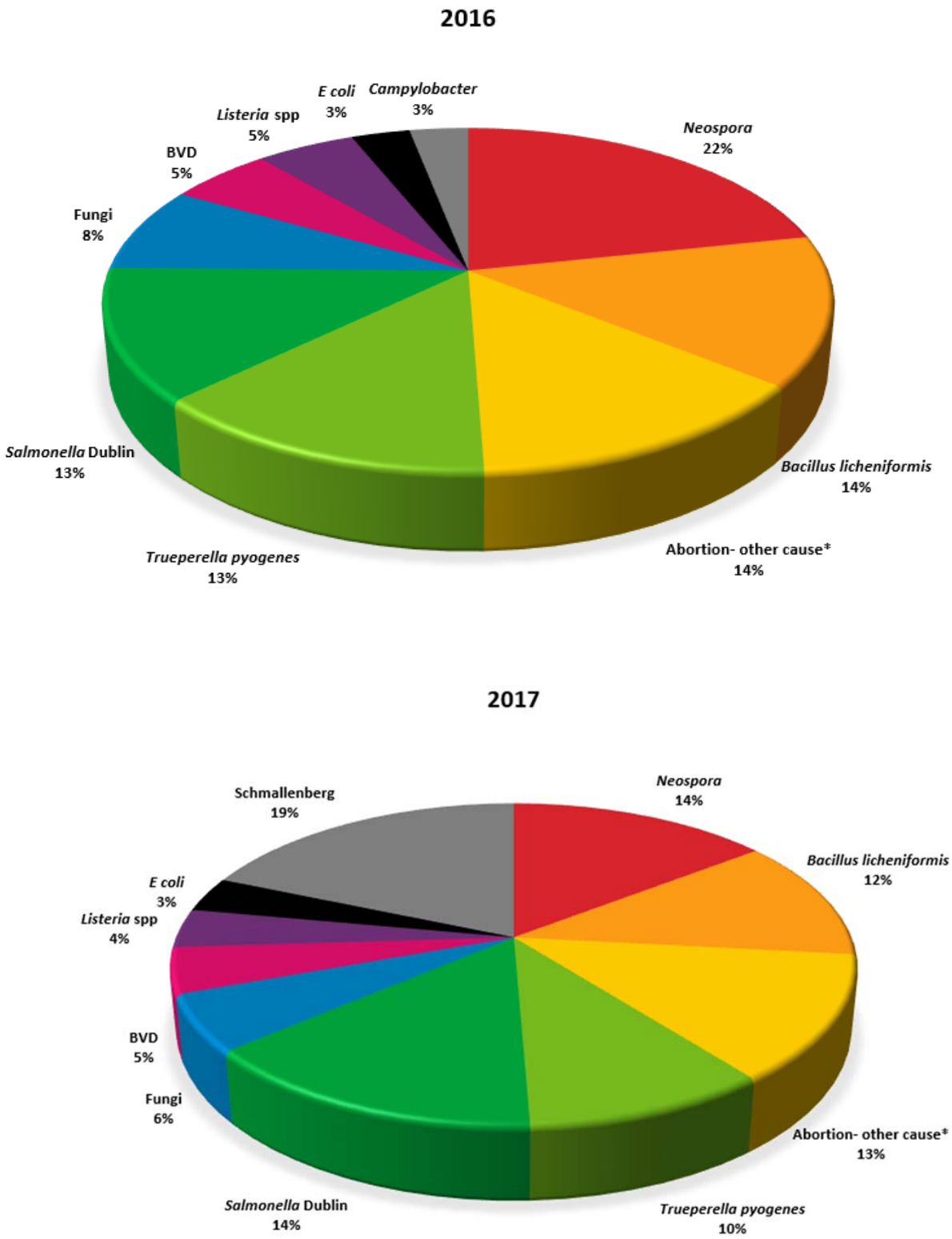

Fig 4: Top 10 Bovine abortion diagnoses in GB, 2016 and 2017 (VIDA)

*'other cause' refers to abortion diagnoses recorded in VIDA that do not have a specific named cause

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).

