GB surveillance

Pig diseases

Veterinary Laboratories Agency

Working for public and animal health

SAC

Quarterly Report: Vol Q2 2009

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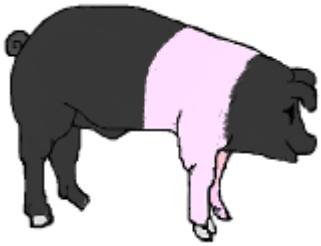


The VIDA diagnoses are recorded on the VLA FarmFile database and comply with agreed diagnostic criteria against which regular validations and audits are undertaken.

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 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 RLs have UKAS Accreditation and comply with ISO 17025 standard. SAC Veterinary Services have UKAS accreditation at their central diagnostic laboratory and at the Edinburgh and St Boswells Disease Surveillance Centres which comply with ISO 17025 standard.

Contents

Highlights

There were no reported incidents of food safety or Notifiable disease involving pigs in the second quarter of 2009.

The incidence of PMWS was the lowest in England and Wales since 2002 and is further evidence that this severe disease continues to come under control and supports the findings of the BPEX vaccine trial.

The diagnostic rate for PRRS this quarter showed an increase on the previous quarter and although this was not statistically significant, it is the highest rate for any quarter since 2002.

The quarterly percentage of relevant diagnostic submissions with a diagnosis of pneumonia and/or pleurisy has shown a significant decrease on the same quarter in 2008 for England, Wales and for GB. This is the lowest for the second quarter since 2002. Although it is only a marginal decrease from the first quarter of 2009 it is supported as being real by data from other sources.

defra

SCOTTISH EXECUTIVE

1) INTRODUCTION

This is the fifth pig surveillance report that combines information from all areas of Great Britain into a single, integrated overview of pig health across the whole region. It has been made possible through a partnership between Defra, SEERAD, the Veterinary Laboratories Agency (VLA) and Scottish Agricultural Colleges Veterinary Services (SAC VS) Division.

A key objective for any pig disease scanning surveillance system is to increase the likelihood of early detection of important changes in pig health. Any major disease occurrence, such as the FMD outbreak of 2001, can have a major impact either by threatening public health and/or animal welfare, or through its economic impact on the agricultural industry and ancillary related industries like tourism across the whole of GB. The possibility of the incursion of exotic diseases, the emergence of a new disease, or changes in known diseases are all risks which scanning surveillance seeks to mitigate. The surveillance networks north and south of the Scottish border used to reported their findings separately, which reduced the likelihood of early detection of important changes in health in this single epidemiological population. The unified GB-wide data resource, coupled with collaborative analytical processes should make detection of all these scenarios both easier and quicker.

The network of 14 VLA Regional Laboratories (RLs) and two Surveillance Centres (at Veterinary Schools) in England and Wales and 8 SAC VS Disease Surveillance Centres in Scotland provides a diagnostic service to private veterinary practitioners across GB. Clinical scanning surveillance information derived from diagnostic samples and carcasses is collected and analysed to determine baseline disease levels in the pig population. The aim is to provide an assessment of the current disease status of the GB pig population and to warn of potential risks from changing disease trends or new diseases and of zoonotic diseases of human health significance.

Since 1975, diagnostic data from both the VLA and SAC has been merged in the veterinary investigation diagnosis analysis (VIDA) database. This database has been an invaluable source of epidemiological trends for over 30 years, but was limited in the range of data recorded and the analyses available. In 1998, the VLA started to produce a more detailed dataset within FarmFile - a powerful database, linked to the VIDA database, containing a greater amount of descriptive epidemiological data on all submissions and incorporating analysis tools used for disease surveillance purposes. These tools provide automated statistical analysis and built-in “alerters” which highlight statistically significant, and therefore potentially clinically significant, changes in diseases diagnosis and trends enabling more extensive analysis of data for England and Wales from 1999 onwards.

The harmonisation project was initiated in 2006 to allow the extension of FarmFile analysis to cover Scotland as well. This involved the development of a single, standardised data collection system; consistent diagnostic criteria and harmonised recording, which enables the collation of the disease surveillance data from all three countries. This has been achieved by collaboration between staff and disease consultants at the VLA and SAC VS, funded by Defra and SEERAD.

Detailed surveillance data from laboratory submissions for all three countries can now be collated, providing a far greater amount of data for analysis and interpretation by disease consultants at a GB level, resulting in improved disease understanding and efficient use of relevant expertise. This should enable action to be taken and resources to be appropriately targeted at an earlier stage than was previously possible, as the dataset is now much more extensive and drawn from the whole pig population of GB. Further analyses will be developed and refined to improve disease surveillance and the health and welfare of the pig population of GB.

2) OVERVIEW

At a pig farmers meeting in North Yorkshire they were told that UK pig farmers on average had lowest weight of pig meat sold per sow, slowest growth rate of finishing pigs and highest cost per kilogram of pig meat produced when compared with European producers. However, a sample of 12 producers at the meeting showed in fact that the best of the UK producers could compare with the rest of Europe (e.g. 748g/day compared with 712g/day for Denmark). It was also said that most UK producers lag behind due to poor buildings which reduced growth but if the buildings were replaced then the growth rate gave an opportunity to increase more pigs per place per year. This facilitated a more rapid pay back on a finishing building costing £200/pig place to within 2.6-4.0 years.

The processing part of the industry is now in the hands of four players;- Morrisons, Cranswick-Bowes, and the two foreign groups Vion (Dutch) and Tulip (Danish).

PIG SUPPLY

There was on the 1/4/09 a shortage of supply, partly caused by last years seasonal infertility. As a result, the UK pig prices are rising helped by the strong Euro against the pound. This smaller supply of pigs is putting increasing strain on the smaller abattoirs who are finding it difficult to source the pigs.
Supplies of slaughtering pigs were down by 12 per cent in Scotland and six per cent in England in April 2009 compared with April 2008.
More people are spending more money on pork.
The world recession has taken the pressure off the supplies of wheat but the soya price continues to rise due to a shortage and the efforts of the speculators. There are believed to be only about 3.5million tons in store at the moment and South American harvests are predicted to be lower because of drought. It is possible that the USA has planted more soya beans, as the price has been so high, in which case the price may fall in the autumn.

EU PIG NUMBERS

The number of pigs in Europe fell by six per cent in the year ending in December 2008, which should keep the British price high throughout 2009 and well into 2010. Czech and Polish herds are noted as being reduced in size.
There was a slight expansion in the number of in-pig sows during the period June to December 2008 in the UK but Scottish numbers continued to fall by as much as 15 per cent between December 2007 and December 2008.
The number of Danish farms with pigs fell by 20 per cent between 2007 and 2008 but the average number on each rose from 1900 to 2200.

In the USA, pig numbers are down three per cent on a year ago. In the USA sales of pork are reduced and stocks are higher than they have ever been, which is likely to be related to the recession.
The Agricultural and Horticultural Development Board estimates that there are a five per cent decline in in-pig gilt numbers and a nine per cent drop in maiden gilts in the EU, which suggests that there will not be a short-term recovery in the EU breeding herd.

PROPOSED LEGISLATION

The application of the rules of Integrated Pollution Prevention and Control (IPPC) to smaller pig farms is still on the horizon but is continuing to be fought by the NPA and BPEX.

Costs in excess of £25,000 could otherwise be levied through the process of application. It is likely but still not determined that producers with less than 200 sows and finishers on the same site may escape the new EU plan. . IPPC does not cover outdoor herds.

EXOTIC DISEASE CONTROL: Defra held a public consultation on proposals for a new independent body for animal health and the creation of a new funding structure for animal health activities. This consultation ended on 30th June 2008. More details can be found at: http://www.defra.gov.uk/animalh/ahws/sharing

Wild boar populations continue to increase in the three main regions, with extension into other areas. There may be around 200 plus in the Kent/Sussex enclave, and the other two areas have smaller numbers (Forest of Dean and West Dorset) but recently they have been seen in East Anglia.

The recent case of bovine TB in an outdoor herd has suggested that outdoor pig keepers should be careful that their pig feed does not become a source of food for badgers.

EU PIG EXPORTS

These have been reduced considerably. For example, Danish exports fell by 12% in January and February 2009.

The Ukrainian currency has declined in value so there are no imports of note to that country.
The reduction in value of Japanese yen compared with the Euro has resulted in imports of Danish pork being dearer for the Japanese.
The value of the South Korean currency has declined and therefore exports to South Korea may be more difficult.

PIG PRICES

In the first week in April, the spot price had risen to 155p/kg but by the 9th May had fallen back to 151.23p/kg. Sow prices had also fallen to 116.9p/kg.
In the week ending the 6th June, the price had risen to 153.6p/kg but the sow prices were still falling to 110.18p/kg. Retail sales were similar to May with weight up but value down as the barbecue trade got into full swing.

PIG MOVEMENTS

Plans to enable linking of the Animal Movements Order and the Food Chain Initiatives data using one set of inputs are being supported by BPEX.

COMMODITY PRICES

The world wheat tonnage is likely to be down from 688 million tons last year to around 655 million this year but the recession and lack of demand will not cause any major price rises.

This year's acreage of soya bean is expected to be higher in the USA and the price possibly over 25% lower than for the last year.

PRODUCT AVAILABILITY

In the past, the treatment of coccidiosis in pigs required the off-label use of Baycox 2.5% solution which required dilution to use in piglets. This has been rectified with the availability of ready to use Baycox 50mg/ml which can give effective single dose administration. Improved weight gain and feed efficiency are described for the product since in many cases the coccidiosis is sub-clinical.

BPEX INITIATIVES

The regional development boards may provide a key to improving pig health. Potentially, there may be schemes in Yorkshire, East Anglia (which is initially targeting dysentery), and the Southwest. In the first of these initiatives, supported by BPEX, Yorkshire Forward started on a plan to investigate the feasibility of regional disease control. Initially, a map of the county will be made to show where the pigs are, and who owns them. The producers can then be grouped into clusters if they are of a like-mind to improve their health. Hopefully, by cutting out some of the diseases, profitability can be increased by up to £8 a pig. The scheme will concentrate on the health status with respect to enzootic pneumonia, mange, PRRS and swine dysentery, the biggest single hazard in the country at the moment and also the most difficult to assess and eradicate.

