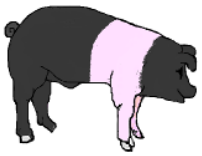
# Emerging Threats Quarterly Report

# Pig diseases

Working for public and animal health

These reports aim to identify emerging animal disease related threats. Their production is underpinned by a large amount of surveillance data and information compiled as part of the Defra Food and Farming Group animal disease surveillance programme. Some of these data can be viewed on the VLA website. http://www.defra.gov.uk/vla/reports/rep_intro.htm

**February 15th 2011 QR 4**



VIDA diagnoses are recorded on the VLA FarmFile database and SAC LIMS database and comply with agreed diagnostic criteria against which regular validations and audits are undertaken.

The investigational expertise and comprehensive diagnostic laboratory facilities of both VLA and SAC are widely acknowledged, and unusual disease problems tend to be referred to either. However recognised conditions where there is either no diagnostic test, or for which a clinical diagnosis offers sufficient specificity to negate the need for laboratory investigation, are unlikely to be represented. The report may therefore be biased in favour of unusual incidents or those diseases that require laboratory investigation for confirmation.

VLA Regional Laboratories and SAC Veterinary Surveillance Centres have UKAS Accreditation and comply with ISO 17025 standard.

## Contents



## Highlights

**Orchitis and weight loss were the presenting signs in a boar with tuberculosis with a likely two-year incubation period. A sow on the same unit also had Tb but showed no clinical signs.**

**Two unusual aetiologies of abortion were detected and were caused by *Actinomyces hyovaginalis* and *Actinobacillus rossii* but were not of zoonotic significance or a significant potential treat to the wider pig population.**

**The further detection of strains of *Brachyspira hyodysenteriae* resistant to antimicrobials, is of concern for the health and welfare of the breeding herd in the UK**

**Pandemic H1N1 influenza virus continues to be detected**

**There is no evidence of the emergence of post weaning cachexic syndrome or high mortality neonatal enteritis as reported in other countries.**

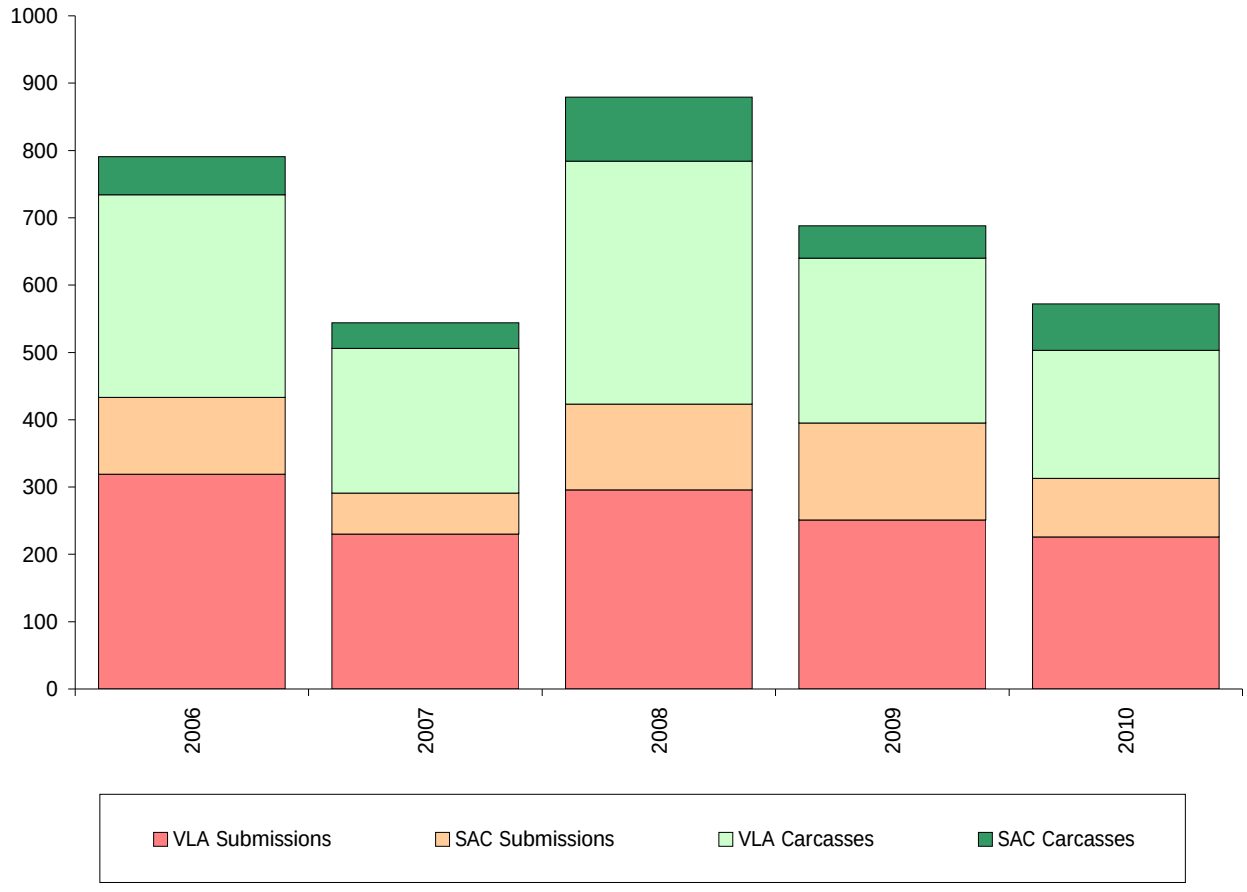
**The investigation continues into the cause of circulatory failure and 22% mortality in neonatal pigs on one farm.**