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. GB Emerging Threats Quarterly Report Cattle Diseases, Quarter 2 April-June 2017: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/642186/pub-survrep-c0217.pdf

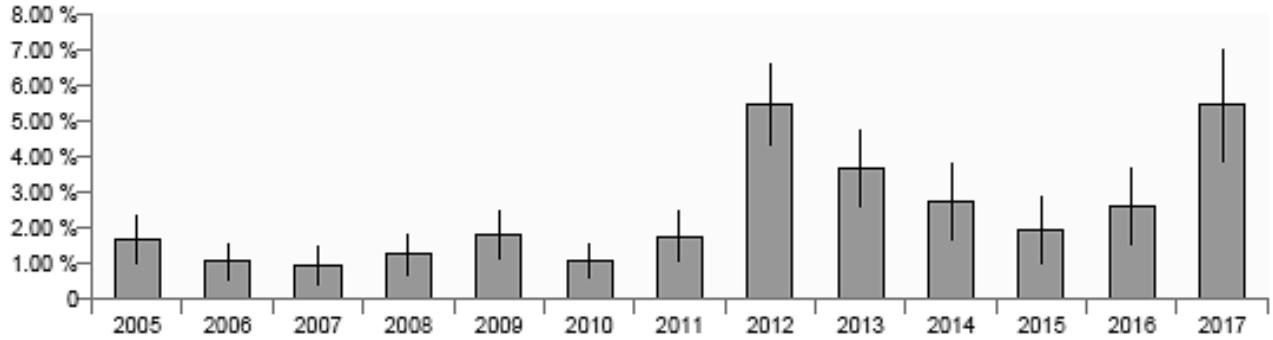

Fig 5: GB incidents of congenital abnormalities in cattle as % of diagnosable submissions in the second quarter, for the years 2005-2017 (VIDA)

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 screenshot of the cattle dashboard (Figure 6 below) shows the distribution of diagnoses of SBV abortion in the second quarter (April-June) of 2017:

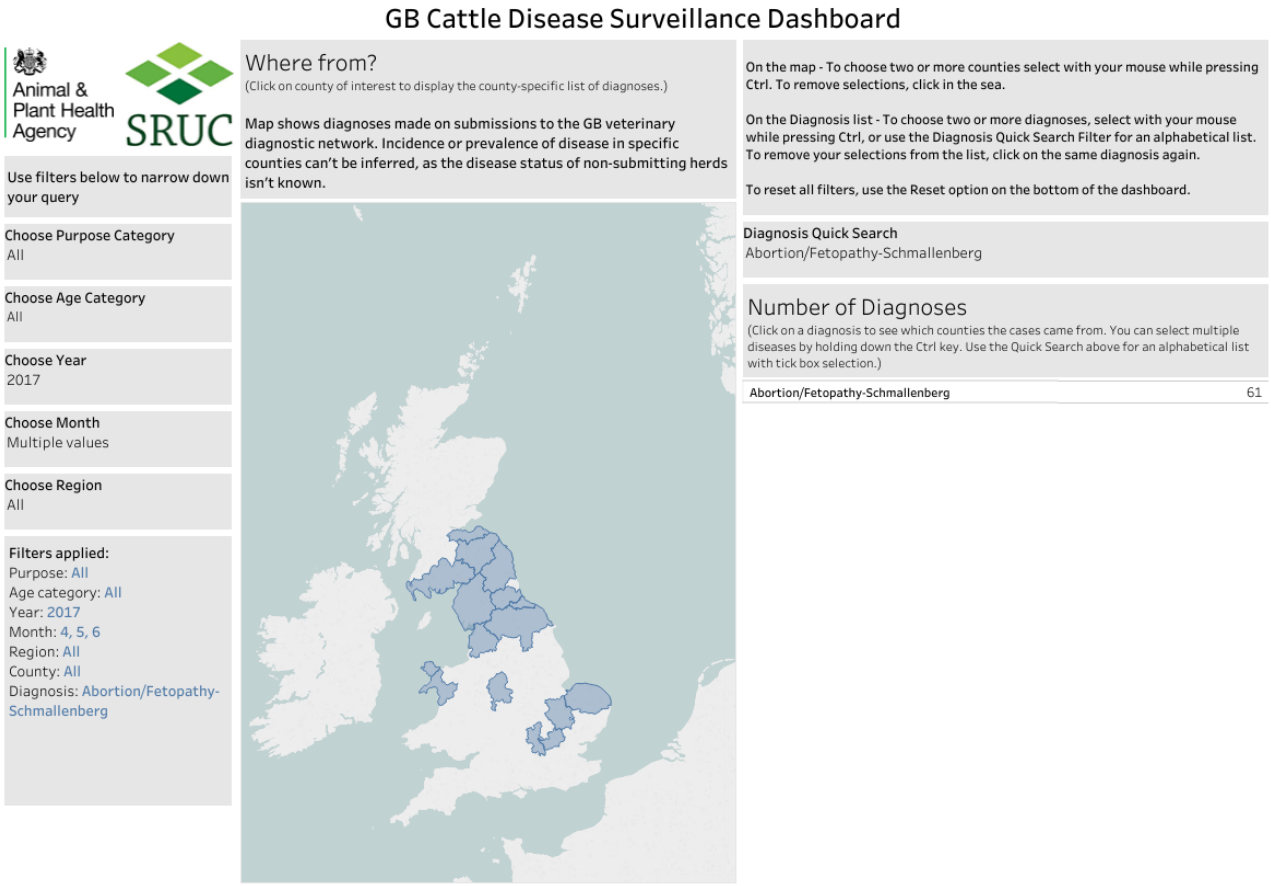

Fig 6: Distribution of SBV diagnoses, Q2 2017 (VIDA)

Pig VIDA diagnoses comments

Pig disease-related threats identified 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 reports 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#pig

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

Porcine respiratory and reproductive syndrome (PPRS)

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 when 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 7, 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 is available online with more details about diagnoses made from 2012 to 2017: https://public.tableau.com/profile/siu.apha#!/vizhome/Porcinereproductiveandrespiratorysyndrome/PRRS

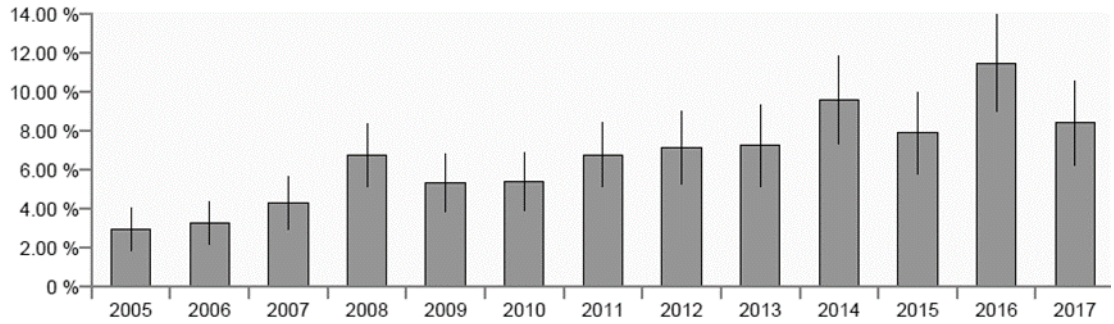

Fig 7: GB incidents in PRRS in Pigs as % of diagnosable submissions

Salmonellosis in pigs

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-2016

The diagnostic rate in Figure 8 shows that salmonellosis is consistently a common diagnosis. The interactive GB pig disease surveillance dashboard indicates that, overall for diagnostic submissions between 2012 and 2017, salmonellosis due to different serotypes together represents the most common diagnosis in GB pigs: https://public.tableau.com/profile/siu.apha#!/vizhome/PigDashboard/Overview