The project of Dan Tucker's from Cambridge on pleurisy has now been completed. It shows that a pig with pleurisy may be £2.26 less profitable than a pig without pleurisy. Of all the 80 batches tested, 78% were found to have pleurisy and in these, over 10% of the batches had more than 20% of the pigs affected. Pleurisy reduced growth rates and carcase weights, increased time to slaughter and was associated with increased food costs. Further economic loss occurred at the processing stage due to extra inspections, trimming, and reduction in line speed, all of which are responsible for extra staff costs.
A study of risk factors on 120 farms with a history of pleurisy showed that the risk factors included: a) a failure to practise all in/all out, b) repeated mixing and c) repeated moving. Units with off-site weaning had less pleurisy than farrow to finish systems. There was even less on these units when wean to finish was practised (i.e. less moving and mixing and all in/ all out).

The BPEX vaccination project for PCV2 was highly successful. In many cases, however, accurate scientific study was not possible because of the difficulty of obtaining fine records from the farms that used the vaccine. However, the study did show that the use of either the sow or piglet vaccines delivered improved performance and improved the variation within batches (19% down to 4%).

INTERESTING SCIENCE –UPDATE FROM THE SCIENTIFIC LITERATURE

See Appendix 1

2.1 Demographics, submissions and carcases

Carcase submissions returned to 2007 levels for England and Wales with 2008 figures affected by the Cambridge University BPEX funded pleurisy project. General submissions in England and Wales were similar to those in 2007-8. Some recovery in Scottish carcases and general submissions were noted after the marked decline in Q2 2007. This may partially reflect the improved profitability of pigs together with vaccine manufactures encouraging submissions when PMWS is suspected. This may not be sustained as sow numbers have markedly declined in Scotland during recent years.

2.2 Diagnostic submissions and carcases

Table 1 Pig Diagnostic Submissions and Carcases, 2005- 2009 (Q2 only)
Table 2 Pig Diagnostic Submissions 2004 – 2009 for England, Scotland and Wales

Table 1

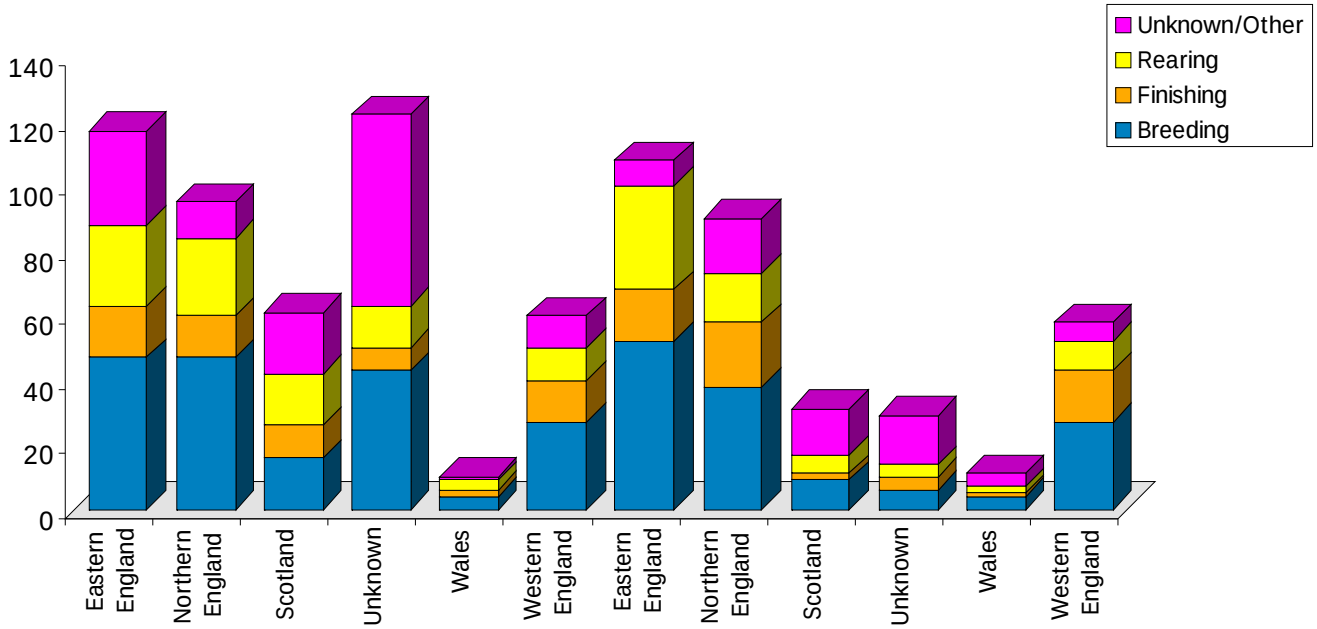
Pig Diagnostic Submissions and Carcasses, Q2 of 2009

	Submissions			Carcasses		
Apr-Jun	**E&W**	**Scotland**	**Total**	**E&W**	**Scotland**	**Total**
2005	297	123	420	259	65	324
2006	283	154	437	274	88	362
2007	260	116	376	213	95	308
2008	252	75	327	278	29	307
2009	251	214	465	229	72	301

All Years	**Breeding**	**Finishing**	**Rearing**	**Unknown/Other**	**Sum:**
Eastern England	214	120	152	108	**585**
Northern England	169	92	100	62	**423**
Scotland	41	24	36	217	**318**
Unknown	71	27	28	197	**323**
Wales	15	12	6	9	**42**
Western England	132	90	54	49	**325**
Sum:	**642**	**365**	**376**	**642**	**2025**

GB Diagnostic Submissions, April to June 2009 (Figure 1) and 2008 (Figure 2)

Figure 1 **Figure 2**



2.2 The Meteorological Office report

Mean temperatures across Great Britain in April, May and June were 0.5 to 2.0 ^{o}C above the average (of 1971-2000). In the first two months of the quarter, eastern England experienced the largest increases in temperature. In June, this occurred in western parts of Britain and Western Scotland experienced the warmest June since 1992. By contrast, temperatures were close to the average in parts of North-east Scotland and England in June.
In 2009, only in January have temperatures been below average in GB.

The rainfall pattern in the quarter was less consistent: In April, rainfall ranged from above normal in the western fringes of Scotland, Wales and south-west England to well below normal in much of eastern Scotland and England, with less than 40% of average across East Anglia. Generally over England and Wales, April was the third consecutive month to be markedly drier than average.
In May, rainfall was above normal in north-west England and much of Scotland, with most of north-west Scotland receiving more than 160% of the average. By contrast, it was drier in southern England, with East Anglia and the south-east receiving less than 75%. Elsewhere, rainfall was mostly close to average.
Rainfall in June was below normal in most of GB, but above normal in a few small areas, with parts of the West Midlands receiving around double the long-term average for June. The driest regions included Kent and Cornwall with around a third of the June average.

2.3 Notifiable Disease Reported

There were no suspected Notifiable Diseases reported by the VLA or SAC to Animal Health involving pigs this quarter.

2.4 Farm Investigational and Advisory Visits

Currently, farm investigatory visits by VLA Veterinary Investigatory Officers are recorded for England and Wales. For Scotland, SAC record investigations, which may or may not include a visit to a farm. Harmonisation of this information is being considered for future reports.
The information below is for England and Wales only.

Table 3:
Farm Investigation and Advisory Visits

April to June Quarter	Breeder	Breeder Fattener	Breeder Rearer	Breeder/ Rearer/ Fattener	Fattener	Other	Rearer	Rearer Fattener	Total Visits
2005	1	1	1	3	9	0	0	1	16
2006	1	0	0	3	7	2	0	1	14
2007	1	0	4	7	25	0	0	15	52
2008	0	0	0	0	0	0	1	0	1
2009	0	0	0	4	1	0	1	1	7
Total	3	1	5	17	42	2	2	18	90

After the low of QR 2 2008 and the high of 2007 (ZAP) visits were increased in Q2 2009. Some of these were to breeder units that were positive for Salmonellae in the EU breeder survey.

2.5 Food Safety Incidents

There were no food safety incidents involving pigs in England, Scotland or Wales.

3) ENDEMIC DISEASE SURVEILLANCE

A note about the disease trends charts.
This section of the report gives information on the data collected and analysed for diseases that were especially prevalent during the quarter due to seasonal influences or are especially topical or noteworthy for the period covered. For this report, data for England and Wales and Scotland have been combined onto a single histogram. Our charts show the number of diagnoses (numerator) as a proportion of the number of submissions in which that diagnosis was possible (denominator). These proportions are represented as blocks and the GB, combined, proportion as a line. The blocks are accompanied by bars indicating 95% confidence limits – generally, the greater the number of samples examined, the smaller is this range and the greater the confidence that reported figure is true. Note that the y-axis scale of the charts varies and therefore care must be taken when comparing individual charts.