## INTRODUCTION

This report contains analysis of disease data for the last quarter year 2010 and annualised data for the whole year compared to previous years. The report will qualify the description of any important disease events by stating whether this is based on quarterly or annualised data analysis

Pig carcase submissions in England and Wales declined during quarter four, as shown in figure 1, due to the initial response to price increases introduced on the first of October 2010 but by December they had returned to levels seen in previous years for this quarter. Discussions with specialist pig practitioners in November corrected any misunderstandings, which resulted in increased carcase submissions. SAC carcase submissions increased compared with the same quarter in 2009.

**Figure 1: Pig Diagnostic Submissions and Carcases Quarter 4 2006 -2010**




## NEW AND EMERGING DISEASES

### SCANNING SURVEILLANCE FOR NEW AND EMERGING DISEASES IN PIGS: Q4, 2010

The following is a summary of pig data analysed by VLA and SAC from diagnostic samples submitted to Regional Laboratories. The aim of this report is to review data where a diagnosis was not reached despite the sample receiving “reasonable” testing. This allows monitoring of this class with the aim of providing information on new or emerging syndromes.

It should be noted that VLA reports prior to 2005 on undiagnosed submissions included submissions which received both adequate and limited testing. Comparisons between the figures within this report should bear this is mind. 'Prior years' refers to pooled data for years 2005-2009 for VLA only data, and to data for 2008-2009 for GB VIDA data.

**VIDA GB data Q1 to Q4, 2010: DNR by Presenting Sign**

- The overall percentage of pig diagnostic submissions for GB VIDA for the 12 months of 2010 (to fourth quarter, Q4) where a diagnosis was not reached (DNR) was 17.6% (171/973). This was not significantly increased from data to Q4 for prior years in which DNR was 17.8%.

- One individual presenting sign (found dead) gave a significant increase in DNR for GB and VLA data; 17.9% (28/156) VLA submissions were undiagnosed to Q4, 2010 compared to 9.9% (27/272) in prior years. No significant increase for submissions found dead was seen in SAC data.

- One individual presenting sign (other) gave a significant increase in DNR for SAC data only: 16.7% (8/48) compared to 6.31% (13/206) in prior years. The undiagnosed SAC submissions were reviewed and showed no common features to suggest a new or emerging disease.

- DNR was not significantly changed in GB, SAC or VLA data for submissions with a presenting sign of diarrhoea. When examined by age category, there was a significant reduction in DNR for pre-weaned pig submissions with a presenting sign of diarrhoea; 7.4% (2/27) compared to 27.3% in prior years. For neonatal pigs, DNR for such submissions remained constant at around 28% (9/32).

- There was no significant increase in DNR for GB, SAC or VLA submissions with a presenting sign of 'wasting': 10.7% (8/75) compared to 11.6% for prior years. When examined by age category, there was no significant increase in DNR for post-weaned pigs: 12.2% (6/49) compared to 10.5% for prior years. The undiagnosed post-weaned VLA submissions were reviewed; four were non-carcase submissions not allowing full testing; the remainder did not show common features. There was no evidence from DNR analysis of the emergence of post-weaning cachexic syndrome (PWCS) which is a wasting syndrome reported from Northern America distinct from porcine circovirus 2-associated disease. PWCS is described as affecting pigs immediately after weaning, usually 4-8 weeks old and the cause has not been established.