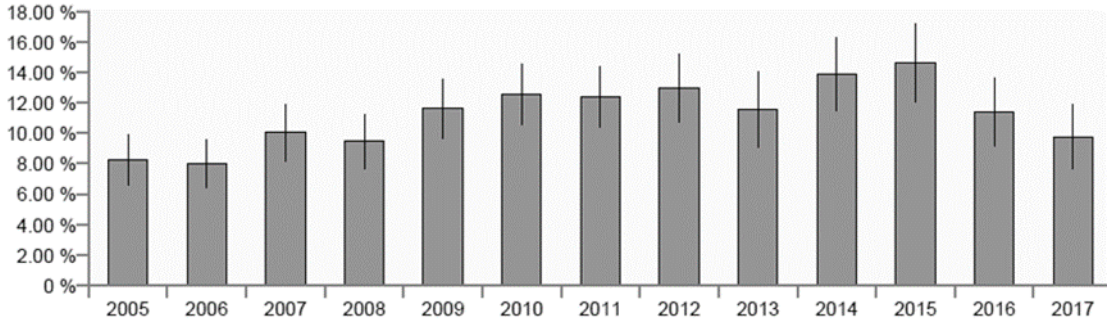

Fig 8: GB incidents of Salmonellosis in Pigs as % of diagnosable submissions

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.

The most recent report with 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-2016

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 9. 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 a few cases since 2011 found to be associated with the recently emerged PCV2 variant known as PCV2d.

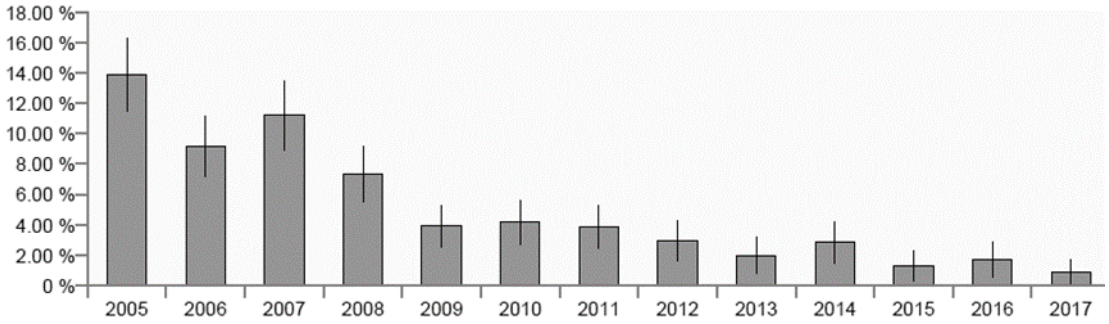

Fig 9: GB incidents of PCVD in pigs as % of diagnosable submissions

Small Ruminant VIDA diagnoses comments

Sheep and goat disease-related threats identified 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#small-ruminants

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

Abortion in sheep

Abortion in sheep was estimated by Bennett, R. and Ljpelaar, J. (2005) to cost the UK sheep industry £30 million per year. Figure 10 shows the VIDA diagnoses for abortion in sheep during 2017.

VIDA diagnoses consistently show over the years three main infectious causes of abortion

- Enzootic abortion (EAE) caused by *Chlamydia abortus*
- Toxoplasmosis
- Infection with *Campylobacter* spp.

These three infections often cause abortion storms, with more than 20% of ewes either aborting or producing weak lambs when the disease first appears in a flock. EAE and toxoplasmosis can be prevented by vaccination.

Schmallenberg virus (SBV) was first identified in the UK as a new and emerging pathogen of cattle and sheep in 2012 following spread of the orthobunyavirus by midges from mainland Europe. Significant losses of lambs were reported in 2012 and 2013, but cases declined and no further cases were diagnosed in sheep in 2014 and 2015. SBV is considered endemic and is not a notifiable disease in the UK.

An APHA investigation detected SBV by PCR in a calf in Cornwall in October 2016. This was followed by four confirmed cases in deformed lambs in the south west of England during December 2016. Surveillance for SBV during the lambing season of 2017 was enhanced and reported on the Vet Gateway webpages: http://apha.defra.gov.uk/vet-gateway/schmallenberg/index.htm

Salmonella and *Listeria* spp are less commonly diagnosed causes of abortion in sheep. Various salmonella serotypes are isolated and only rarely are they the zoonotic serotypes associated with illness in people.

Listeria spp can cause sporadic abortions, usually in flocks where ewes are being fed silage or root crops.