3.1) Salmonella and Salmonellosis

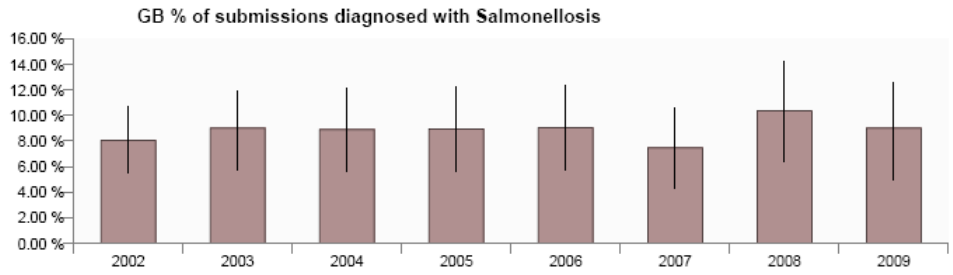
Details of the rate of diagnosis of salmonellosis from diagnosable submissions from GB are detailed in Table 4 and Figure 3, in both tabulated and graph formats:

Table 4: Number and percentage of submissions tested and found positive for Salmonella in Q2 2002 - 2009

Current Quarter 2 GB Rates Of Diagnosis For Salmonellosis In Pigs

Year	Subs & Subs Tested			% Subs Rec'd Tested	% Subs Tested Diag'd	Confidence Interval	
	Num Subs Rec'd	Num Subs Tested	Num Subs Diag'd				
2002	498	410	33	82.33 %	8.05 %	5.50 %	10.73 %
2003	419	322	29	76.85 %	9.01 %	5.79 %	11.95 %
2004	379	292	26	77.04 %	8.90 %	5.62 %	12.13 %
2005	419	290	26	69.21 %	8.97 %	5.68 %	12.25 %
2006	407	288	26	70.76 %	9.03 %	5.72 %	12.34 %
2007	374	268	20	71.66 %	7.46 %	4.32 %	10.61 %
2008	322	232	24	72.05 %	10.34 %	6.43 %	14.26 %
2009 *	323	211	19	65.33 %	9.00 %	5.02 %	12.57 %

Figure 3: Percentage of submissions diagnosed with salmonellosis in Q2, 2002 -2009



In Q2 15 (9.0%) of the 211 submissions tested were positive whilst in Q1 27 (10.7%) of the 252 submissions tested were positive. This increase between Q1 and Q2 was not of statistical significance.

All but one of the *Salmonella* isolates this quarter from VLA laboratories were *Salmonella Typhimurium,* including an unusual PT120 isolate from two separate units. Other phage types isolated included PT193, U288 and U310.

The two units infected with PT120 were owned and run by two brothers. Both assisted in the treatment of pigs sick with salmonellosis on the first farm and the one brother had salmonella like symptoms two day after treating the pigs. A visit was offered but refused. The two brothers then went and treated pigs on the second brothers farm and when the second brother showed clinical signs he accepted the offer of an advisory farm visit. The unit was an indoor 1200 pig all in, all out nursery finisher unit where one of the *Salmonella Typhimurium* PT120 isolates was recovered in May this year. Environmental and faecal samples taken during the visit yielded group B *Salmonella* organisms from multiple sources including rat and swallow faeces. A dead pig post-mortemed during the visit showed signs of chronic salmonellosis

and advice was given on the culling of similar pigs not responding to therapy. Advice was also given regarding the poor hygiene on the unit and the resultant zoonotic risk. Both cases were discussed with the HPA.

A visit was made to another unit following the isolation of a multi drug resistant *Salmonella Typhimurium* from weaned pigs. A total of 28 samples were collected during the visit, with *Salmonella* isolated from six of them.

Salmonella Reading was isolated from one of a group of 6 finishing pigs which were submitted as part of an investigation into wasting and high mortality post weaning. Active PRRSV was identified in the submitted animals, together with a fibrinous polyserositis suggestive of Glasser's disease. This case emphasises the problems associated with immunosuppressive viral infections which may affect the incidence of other diseases.

Four visits were made under FZ 2015(ZNCP Support visits) in the quarter with some of these having been initiated in Q1. Samples collected on these Support visits yielded *Salmonella Typhimurium* phage types U310 in one case and 193 in two cases, one of these showing multi-drug resistance. In the fourth case, 34/36 samples were positive for the presence of a group B *Salmonella,* and a further sample yielded a group E isolate. This high level of positive samples confirmed that infection was widespread on this unit.
A further batch of visit request cards went out from BPEX in the last week of May and 5 Support visit requests have already been made via cards returned by farmers to CERA.

The BPEX -sponsored Intervention Study, is drawing to a close with only four farms continuing to be sampled in Q2. Initial findings from this study have already been detailed in the July edition of Pig World, with VLA only involved in the laboratory testing of collected samples and not analysis of the results.

3.2) Brucellosis

The number of cultures for Brucella suis undertaken at Regional Laboratories since Q2 2007 is shown in Table 5. Brucella suis was not isolated from any of the cultures detailed in table 5.

Table 5: The number of primary cultures for *B.suis* undertaken by Regional Laboratories under SB4070

	Q1	Q2	Q3	Q4	Total
2007	Data not available	26	24	7	57 plus Q1
2008	33	13	26	7	79
2009	10	11			

3.3)Streptococcal Infections

The number of *Streptococcus suis* isolates for Q2 are similar to Q2 2008 with *S. suis* 2 again predominating. The numbers of untypable strains are similar to the same quarter last year. Three untypable strains of *S suis* were submitted to SAC for a small study to examine a perceived increase in the number of untypable stains being seen by SAC and conclusions will be reported when available.

Table 6: Number of isolates of Streptococcus suis and their serotype for Q2 2006 to 2009

Year/serotype	1	2	3	4	7	8	9	28	1/2	UT	Total
2006	3	7					1				11
2007	2	12		1	1				2		18
2008	2	15		1	3	2	1		1	5	30
2009	3	18	1	1	2	3		1	1	3	33

UT = Untypable

Other Bacteria

Strains of a haemophilus like organism which gave an acceptable identification for H. paraphrophilus have had 16S results returned; these indicate that these strains are, in fact, consistent with H. parasuis.

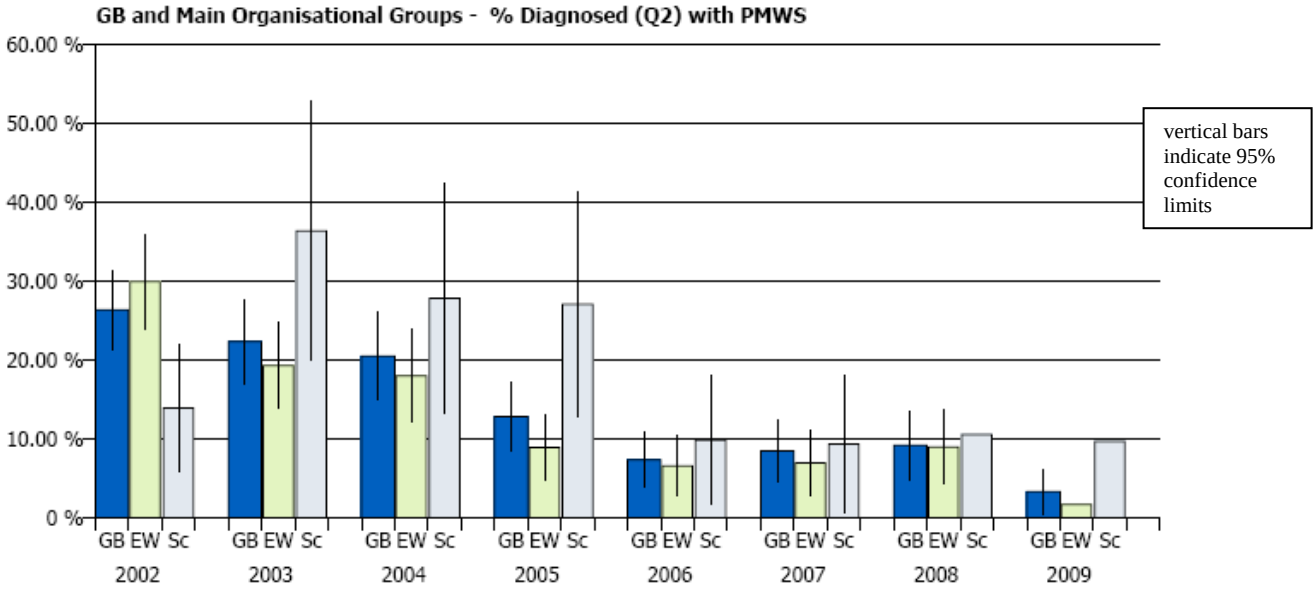
No other unusual bacteria have been recovered from pigs this quarter.

3.4) PMWS

The decline in quarterly percentage of relevant diagnostic submission with a diagnosis of PMWS continued for Q2 for GB (see histogram figure 4). Whilst England and Wales recorded

the lowest rate of diagnosis (1.9%) since 2002. Scotland saw a rise in cases for Q2 (which was at 13%) compared with the same quarter last year and Q1 of 2009. One possible cause for the rise in Scotland is a commercially led initiative to promote use of PCV2 vaccine targeting Scottish herds; company funded investigations on selected cases have been undertaken to confirm the presence of PMWS before initiating vaccination.

Figure 4: Diagnostic rates for PMWS for second quarters of each year 2002 - 2009

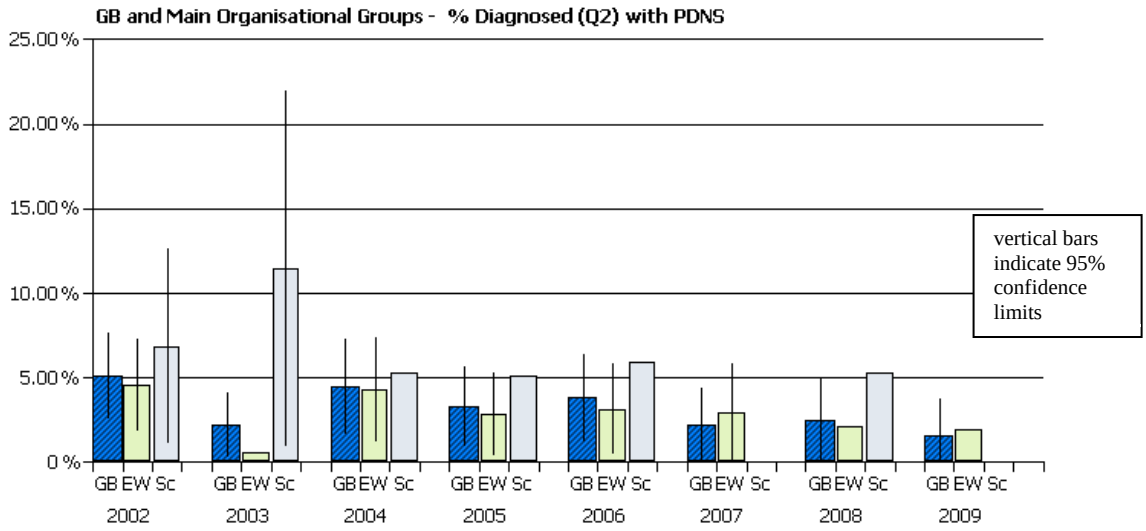


A continuation of a questionnaire based study looked at cases of porcine circovirus associated disease (PCVAD) between 1st May 2008 and 1st May 2009 and the history of vaccine use. Of 46 cases of PCVAD identified during this period further information was available for 38. Of these 38 there were seven cases in herds using PCV2 vaccine in sows but not piglets, one case in a herd using vaccine in sows and piglets and one case in a herd using vaccine in piglets not sows. Three of the cases were PDNS the cause of which is not known and which vaccine is not claimed to protect against. Of the remaining six cases four had concurrent PRRSV infection and two were of unknown PRRS status. These findings link in with the BPEX funded vaccination study results as summarised in the Overview.