**VIDA GB data to Q4, 2010: DNR by Disease Syndrome**

- As in the first three quarters of 2010, there was a significant increase in GB and VLA data for DNR for systemic and miscellaneous syndrome to Q4, 2010 compared to prior years; this was for systemic and miscellaneous syndrome for which DNR for VLA submissions was 12% (39/325) compared to 7.6%. No such increase for systemic and miscellaneous submissions was seen in SAC data.

**Increased DNR for 'Systemic and Miscellaneous' syndrome GB Submissions**

- Over half (24/40) of the undiagnosed GB submissions in the systemic and miscellaneous syndrome had a presenting sign of 'found dead'; the remainder included a variety of signs. The significantly increased DNR for this syndrome thus mirrors the increase in DNR mentioned above for submissions of pigs found dead.

- DNR analysis for the last quarterly report included reviewing details for VLA submissions for both systemic and miscellaneous syndrome and a presenting sign of found dead using Vladimir data and the findings did not suggest a common presentation or a new or emerging disease. Several submissions related to the 5-day investigation of deaths in pre-weaned pigs referred to elsewhere in this report. The undiagnosed submissions in Q4 were also reviewed; endocarditis and possible bracken poisoning were present in two, findings in the three other undiagnosed cases involving Saddleback and Gloucester Old Spot pigs were non-specific. Uncommon diagnoses such as bracken or other plant poisonings need to be considered where smaller numbers of pigs are kept outdoors on land which is not conventional commercial agricultural land. It is also clear that prompt submission of carcases is important, that antimicrobial treatment adversely affects bacteriology, that it is important to

submit more than one pig where a group problem is being investigated, and that follow-up submissions may be necessary to establish diagnoses if clinical disease is persisting on farm.

- There was no significant reduction in DNR for enteric syndrome for GB, VLA and SAC data; the GB DNR was 15.8% (46/291) compared to 18.5% for prior years. Further analysis revealed that there was a significant reduction in DNR for enteric submissions from pre-weaned pigs; 9.4% (3/32) were undiagnosed to Q4, 2010 compared to 28.4% in prior years. For enteric submissions from neonatal pigs, DNR remained around 26% (9/35). Undiagnosed pre-weaned and neonatal VLA submissions with a presenting sign of diarrhoea and/or of enteric syndrome were reviewed. Six were non-carcase submissions where full diagnostic post-mortem examination and testing is not possible. Of the submissions of pigs, two were part of the 5-day investigation into *Clostridium difficile* described in the January to September 2010 quarterly report;, one was suspected colibacillosis, one was suspected to be in the chronic stage of disease and two submissions of dead pigs were undiagnosed. Where no diagnosis is established from reasonable testing, further submissions are recommended. The DNR analysis provides no evidence from undiagnosed submissions that the unexplained neonatal pig enteric problem, described in Europe and referred to in previous quarterly report, is emerging in GB pigs, although it is worth noting that the problem is poorly characterised.

## ONGOING EMERGING DISEASE INVESTIGATION

**Heart failure** - A five-day investigation into high pre-weaning mortality in a 350-sow outdoor herd continues. The clinical picture so far shows 22% mortality in neonatal pigs with deaths at 4-5 and 10-21 days of age in rapidly growing piglets. Necropsy findings have been consistent with a heart failure but no aetiology has so far been determined and no histological evidence of primary cardiomyopathy was evident, although there is some anaemia. Histopathology findings are consistent with acute cardiovascular failure with no evidence of infectious disease. Deaths are only occurring in the rapidly growing pigs, suggesting a metabolic or nutritional aetiology. There were problems in the herd before it was killed out and repopulated in 2009 so a genetic aetiology is improbable. There is no evidence that the incidence is changing or affecting other age groups as would likely occur with infectious disease. Investigations into possible soil ingestion preventing iron or vitamin E absorption and thiamine deficiency continue. If there is a marginal nutritional/metabolic deficiency then in most species it manifests in the rapidly growing animals. **The risk of disease spreading is low as there are no findings to suggest an infectious aetiology. There are no reports of this syndrome being described or seen elsewhere. Until an aetiology has been established it is not possible to say if this is a new and emerging disease. Any further action needed will be determined when the investigation is complete.**