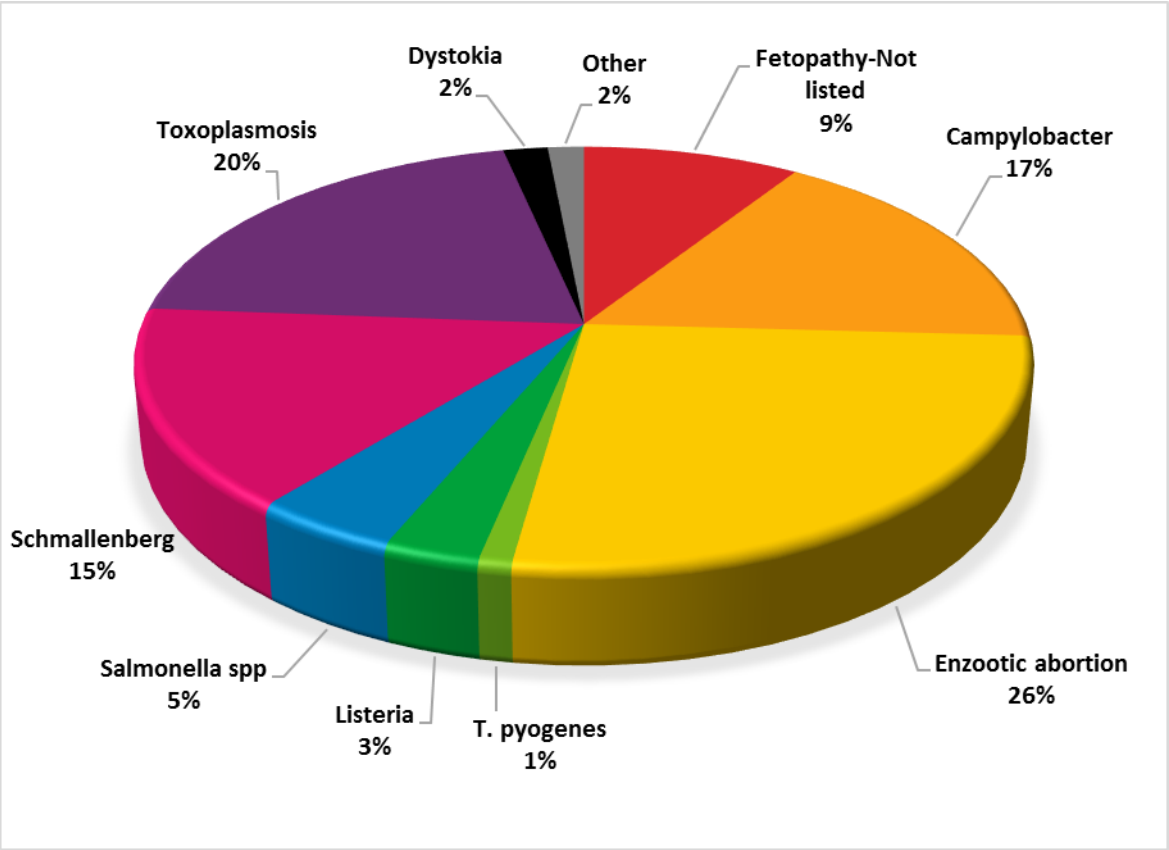

Fig 10: Diagnosis of ovine fetopathy in 2017 (excluding "fetopathy Diagnosis not reached") as a percentage of all ovine fetopathy diagnoses (n= 854). Other includes Fungal, Yersinia spp and *Bacillus licheniformis*.

Parasitic Gastroenteritis (PGE) in sheep

The annual cost of gastro-intestinal parasites to the British sheep industry was estimated by Bennett, R. and Ljpelaar, J. (2005) to be £84 million, making PGE the most costly disease affecting sheep. Parasitic worms reduce growth rates and performance. Five classes of anthelmintic have been licensed for use in sheep in the UK. Resistance to benzimidazoles (1-BZ), levamisoles (2-LV) and macrocyclic lactones (3-ML) is widespread and there are concerns that resistance is increasing (Mitchell and others 2010) due to overuse or inappropriate use of the treatments available.

Parasitic gastro-enteritis (PGE) is consistently the most common VIDA diagnosis in sheep, and includes VIDA codes for PGE Nematodirus, PGE Haemonchus and PGE Not Otherwise Specified (NOS). Figure 11 shows all incidents of PGE including haemonchus, nematodirus and PGE NOS in sheep recorded in VIDA from 2015-2017. Seasonal peaks in VIDA diagnoses of PGE are typically evident in late summer.