3.5) PDNS

Cases of PDNS remained low this quarter. The decline in quarterly percentage of relevant diagnostic submission with a diagnosis of PDNS continued for the second quarter (see histogram figure 5.

Figure 5: Percentage of diagnosable submissions confirmed with PDNS in the second quarters of each year 2002 - 2009



3.6) PRRS

The quarterly percentage of relevant diagnostic submission with a diagnosis of PRRS showed a marginal increase, which was not statistically significant, on the same quarter last year (see histogram, Figure 6). This data includes diagnoses of pneumonia associated with PRRS, systemic PRRS and foetopathy. The diagnostic rate for this quarter (10%) was an increase on the previous quarter (5%), although this is not statistically significant, it is the highest rate for any quarter since 2002. Figure 7 shows this peak of cases. The VLA are currently sequencing stored isolates of this virus to determine if it is changing significantly over time.

Figure 6: Percentage of diagnosable submissions with PRRS in the second quarters of each year 2002 – 2009

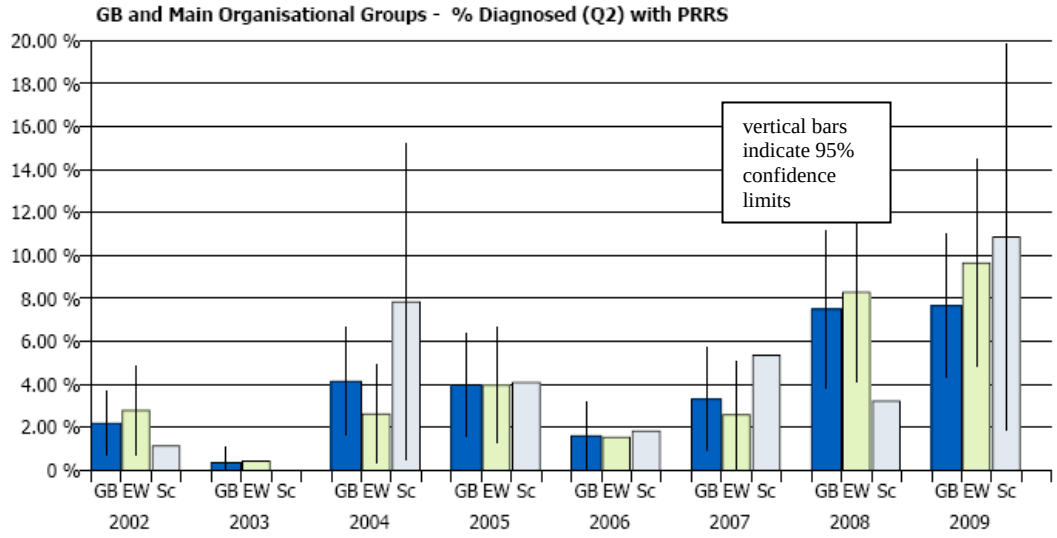
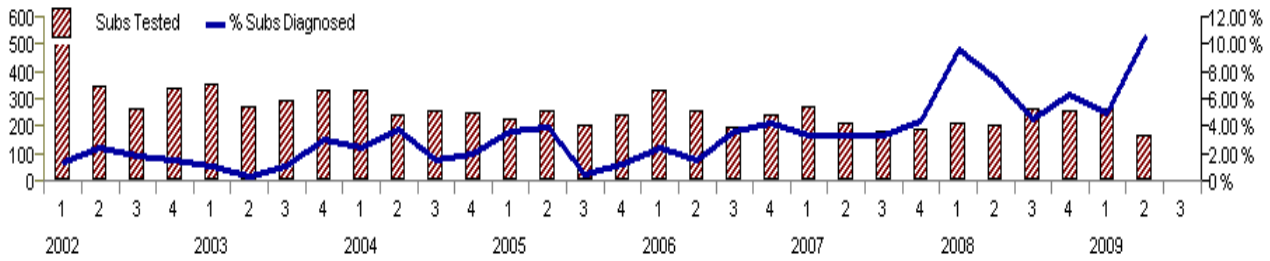


Figure 7: Numbers of submissions tested and percentages diagnosed with PRRS for all quarters since 2002

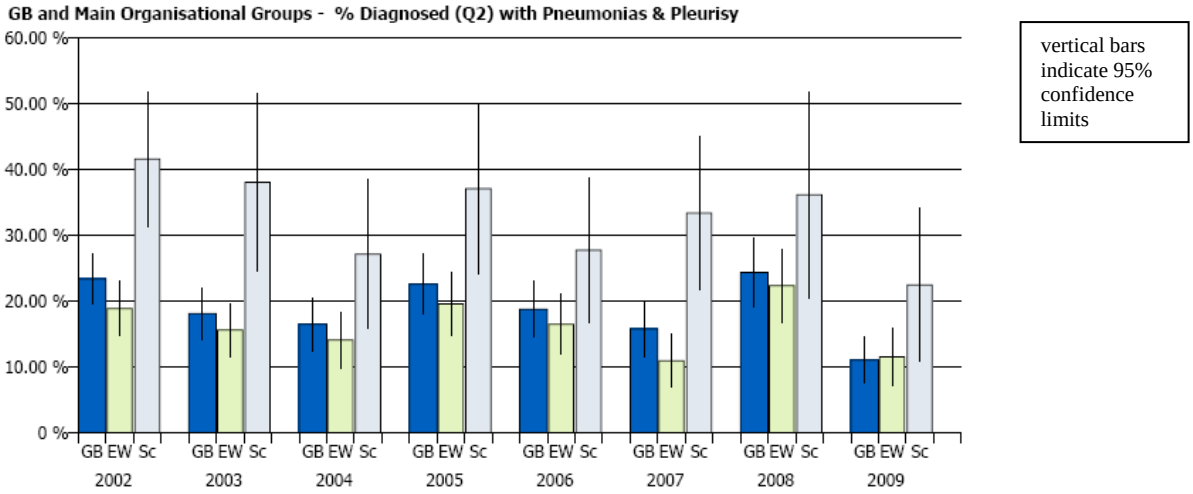


Data for England and Wales for the first two quarters of 2009 indicate that 58.6% of PRRS cases were of the systemic form, 34.5% pneumonia due to PRRSV and 6.9% feotopathy due to PRRSV (it is possible that some cases will be recorded within more than one category).

3.7) Respiratory Disease

The quarterly percentage of relevant diagnostic submissions with a diagnosis of pneumonia and/or pleurisy has shown a significant decrease on the same quarter in 2008 for England and Wales and for GB with a non-statistically significant decrease for Scotland (see histogram, Figure 8). Although the rate of diagnosis is the lowest for the second quarter since 2002 it is only a marginal decrease from the first quarter of 2009. This finding is supported by the lack of an increase in respiratory disease in this quarter reported by NADIS.

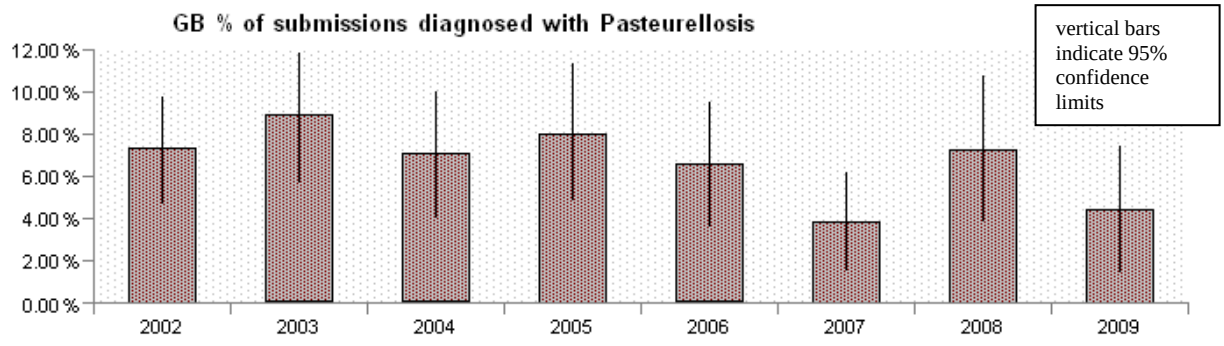
Figure 8: Percentage of diagnosable submissions with pneumonias and pleurisy in the second quarters of each year 2002 – 2009



3.7.1 Pasteurellosis

The fall in pneumonias and pleurisy is reflected in figures for pasteurellosis as might be expected and as shown in figure 9.