**Reproductive disease** – In the previous emerging threats quarterly report (Q3 2010 http://vla.defra.gov.uk/reports/docs/rep survrep qtlyp0310.pdf) a suppurative placentitis was reported as an unusual finding in a small herd of 30 sows with two sows aborting approximately 2-3 weeks early. *Actinomyces hyovaginalis* was isolated from the stomach contents of one piglet. There are reports of this organism being isolated from aborted pig foetuses and vaginal discharges and on occasions it has been isolated from other sites and other species. This is a likely sporadic cause of abortion, and unlikely to raise any immediate concerns for the pig industry. The bacterium has no known zoonotic significance. **There is therefore no known risk to either human health or the wider pig industry posed by *Actinomyces hyovaginalis*.**

## UNUSUAL DIAGNOSES

### Tuberculosis

*Mycobacterium bovis* infection was diagnosed in 2 adult pigs. The pigs were kept on a farm where there had been *M. bovis* infection in goats in 2008 (Daniel et al, 2009) and milk from the goats was fed to the pigs prior to the diagnosis of tuberculosis in the goats. The boar initially presented with right testicular swelling and about 2 months later, the left testicle also became swollen. Three weeks later the boar was

euthanased having lost weight. At necropsy, there were pale areas, sometimes calcified, in multiple lymph nodes, liver and lung and there was thickening of the omentum. There were white areas in both testes which were enlarged and extensively calcified. Histopathological changes consistent with tuberculosis were seen in testes, lung, liver and lymph node and acid fast organisms were detected in lymph node and testes. The sow appeared healthy but was euthanased and small pale areas were detected in the left bronchial lymph nodes. *Mycobacterium. bovis* spoligotype 9 was isolated from tissues from both pigs and this was the same spoligotype previously isolated from the goats. If the pigs were infected by drinking milk from infected goats, the time between infection and development of clinical signs in the boar was over 2 years. Tuberculosis of the testis is recorded in man and cattle and there is at least one report in a pig (Gavez E., 1957).

DANIEL, R., EVANS, H., ROLFE, S., DE LA RUA-DOMENECH, R., CRAWSHAW, T., HIGGINS, R. J., SCHOCK, A. & CLIFTON-HADLEY, R. 2009. Outbreak of tuberculosis caused by Mycobacterium bovis in golden Guernsey goats in Great Britain. *Veterinary Record,* 165**,** 335-342.

GAVEZ E. 1957 Role of Leydig cells in tuberculous and brucellar epididymitis and orchitis in pigs. *Veterinaria,* 6, 33-45.

**Pigs are very susceptible to Mycobacterium bovis. In other European countries pigs can and do act as a reservoir of disease for cattle. In the UK, it is likely that the risk is low for tuberculosis becoming established in pigs such that they are a significant reservoir of infection and a significant source of zoonotic disease for pig keepers. There has been a growing trend to breed and raise pigs commercially outdoors in recent years. In addition, there are a growing number of hobby farms and small holdings. Tb in pigs in the UK has been found on both large scale commercial and small scale holdings.**
**Pigs are omnivorous and if tuberculosis is present in wildlife in that area then they could potentially become infected by their rooting and foraging activities. In the case described above there was a likely long incubation period with one animal exhibiting clinical signs and the other being asymptomatic. There are reports from British Pig Health Scheme of more tuberculosis being detected in pigs at slaughter – this appears to represent an increased awareness and submission rate at meat inspection. However, the increase in pet/hobby/small holding pigs may mean cases of tuberculosis are missed as many of these animals will not enter the food chain where monitoring for tuberculosis occurs. There is much movement and contact between pigs from small holdings with shared boars, markets and shows as likely contact points. The case above is the first reported case of orchitis due to *Mycobacterium bovis* in a boar in the UK. More work is needed to assess the risks that pet/hobby/small holding pigs pose to tuberculosis control and human health. This will be discussed with VLA researchers.**

***Actinobacillus rossii* abortion**

Nine porcine foetuses were submitted for post mortem examination as part of an investigation into abortion in a bought-in gilt which was approximately 70 days in-pig. Reportedly, eight abortions in total had occurred on this farm before the submission of these piglets. Most of the gilts which had been scanned in-pig were subsequently found to be empty. Gilts were served using artificial insemination. No increase in mummified or stillborn piglets had been noted. On gross post-mortem examination of fetuses, kidneys were enlarged with mottled beige discolouration in two of the three foetuses examined. Tests for PRRS, *Leptospira* and parvovirus (all by PCR) were negative, as were enrichment cultures for *Salmonella* on foetal stomach contents. However, routine culture of foetal stomach contents revealed profuse pure growth of *Actinobacillus rossii*, from one of the fetuses. *Actinobacillus rossii* has been identified as an inhabitant of the porcine vagina (Sneath & Stevens 1990) and has been suggested as a cause of porcine abortion. Further, RTX toxin genes have recently been identified in strains of *Actinobacillus rossii* (Mayor *et al.* 2006) and the possession of these virulence factors may contribute to the organism's ability to act as a sporadic cause of porcine abortion In this case disease was in maiden gilts and this may suggest spread following contact with sows. No reasonable precautions can be taken to prevent disease. This organism is not of known zoonotic significance. **There is therefore no known risk to either human health or the wider pig industry.**