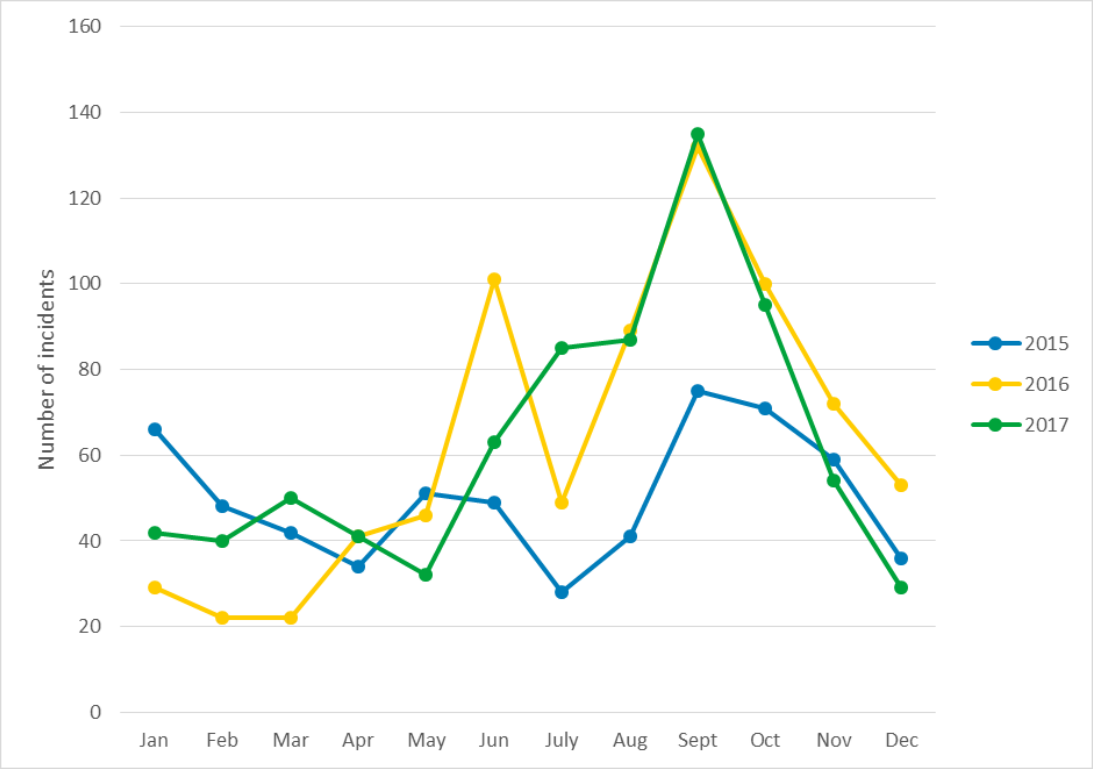

Fig 11. Incidents of PGE combining haemonchosis, nematodirosis and PGE (Not Otherwise Specified) in sheep 2015-2017 (VIDA)

Liver Fluke in sheep

Liver fluke disease in sheep 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 VIDA diagnosis codes for Acute and Chronic liver fluke infections. Incidents of chronic and acute fasciolosis in sheep from 2005-2017 as a percentage of the enteric syndrome are shown in Figure 12. Acute infections cause sudden death due to haemorrhage in the liver caused by migrating larvae. Chronic infections of liver fluke result in poor body condition sometimes leading to death. The incidence of fasciolosis is typically highest in years when rainfall is above average during the summer.

Economic losses associated with this disease 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 (Mitchell, Maris and Bonniwell, 1998; Thomas, Coles and Duffus, 2000; and Sargison and Scott 2011) and resistance was confirmed in 2012 (Gordon et al 2012). The prevalence of TCBZ resistance is not known, but its presence is a major threat to the farming of sheep in wetter areas of the UK where liver fluke is endemic.