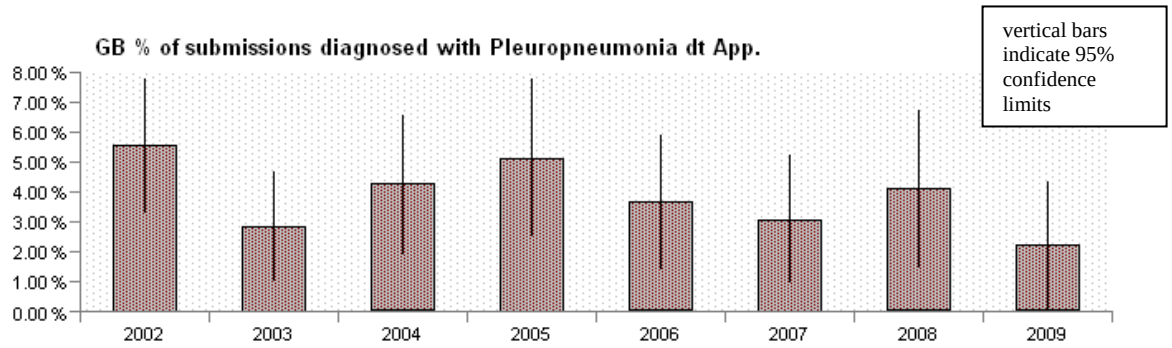
Figure 9: Second quarter diagnostic rates for pasteurellosis 2002 – 2009



3.7.2 Actinobacillosis

The fall in pneumonias and pleurisy is again reflected in figures for diagnoses of *Actinobacillus pleuropneumonia* (APP) pneumonia. Figure 10 shows a decrease, not statistically significant, compared with all second quarters since 2002.

Figure10: Second quarter diagnostic rates for actinobacillosis 2002 – 2009

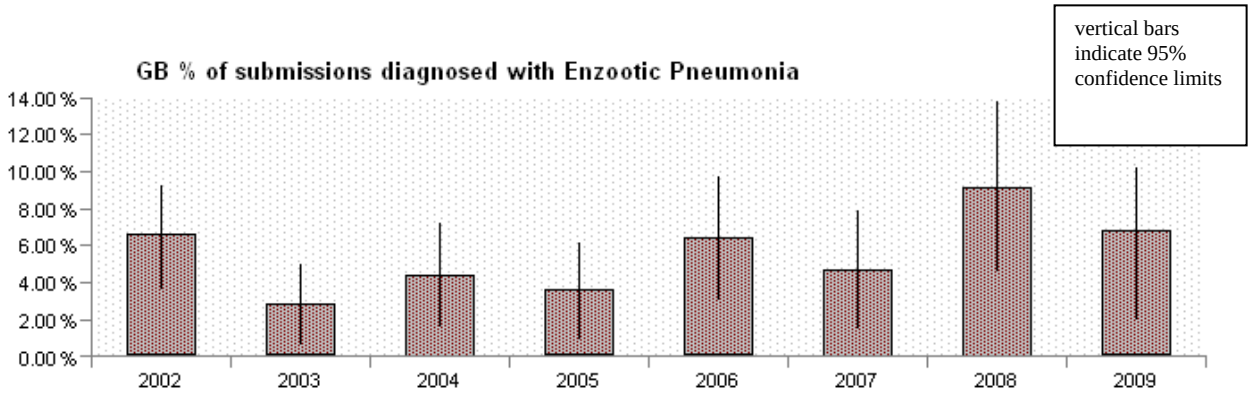


Pneumonia due to APP can have a severe economic impact with deaths occurring in finishing pigs. APP caused sudden deaths in eighteen-week-old finishing pigs on one farm where disease was thought to be exacerbated by concurrent PRRS infection. On another farm lethargy and wasting was reported two weeks after entry into the indoor finishing site after being reared outdoors. Morbidity was approximately 7.5% and mortality 3.5%. The pigs seroconverted to PRRSV after entry to the unit and a necropsied eighteen-week-old pig with severe pneumonia had both PRRS and APP.

3.7.3 Enzootic pneumonia

In the second quarter of 2008 there was a peak in the numbers of cases diagnosed with enzootic pneumonia in England and Wales but this has not been sustained and there is a non-statistically significant decrease in the second quarter of 2009 (see histogram, Figure 11).

Figure 11: Second quarter diagnostic rates for enzootic pneumonia 2002 – 2009



Due to growing evidence from the field and from experimental infections that some strains of *Mycoplasma hyorhinis* can cause enzootic pneumonia in their own right as well as occasionally causing polyarthritis, polyserositis, eustachitis and otitis in piglets a new VIDA code was introduced to record
diagnoses of pneumonia due to Mycoplasma hyorhinis in the fourth quarter of 2008. During the first two quarters of 2009 in England and Wales there have been ten cases recorded as pneumonia due to *M.hyorhinis.*

3.7.4) Swine Influenza

Both swine influenza virus-positive samples from Q2 2009 were from the same submission and yielded an H1N2 influenza virus, similar to one isolated in December 2008.

During Q2, the VLA coordinated and reported the preliminary findings from an EU consortium project investigating the infection dynamics, clinical outcome, pathogenesis, host susceptibility, immune response and transmissibility of pandemic (H1N1) 2009 virus infection in pigs. The study was funded by the European Commission (DG SANCO) and Defra, and comprised a project consortium of nine institutes and organisations from eight EU member states, coordinated by the Mammalian Influenza Group, VLA – Weybridge. Further updates will continue to be provided through a variety of media, including websites (European Commission, DG SANCO, VLA, Defra), and peer-reviewed and other publications.

There have been no reported cases of pandemic (H1N1) 2009 (the influenza A virus currently causing disease in humans) in pigs in the UK or in the EU. To date however, disease in pigs has been reported from Argentina, Canada (Alberta and Quebec) and Australia, but the exact routes of introduction of virus into these pig herds remain uncertain. Globally, infected people are considered the most plausible route for the entry of the pandemic (H1N1) 2009 virus into pig herds. Therefore, it is important for vigilance and biosecurity to be maintained.

Leading industry organisations, in collaboration with VLA, SAC and Defra, have published a Code of Practice entitled 'Influenza in Pigs' in response to the emergence and spread of pandemic (H1N1) 2009 in people:
http://www.bpex.org/downloads/298893/293153/Influenza%20in%20Pigs%20Code%20of%20Practice.pdf

More information about swine influenza and the pandemic (H1N1) 2009 influenza virus can be found on the VLA, Defra and DG SANCO websites:

http://www.defra.gov.uk/vla/diseases/dis_si.htm
http://www.defra.gov.uk/animalh/diseases/swine-flu/index.htm
http://ec.europa. eu/food/committees/regulatory/scfcah/animal_health/index_en.htm

Table 7: Number of samples tested for influenza and the number positive by quarter and year from 2007 - 2009

Year	Q1 no tested	Q1 no (%) positive	Q2 no tested	Q2 no (%) positive	Q3 no tested	Q3 no (%) positive	Q4 no tested	Q4 no (%) positive	Total
2007	88	4	33	1	27	0	53	3	201/8
		(4.5%)		(3.0%)		(0%)		(5.7%)	(4.0%)
2008	84	4	64	4	72	2	152	3	372/13
		(4.8%)		(6.3%)		(2.8%)		(2.0%)	(3.5%)
2009	76	3	103	2	-	-	-	-	-
		(3.9%)		(1.9%)					

All data from 2007 and 2008 quarterly reports has been reviewed as some quarterly reports referred to submissions and others to samples tested. This table contains the definitive figures for 2007Q1 to 2009 Q2

3.8) Alimentary Disease

3.8.1 Swine Dysentery (*Brachyspira hyodysenteriae*)

This quarter there were 13 diagnoses of swine dysentery made (see Table 8), comprising six diagnoses in England and Wales, and seven from Scotland. No diagnoses were recorded by VLA Bury St. Edmunds, which may suggest that the disease is coming under control in this region, following the Swine Dysentery Producers' Charter initiative. The Thirsk regional laboratory made four of the diagnoses and all were submitted as part of investigations into a pocket of infection in one geographical area and pigs linked to it.

Table 8. Number of diagnoses of swine dysentery and percentage of submissions tested in GB, Q2 2002 - 2009.

Current Quarter 2 GB Rates Of Diagnosis For Swine Dysentry In Pigs

	Subs & Subs Tested						
Year	Num Subs Rec'd	Num Subs Tested	Num Subs Diag'd	% Subs Rec'd Tested	% Subs Tested Diag'd	Confidence Interval	
2002	499	329	11	65.93 %	3.34 %	1.39 %	5.24 %
2003	419	242	4	57.76 %	1.65 %	0.05 %	3.23 %
2004	379	244	10	64.38 %	4.10 %	1.61 %	6.59 %
2005	419	276	22	65.87 %	7.97 %	4.78 %	11.17 %
2006	407	255	14	62.65 %	5.49 %	2.69 %	8.29 %
2007	374	231	12	61.76 %	5.19 %	2.33 %	8.06 %
2008	322	191	11	59.32 %	5.76 %	2.46 %	9.06 %
2009 *	322	180	13	55.90 %	7.22 %	3.34 %	10.18 %

* period currently in progress

3.8.2) *Lawsonia intracellularis* infections

A continuing decline was seen for the fourth year running in this quarter with 2.21% diagnosed in 136 submissions tested. This compares with 4.4% diagnosed in quarter 2 2008. The majority of diagnoses occurred in Scotland continuing the trend of the last eight years.
Two cases of porcine proliferative enteritis (PPE), caused by *Lawsonia intracellularis*, were confirmed by VLA Thirsk this quarter. One case reported up to ten per cent of pigs losing five to ten kg in the last four weeks before slaughter, following mixing immediately after weighing to try

to ensure even batches at slaughter . Post mortem examination of four affected animals revealed gross lesions of thickened terminal ileum with variable mucosal necrosis and diptheresis. The caecum and colon showed similar changes in a more irregular patchy distribution. Severe gastric ulceration was seen in two of the four carcases. *Lawsonia intracellularis* was confirmed by MZN stained smears of ileal mucosal scrapes. Animals were also positive for PRRSv RNA on PCR.
Similar gross findings were described in the second case which was a ten-week-old pig from a unit experiencing a generalised scour problem in post weaned pigs. Mortality was very low but morbidity was high and decreased weight gains were causing problems. PPE was again confirmed by mucosal scrapes but in this case *Salmonella typhimurium* DT 120 and *Brachyspira pilosicoli* were compounding the problem.