Mayor, D et al. (2006) Distribution of RTX Toxin Genes in strains of *Actinobacillus rossii* and *Pasteurella mairii* Veterinary Microbiology 116, 194 – 201.

Sneath, P.H. and Stevens, M. (1990) *Actinobacillus rossii* sp. Nov., *Actinobacillus seminis sp. Nov., nom. Rev., Pasteurella bettii* sp. Nov., *Pasteurella lymphangitidis* sp. Nov., *Pasteurella mairii* sp. Nov., and *Pasteurella trehalosi* sp. Nov. International Journal of Systemic Bacteriology 40, 140 – 153.

## CHANGES IN DISEASE PATTERNS AND RISK FACTORS

### Respiratory Disease

There were no significant changes in quarterly or annual rates of diagnoses of porcine respiratory diseases. The British Pig Health Scheme has noted an increase in enzootic pneumonia type lesions in pigs at slaughter but these can be caused by a number of organisms and it does not necessarily represent an increase in *Mycoplasma hyopneumoniae* infection.

### Reproductive Disease

See sections “Unusual Diagnosis” and “Ongoing Emerging Disease Investigations” both on page 4.

### Enteric Disease

#### Salmonellosis

The upward trend in isolation of salmonellas in porcine submissions since 2002 continued with a small but not significant increase between 2009 and 2010.

*Salmonella Typhimurium* remains the predominant serotype, with a notable increase in the numbers of monophasic variants identified. Antibiotic resistance within this serotype is an issue of concern for animal and public health and continues to be monitored. **The level of infection within the UK pig herd is of concern as both a risk to the health and welfare of pigs and as a zoonotic disease. Practical cost effective means of on farm control of salmonella infection have yet to be identified whilst the National Control Programme targets have not yet been determined. However, the industry is aware of the situation regarding porcine salmonellosis and the Government continues to encourage it to take a lead in the identification and implementation of effective control against salmonella.**

#### Antimicrobial resistance – *Brachyspira hyodysenteriae*

The well documented previously reported increase in prevalence of swine dysentery (SD) in East Anglia and in Yorkshire has been noted. The apparent growing resistance to commonly used therapeutic antimicrobials in isolates associated with SD, resulted in the Pig Expert Group (PEG) decision in September 2010 to screen all isolates obtained through VLA scanning surveillance of pigs to obtain MIC values for the pleuromutilin antimicrobial tiamulin (the most commonly used treatment for SD) on a quarterly basis rather than annual as was previously done. Three isolates in Q4 from 2 different units were tested and found to be tiamulin resistant. This is of concern to the industry, as the emergence and potential spread of organisms resistant to the limited antimicrobials available would have an adverse effect on the health and welfare of pigs and be of economic importance to the industry. Control is based upon either appropriate antibiotic therapy of affected pig herds, which is cost effective when pig prices are high(but can provide selective pressure for the emergence of antimicrobial resistance) or eradication by partial depopulation, cleaning, disinfection and intensive treatment or eradication by total depopulation, cleaning and disinfection. **The PEG decided to store all future isolates and to test for antimicrobial resistance against the other available therapeutic drugs if tiamulin resistance was detected. The Veterinary Medical Directorate are aware of the situation and close monitoring will follow. The Pig Veterinary Society (PVS) are aware of the issue and the results of the MIC testing**

**done on over 70 stored Brachyspira hyodysenteriae isolates were presented to the PVS in November 2010.**

### Cardiovascular Disease

See ongoing emerging disease investigations section

### Nervous Diseases

No remarkable changes noted

### Other Diseases

In late November 2010 the German authorities informed the European Commission's Rapid Alert System for Food and Feed (RASFF) that a batch of fatty acids, which was meant to be used for technical purposes, was mixed with the fat for the production of animal feed. The batch of fatty acids was produced in a biodiesel company and delivered to a feed fat producing company and contained higher levels of dioxin than allowed by EU law. None of this feed was delivered outside of Germany and therefore there was no threat to UK pigs or consumers of UK pig meat.