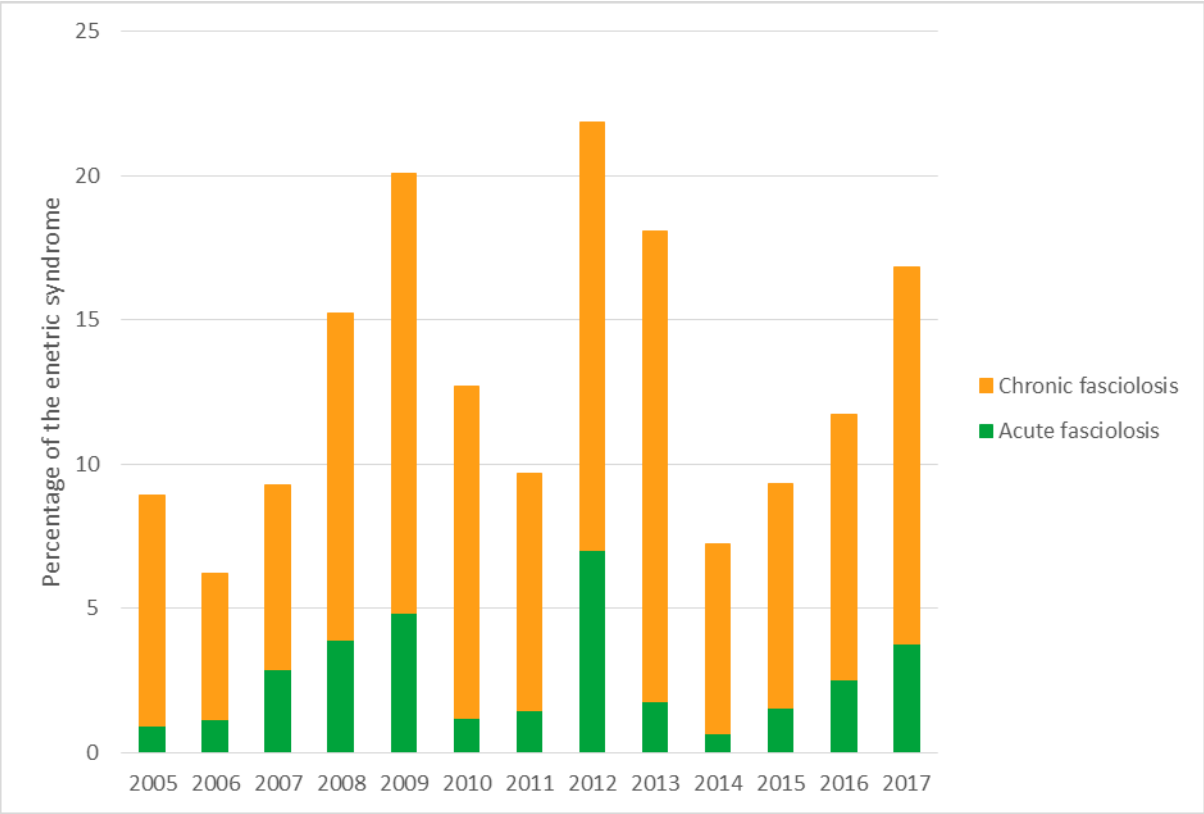

Fig 12: VIDA diagnoses of chronic and acute fasciolosis in sheep, 2005-2017 as a proportion of enteric syndrome VIDA diagnoses in sheep

Common diseases of goats

The four most common diseases in goats that are diagnosed and recorded in VIDA are pulpy kidney, Johnes disease, coccidiosis and PGE shown in Figure 13. Like sheep, PGE is the most commonly diagnosed disease in goats. Goats do not develop immunity to gastrointestinal worms 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.