3.8.3) Enteric colibacillosis

There were five confirmed enteric colibacillosis cases in England and Wales this quarter. Two cases were reported in neonatal piglets, two in pre-weaned and one in post-weaned pigs. One unit was found to have the problem in both neonatal and pre-weaned animals with the latter apparently first affected followed by a problem in the neonatal animals three weeks later.

Three one to two-day-old piglets were submitted live to investigate scouring in litters from all ages of sows and not responding to antibiotic treatment. Enteric colibacillosis was diagnosed with profuse growths of *E.coli* serotype O149: K91, K88ac (Abbotstown strain) from the intestines. In one piglet the gammaglobulin concentration was 0.8 ZST units (reference range >20 ZST units) indicating a failure of colostrum antibody uptake, which its empty stomach suggests was due to a failure to ingest colostrum. In the two other piglets which had milk in their stomachs, gammaglobulin concentrations were >20 ZST units indicating that there was satisfactory colostral antibody uptake.

Enteric colibacillosis due to *E.coli Abbotstown* (serotype 0149: K91, K88ac) was also diagnosed as one of a range of problems in a three-week-old piglet from an indoor 800-sow weaner producer which also reported poor growth in piglets in farrowing houses as well as piglets in good body condition dying suddenly around three-weeks-old. The problem had escalated in the two weeks prior to submission and approximately 25% of pigs were affected in each batch of 300 weaned weekly. Piglets were given routine oral anticoccidial treatment at four-days-old and sows were vaccinated for PRRSV. In addition, farrowing houses were reported to be excessively hot with sows having reduced appetites and although bright and non pyrexic, there was no increased abortion or stillbirth rate. One-week-old pigs (four live and one dead) were submitted in poor body condition together with the three-week-old pig in good body condition which had died suddenly and from which *E.coli Abbotstown* was isolated. In the one-week-old pigs findings were somewhat mixed. One pig was scouring and intestinal histopathology revealed marked villus blunting with fusion and associated crypt hyperplasia consistent with viral enteritis; rotavirus was detected in small intestinal contents. Gingival lesions associated with clipped teeth were present in two pigs and in both there was tooth rot fragmentation. It was

recommended that teeth clipping procedure and hygiene be reviewed. Several of the pigs had significant carpal abrasions and there was tail necrosis in one pig, likely to be associated with floor trauma. In one pig lower limb abrasions were severe and widespread, this pig was particularly wasted and may have spent more time recumbent than normal. The importance of providing a clean dry non-abrasive lying area for piglets was emphasised and recommended. PRRS virus was not detected in the piglets and, given the mixed findings and clinical history of hot conditions in the farrowing houses poor milk supply as well as managemental issues were suspected to be significant factors in the clinical problem.

In a third case of *E.coli Abbotstown* enteritis, three weaner pigs were submitted with a history of colitis at five weeks of age following weaning at approximately four weeks. The problem had been on the unit for some time and appeared to have occurred after a change in disinfectant on this breeder/finisher unit. The herd had previously experienced PMWS and was currently practising PCV2 vaccination. Post mortem examination of these pigs, that were sunken eyed and had hairy coats, revealed distended small intestine with watery yellow flocculent contents. The serosal vessels of the small intestine were engorged, and a profuse pure growths of the beta-haemolytic *E. coli* were isolated from the small intestines of all three piglets, and identified as *E. coli* 0149: K91, K88 ac (Abbotstown). In addition a Group B *Salmonella* was isolated.

Post-weaning diarrhoea was reported to affect approximately 50% of a group of 120 piglets. A non-pyrexic, dull and lethargic live piglet was euthanased for most mortem examination. There were a moderate number of minor skin abrasions over the neck and head. Approximately one third of the gastric mucosa showed superficial haemorrhage and culture of the liquid contents of the small and large intestines and liver yielded a heavy pure growth of K88 LT (heat labile virulence factor) positive *E. coli*. The skin lesions on this piglet suggested there had been a significant amount of fighting in the group and it was advised to minimise stress during weaning.

3.8.4) Neonatal enteric disease due to rotavirus, coccidiosis and *Clostridium perfringens*.

Only one case of rotavirus was recorded this quarter in England and Wales.
Clostridial disease was at an eight year low for quarter 2 with none detected in 150 submissions tested.

3.8.5) Colitis not due to swine dysentery or salmonellosis

Four diagnoses of *B. pilosicoli* were made in pigs this quarter. Three were from one regional laboratory, and were found in animals in which swine dysentery (SD) was a differential diagnosis, probably submitted as a direct result of heightened awareness of the latter disease. In all cases, clinical signs were more mild than would be expected with SD, except in the one case where *B. hyodysenteriae* was concurrently present. In two of the four cases, concurrent salmonellosis was diagnosed. Carcases were submitted in half of the cases, which facilitated a more thorough evaluation of predisposing causes and concurrent disease. *B. pilosicoli* was the only diagnosis in one case where only faeces were submitted. --

3.8.6) Gastric ulceration

None reported this quarter.

3.8.7) Helminthiasis

Parasitic gastroenteritis was diagnosed at VLA Aberystwyth, when a faeces sample was submitted from outdoor finishing pigs where three out of the group of ten had lost considerable amounts of weight over a two-week period. An ascarid worm egg count of 54,850 eggs per gram implicated worms as a cause of the condition loss. The female *Ascaris suum* worm is a phenomenal egg-layer.
A recent article highlights the potential immunosuppressive effects of ascaridiasis in pigs, with particular reference to responses to *Mycoplasma hyopneumoniae* vaccination (Steenhard, N.R. et al. (2009 Vaccine 27, 5161-69.); *Ascaris suum* infection negatively affects the response to *Mycoplasma hyopneumoniae* vaccination and subsequent challenge infection in pigs.

3.8.8) Intestinal torsion

Two cases were reported and both involved individual animals only on the units concerned. One pig was 24 weeks old and found dead the night before it was due to go for slaughter. The other involved a pre-weaned eight-week-old pig with no other members of the litter affected.

3.8.9) Rectal Strictures

Non diagnosed this quarter.

3.9) Mycoplasmas

3.9.1) *Mycoplasma* Surveillance

65 samples from 34 cases were submitted. Pure *M. hyopneumoniae* was identified on seven occasions (six from lungs and one from a joint sample). In addition *M. hyopneumoniae* was identified mixed with *M. hyorhinis* (1), and mixed with *M. hyosynoviae* (1) both from lung samples. Additionally, *M. hyorhinis* was detected eight times from lungs, one mixed with *M. arginini* and one mixed with *M. hyosynoviae*. *M. hyorhinis* was also isolated from an elbow joint and *M. hyosynoviae* from a joint capsule.

3.9.2) *Mycoplasma* News from Publications

Yuan *et al.* (2009) from Shanghai, China report that a large proportion (32 out of 65, 49%) of humans in close contact with swine infected with *Mycoplasma suis* had a positive PCR result for *M. suis* which gave a 98% match by partial 16S rRNA sequence.

A Spanish group (Fraile *et al.*, 2009) examined lung lesions at the slaughterhouse and carried out serology to estimate the importance of respiratory disease on the farm. Data was obtained from 107 farms covering approximately 11,000 pigs. Pleuritis and cranio-ventral pulmonary consolidation lesions were recorded in 26.8% and 55.7% of slaughter age pigs. Antibodies to PRRSV, swine influenza virus, *Actinobacillus pleuropneumoniae* (App) and *Mycoplasma hyopneumoniae* were highly prevalent at more than 82% on most farms. Multivariable analysis estimated that the percentage of animals with pleuritis compatible with Actinobacillus pleuropneumoniae (APP) infection depended on the existence of an all in-all out by room management system and App and PRRSV herd seroprevalence. It was also possible that

the presence of enzootic pneumonia-like lesions were affected by the type of farm ventilation, the presence of respiratory signs during the fattening period and *M. hyopneumoniae* and SIV H1N2 herd seroprevalence.

Steenhard *et al.* (2009) indicated that the presence of *Ascaris suum* significantly compromised the effect of *M. hyopneumoniae* vaccination.

In a survey representing approx 51% of the large pig herds in Australia, Lawsonia, Mycoplasma and *E. coli* were the main reasons for using antimicrobials. Most piggeries used drugs of low importance to human medicine such as tetracyclines, penicillins and sulfonamides, although 25% of herds had used ceftiofur (Jordan *et al*., 2009).

Dee *et al*. (2009) have shown airborne transport of *Mycoplasma hyopneumoniae* which was detected 4.7km away from the source population.

References

Dee *et al*. (2009). Evidence of long distance airbourne transport of porcine reproductive and respiratory syndrome virus and *Mycoplasma hyopneumoniae. Vet Res.* **40:** 39.

Fraile *et al.* (2009). Risk factors associated with pleuritis and cranio-ventral pulmonary consolidation in slaughter-aged pigs. *Vet J.* Jun 13, E pub ahead of print.

Jordan *et al*. (2009). Antimicrobial use in the Australian pig industry: results of a national survey. *Aust Vet J.* **87:** 222-229.

Steenhard *et al.* (2009). *Ascaris suum* infection negatively affects the response to a *Mycoplasma hyopneumoniae* vaccination and subsequent challenge infection in pigs. *Vaccine* Jun 11. Epub ahead of print.

Yuan *et al*. (2009). Prevalence of *Mycoplasma suis* (*Eperythrozoon suis*) infection in swine and swine-farm workers in Shanghai, China. *Am. J. Vet Res.* **70:** 890-894.

3.10) Reproductive Diseases

The number of submissions for investigation of reproductive diseases was similar, albeit slightly lower, to the previous quarter (see table 9 below). The only diagnosis reported in the quarter was porcine parvovirus (PPV) as the cause of abortion in gilts. In eleven foetuses from the same litter there was evidence of sequential foetal deaths including variable crown-rump lengths and mummifications. Three gilts from a group of six in a 150–sow herd were affected – sows were not affected. PPV was confirmed by demonstration of viral antigen in foetal liver. It is thought that inaccurate timing of vaccination contributed to the problem.

Table 9: Number of pig submissions for diagnosis of reproductive diseases by quarter 2006 - 2009

Year	Abortion					Other reproductive				
	Q1	Q2	Q3	Q4	Total	Q1	Q2	Q3	Q4	Total
2006	27	17	21	11	76	17	14	19	34	84
2007	16	11	24	14	65	9	11	22	18	60
2008	13	20	32	16	81	15	16	17	18	66
2009	20	21				12	13			

3.11) Nervous Diseases

No nervous diseases of note were investigated this quarter.

4) UNUSUAL AND NEW DISEASES

No unusual or new diseases were reported or investigated this quarter.

5) SCANNING SURVEILLANCE FOR NEW AND EMERGING DISEASES IN PIGS

Monitoring the trends in diagnoses of known diseases cannot, by definition, detect either new diseases, or changes in endemic diseases that would prevent a diagnosis from being reached (for example a change in the pathogen that compromised the usual diagnostic test). Such new or emerging diseases would likely first be detected by observation of increased numbers of clinical and/or pathological syndromes for which a diagnosis could not be reached in the normal way. Such submissions are regularly analysed to look for changes that could indicate the presence of a new or emerging disease, which may be reflected by an increase in undiagnosed disease. Undiagnosed disease submissions are summarised broadly by the clinical presentation of disease and, once this has been determined by further investigation, the body system affected. Both groups are investigated and trends in the levels are compared over time.

This approach has been developed and refined over recent years and such analyses are now possible for data from GB.

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 2004-2008 for VLA only data, and to data for 2008 for GB DNR analysis.

Overall VIDA DNR rates

- The overall percentage of pig diagnostic submissions from VIDA for the first 6 months of 2009 (to second quarter, Q2) where a diagnosis was not reached (DNR) was 20.6% (111/540). This was significantly increased from data to Q2 for prior years in which DNR was 15.3%.
- Individually, the DNR was significantly increased for overall VLA data but not for overall SAC data with DNRs of 22.7% and 14.6 % respectively.
- There was no significant increase in DNR rate for any individual syndrome to Q2, 2009 compared to prior years.
- There was no significant increase in DNR to Q2, 2009 for respiratory syndrome or for submissions with respiratory disease as a presenting sign. DNR for respiratory syndrome remains low at 7.5% (7/93) and for respiratory disease as a presenting sign at 12% (7/57)
- As in Q1, 2009, there was a significant increase in GB DNR rate for submissions with a presenting sign of wasting to Q2, 2009 (18.2% (10/55) compared to prior years (2.2%, 1/46).

Tables 11 and 12 give GB, VLA and SAC DNR rates by syndrome and presenting sign to Q2, 2009 compared to prior years.

Increased DNR for wasting as a presenting sign: GB VIDA data

- ***Ten of 48 submissions with a presenting sign of wasting did not achieve a VIDA diagnosis in Q2, 2009 while all but one of the 46 submissions in Q2 of 2008 were diagnosed. These ten DNR submissions were reviewed.***
- ***Eight submissions were from housed pigs (although housed pigs are over-represented and constitute 36 of the 48 submissions with wasting as presenting sign).***
- Several regions were represented (Eastern, Northern and Western England, Wales, Scotland). Five of the undiagnosed submissions were to VLA (DNR for wasting 14.3%), five were to SAC (DNR for wasting 38.5%). Submissions were from pre- and post-weaned pigs.
- ***Seven of the ten undiagnosed submissions were in Q1, 2009 (submissions received in Q1 but not completed until Q2). In the previous quarterly report, the details of VLA undiagnosed submissions (coded as reasonable testing) with wasting as a presenting sign (both main and secondary) were examined. Further undiagnosed VLA submissions in Q2 were also reviewed and as for Q1, 2009, there was no evidence that the increased DNR for pigs presented with wasting is due to the emergence of a new disease or syndrome, however this will be kept under review.***
- ***Explanations for DNR of the VLA submissions included chronic disease, likely earlier intestinal damage and, in two cases, testing was limited by the sample type (swab and faeces only).***

VLA only DNR rates

- Examining DNR by syndrome for rolling 12 month data for VLA submissions, there was no increase in DNR for any syndrome to Q2, 2009 compared to prior years (2004-8).

- Examining DNR by syndrome for the first 6 months of 2009, there was a significant increase in undiagnosed submissions for reproductive syndrome; DNR was 89% (26/29) compared to 68% in prior years (76/111). The 26 submissions will be reviewed. Fluctuations in DNR are a feature of this syndrome in which the diagnostic rate is low due to factors outlined in a previous report: http://www.defra.gov.uk/vla/reports/docs/rep_survrep_qtlyp0208.pdf.

- Examining DNR by presenting sign for rolling 12 month data for VLA submissions, there was a significant increase in DNR for submissions with a presenting sign of 'malaise' to Q2, 2009 (27%, 13/48) compared to prior years 2004-8 (13.5%). However, the increase in DNR was not significant for this presenting sign for the first 6 months of 2009 compared with prior years.

- The 13 undiagnosed cases were reviewed as detailed in Table 1. There is no evidence from these to suggest an emerging or new disease or syndrome.

Table 10: Details of undiagnosed VLA submissions for which malaise was the main presenting sign, July 2008- June2009

Likely reason for DNR	Number of submissions
Not known (abortions, stillbirths, neonatal deaths) further investigation advised	1
Limited testing	4
Chronic renal failure, cause no longer apparent	1
Likely bacterial septicaemia, no organisms isolated	2
Likely clostridial disease (necrotic enteritis), no toxins detected	1
Disease in individual pot-bellied pigs, possibly metabolic disease	2
Submissions from one herd confirmed in other submissions as swine influenza outbreak (H1N2)	2

- Table 13 gives VLA 12 month rolling DNR rates by syndrome to Q2, 2009 compared to prior years.

Table 11: VIDA Overall Changes in DNR rates for Pigs by Presenting Sign to Q2 for 2009 and prior years (2008)

	Overall			Prior years (from 2008)			2009					
Presenting Sign	DNR	Subs	% DNR	DNR	Subs	% DNR	DNR	Subs	% DNR	diff	SE Yr-Yr	z
ABORTION	34	43	79.07 %	11	15	73.33 %	23	28	82.14 %	8.81 %	13.02 %	0.68
DIARRHOEA	48	191	25.13 %	16	84	19.05 %	32	107	29.91 %	10.86 %	6.32 %	1.72
FNDDEAD	18	182	9.89 %	12	90	13.33 %	6	92	6.52 %	-6.81 %	4.43 %	-1.54
GIT_XDIARR	2	6	33.33 %	2	6	33.33 %	0	0		-33.33 %		
HEALTHY	0	3	0.00 %	0	1	0.00 %	0	2	0.00 %	0.00 %		
LAME	3	41	7.32 %	2	22	9.09 %	1	19	5.26 %	-3.83 %	8.16 %	-0.47
MALAISE	8	48	16.67 %	3	23	13.04 %	5	25	20.00 %	6.96 %	10.77 %	0.65
MUSC_SKEL	0	3	0.00 %	0	1	0.00 %	0	2	0.00 %	0.00 %		
NERVOUS	5	30	16.67 %	2	11	18.18 %	3	19	15.79 %	-2.39 %		
OTHER	13	111	11.71 %	7	50	14.00 %	6	61	9.84 %	-4.16 %	6.13 %	-0.68
RECUMBT	2	15	13.33 %	1	8	12.50 %	1	7	14.29 %	1.79 %		
REPRO	14	20	70.00 %	6	10	60.00 %	8	10	80.00 %	20.00 %		
RESPIR	11	119	9.24 %	4	62	6.45 %	7	57	12.28 %	5.83 %	5.31 %	1.10
SKIN	2	22	9.09 %	2	14	14.29 %	0	8	0.00 %	-14.29 %		
UNKNOWN	15	94	15.96 %	6	47	12.77 %	9	47	19.15 %	6.38 %	7.55 %	0.84
URINARY	0	1	0.00 %	0	0		0	1	0.00 %	0.00 %		
WASTING	11	101	10.89 %	1	46	2.17 %	10	55	18.18 %	16.01 %	6.22 %	2.57
	186	**1,030**	**18.06 %**	**75**	**490**	**15.31 %**	**111**	**540**	**20.6 %**	5.25 %	2.40 %	2.19

SAC	Overall			Prior years			2009					
Pres	DNR	Subs	% DNR	DNR	Subs	% DNR	DNR	Subs	% DNR	diff	SE Yr-Yr	z
ABORTION	2	4	50.0 %	0	0		2	4	50.0 %	50.0 %		
DIARRHOEA	8	35	22.9 %	2	9	22.22 %	6	26	23.1 %	0.9 %		
FNDDEAD	8	49	16.3 %	6	22	27.27 %	2	27	7.4 %	-19.9 %	10.6 %	-1.87
GIT_XDIARR	0	1	0.0 %	0	1	0.00 %	0	0		0.0 %		
LAME	0	4	0.0 %	0	3	0.00 %	0	1	0.0 %	0.0 %		
MALAISE	1	1	100.0 %	1	1	100.00 %	0	0		-100.0 %		
NERVOUS	0	4	0.0 %	0	0		0	4	0.0 %	0.0 %		
OTHER	8	97	8.2 %	6	48	12.50 %	2	49	4.1 %	-8.4 %	5.6 %	-1.51
REPRO	2	3	66.7 %	1	1	100.00 %	1	2	50.0 %	-50.0 %		
RESPIR	4	19	21.1 %	2	13	15.38 %	2	6	33.3 %	17.9 %		
SKIN	0	7	0.0 %	0	5	0.00 %	0	2	0.0 %	0.0 %		
UNKNOWN	1	15	6.7 %	0	6	0.00 %	1	9	11.1 %	11.1 %		
WASTING	6	24	25.0 %	1	10	10.00 %	5	14	35.7 %	25.7 %		
	40	**263**	**15.21 %**	**19**	**119**	**15.97 %**	**21**	**144**	**14.58 %**	-1.38 %	4.45 %	-0.31