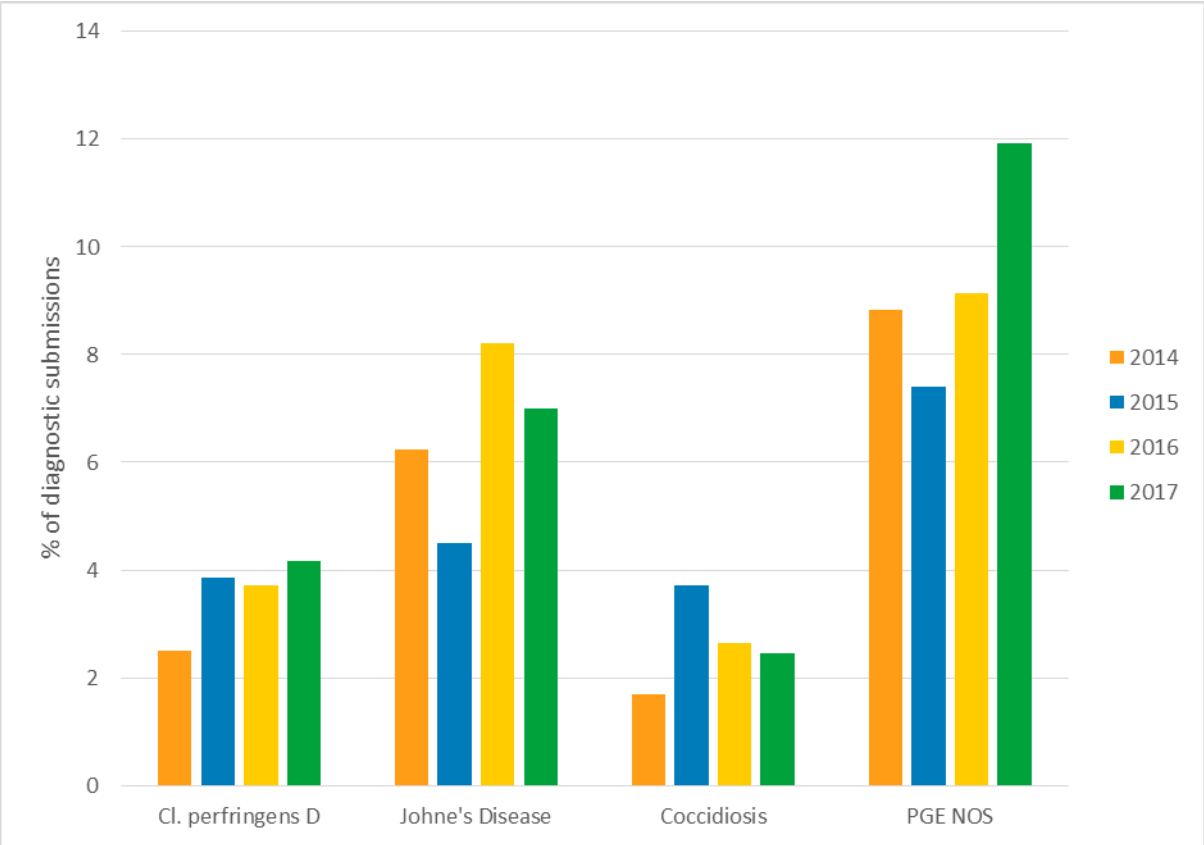

Fig 13: VIDA diagnosis of Pulpy Kidney, Johnes disease, coccidiosis and PGE NOS in goats in Great Britain as a percentage of diagnostic submissions in goats 2014-2017

References

Mitchell, E. S. E., Hunt, K. R., Wood, R. & Mclean, B. (2010) Anthelmintic resistance on sheep farms in Wales. Veterinary Record; 166, 650-652.

Bennett, R. and Ljpelaar, J. (2005) Updated estimates of the costs associated with thirty four endemic livestock diseases in Great Britain: a note: Journal of Agricultural Economics. 56 (1); 135-144.

Mitchell, G. B. R., Maris, L., and Bonniwell, M. A. (1998) Triclabendazoleresistant fluke in Scottish sheep. Veterinary Record; 143, 399.

Thomas, I., Coles, G. C., and Duffus, K. (2000) Triclabendazole-resistant Fasciola hepatica in south-west Wales. Veterinary Record; 146, 200.

Sargison N. D. & Scott P. R. (2011) The diagnosis and economic consequences of triclabendazole resistance in Fasciola hepatica in a sheep flock in the south-east of Scotland. Veterinary Record; 168, 159.

Gordon, D., Zadoks, R. , Skuce, P. and Sargison, N. (2012) Confirmation of triclabendazole resistance in liver fluke in the UK. Veterinary Record; 171, 159-160.

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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

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