VLA	Overall			Prior years			2009					
Pres	DNR	Subs	% DNR	DNR	Subs	% DNR	DNR	Subs	% DNR	diff	SE Yr-Yr	z
ABORTION	32	39	82.1 %	11	15	73.33 %	21	24	87.5 %	14.2 %		
DIARRHOEA	40	156	25.6 %	14	75	18.67 %	26	81	32.1 %	13.4 %	7.0 %	1.92
FNDDEAD	10	133	7.5 %	6	68	8.82 %	4	65	6.2 %	-2.7 %	4.6 %	-0.58
GIT_XDIARR	2	5	40.0 %	2	5	40.00 %	0	0		-40.0 %		
HEALTHY	0	3	0.0 %	0	1	0.00 %	0	2	0.0 %	0.0 %		
LAME	3	37	8.1 %	2	19	10.53 %	1	18	5.6 %	-5.0 %		
MALAISE	7	47	14.9 %	2	22	9.09 %	5	25	20.0 %	10.9 %	10.4 %	1.05
MUSC_SKEL	0	3	0.0 %	0	1	0.00 %	0	2	0.0 %	0.0 %		
NERVOUS	5	26	19.2 %	2	11	18.18 %	3	15	20.0 %	1.8 %		
OTHER	5	14	35.7 %	1	2	50.00 %	4	12	33.3 %	-16.7 %		
RECUMBT	2	15	13.3 %	1	8	12.50 %	1	7	14.3 %	1.8 %		
REPRO	12	17	70.6 %	5	9	55.56 %	7	8	87.5 %	31.9 %		
RESPIR	7	100	7.0 %	2	49	4.08 %	5	51	9.8 %	5.7 %	5.1 %	1.12
SKIN	2	15	13.3 %	2	9	22.22 %	0	6	0.0 %	-22.2 %		
UNKNOWN	14	79	17.7 %	6	41	14.63 %	8	38	21.1 %	6.4 %	8.6 %	0.75
URINARY	0	1	0.0 %	0	0		0	1	0.0 %	0.0 %		
WASTING	5	77	6.5 %	0	36	0.00 %	5	41	12.2 %	12.2 %	5.6 %	2.17
	146	**767**	**19.04 %**	**56**	**371**	**15.09 %**	**90**	**396**	**22.73 %**	7.63 %	2.84 %	2.69

The red highlighting of 'wasting' indicates a significant increase in DNR for this presenting sign compared to prior years.

Table 12: VIDA Overall Changes in DNR rates for Pigs by Syndrome to Q2 for 2009 and prior years

1.1 VIDA (GB) Overall Changes in DNR rates for Pigs by Syndrome to Q2 for 2009 and prior years

GB

Syndrome	Overall			Prior years (2008 onwards)			2009			diff	SE Yr - Yr	z
	DNR	Subs	% DNR	DNR	Subs	% DNR	DNR	Subs	% DNR			
Circulatory	1	21	4.76 %	0	8	0.00 %	1	13	7.69 %	7.69 %		
Enteric	72	321	22.43 %	28	148	18.92 %	44	173	25.43 %	6.51 %	4.67 %	1.39
Musculo-skeletal	5	52	9.62 %	2	24	8.33 %	3	28	10.71 %	2.38 %	8.20 %	0.29
Nervous / Sensory	9	57	15.79 %	5	25	20.00 %	4	32	12.50 %	-7.50 %	9.73 %	-0.77
Reproductive	51	63	80.95 %	18	24	75.00 %	33	39	84.62 %	9.62 %	10.19 %	0.94
Respiratory	12	210	5.71 %	5	117	4.27 %	7	93	7.53 %	3.25 %	3.22 %	1.01
Skin	2	23	8.70 %	1	13	7.69 %	1	10	10.00 %	2.31 %		
Systemic & Misc	17	387	4.39 %	8	188	4.26 %	9	199	4.52 %	0.27 %	2.08 %	0.13
Unknown (999,990,991,980,970	17	20	85.00 %	8	8	100.00 %	9	12	75.00 %	-25.00 %		
Urinary	1	10	10.00 %	0	3	0.00 %	1	7	14.29 %	14.29 %		

SAC

Syndrome	Overall			Prior years (2008 onwards)			2009			diff	SE Yr - Yr	z
	DNR	Subs	% DNR	DNR	Subs	% DNR	DNR	Subs	% DNR			
Circulatory	0	7	0.00 %	0	1	0.00 %	0	6	0.00 %	0.00 %		
Enteric	19	113	16.81 %	9	51	17.65 %	10	62	16.13 %	-1.52 %	7.07 %	-0.21
Musculo-skeletal	1	8	12.50 %	0	3	0.00 %	1	5	20.00 %	20.00 %		
Nervous / Sensory	0	5	0.00 %	0	0		0	5	0.00 %	0.00 %		
Reproductive	3	7	42.86 %	1	2	50.00 %	2	5	40.00 %	-10.00 %		
Respiratory	3	48	6.25 %	1	29	3.45 %	2	19	10.53 %	7.08 %	7.14 %	0.99
Skin	0	8	0.00 %	0	5	0.00 %	0	3	0.00 %	0.00 %		
Systemic & Misc	4	73	5.48 %	3	35	8.57 %	1	38	2.63 %	-5.94 %	5.33 %	-1.11
Unknown (999,990,991,980,970	11	13	84.62 %	5	5	100.00 %	6	8	75.00 %	-25.00 %		
Urinary	0	1	0.00 %	0	0		0	1	0.00 %	0.00 %		

VLA

Syndrome	Overall			Prior years (2008 onwards)			2009			diff	SE Yr - Yr	z
	DNR	Subs	% DNR	DNR	Subs	% DNR	DNR	Subs	% DNR			
Circulatory	1	14	7.14 %	0	7	0.00 %	1	7	14.29 %	14.29 %		
Enteric	53	208	25.48 %	19	97	19.59 %	34	111	30.63 %	11.04 %	6.06 %	1.82
Musculo-skeletal	4	44	9.09 %	2	21	9.52 %	2	23	8.70 %	-0.83 %	8.68 %	-0.10
Nervous / Sensory	9	52	17.31 %	5	25	20.00 %	4	27	14.81 %	-5.19 %	10.50 %	-0.49
Reproductive	48	56	85.71 %	17	22	77.27 %	31	34	91.18 %	13.90 %	9.57 %	1.45
Respiratory	9	162	5.56 %	4	88	4.55 %	5	74	6.76 %	2.21 %	3.61 %	0.61
Skin	2	15	13.33 %	1	8	12.50 %	1	7	14.29 %	1.79 %		
Systemic & Misc	13	314	4.14 %	5	153	3.27 %	8	161	4.97 %	1.70 %	2.25 %	0.76
Unknown (999,990,991,980,970	6	7	85.71 %	3	3	100.00 %	3	4	75.00 %	-25.00 %		
Urinary	1	9	11.11 %	0	3	0.00 %	1	6	16.67 %	16.67 %		

Table 13: Overall Changes in VLA DNR rates for Pigs by Syndrome for 12 months Q 2008/3 to Q 2009/2 and previous 5 years

	Overall			Prior years Q 2003/3 to Q 2008/2			Last 12 Months Q 2008/3 to Q 2009/2					
Syndrome	DNR	Subs	% DNR	DNR	Subs	% DNR	DNR	Subs	% DNR	diff	SE Year to Year	z
Circulatory	10	114	8.77 %	9	97	9.28 %	1	17	5.88 %	-3.40 %	7.44 %	-0.46
Enteric	356	1,536	23.18 %	297	1,275	23.29 %	59	261	22.61 %	-0.69 %	2.87 %	-0.24
Mastitis	0	10	0.00 %	0	6	0.00 %	0	4	0.00 %	0.00 %		
Musculo-skeletal	21	211	9.95 %	18	165	10.91 %	3	46	6.52 %	-4.39 %	4.99 %	-0.88
Nervous / Sensory	27	246	10.98 %	19	196	9.69 %	8	50	16.00 %	6.31 %	4.95 %	1.27
Reproductive	237	363	65.29 %	186	295	63.05 %	51	68	75.00 %	11.95 %	6.40 %	1.87
Respiratory	77	1,039	7.41 %	71	899	7.90 %	6	140	4.29 %	-3.61 %	2.38 %	-1.52
Skin	26	124	20.97 %	25	107	23.36 %	1	17	5.88 %	-17.48 %	10.63 %	-1.64
Systemic & Misc	164	2,034	8.06 %	136	1,711	7.95 %	28	323	8.67 %	0.72 %	1.65 %	0.44
Unknown (999,990,991,980,970	52	59	88.14 %	47	53	88.68 %	5	6	83.33 %	-5.35 %	13.93 %	-0.38
Urinary	5	38	13.16 %	3	26	11.54 %	2	12	16.67 %	5.13 %		

APPENDIX 1

INTERESTING SCIENCE – UPDATE FROM THE SCIENTIFIC LITERATURE

CLASSICAL SWINE FEVER: A study in the Netherlands of pestiviruses in pigs has reported a low incidence of BD and BVD viruses in pigs. Neither pose a real threat to pigs but monitoring of the two viruses helps in the case of a real CSF outbreak. Risk factors for BVDV included cattle on the same premises and for BDV the presence of sheep and goats within a 3km radius. Knowledge of the presence of these viruses will help in identifying both false positives and false negatives in the case of a CSF outbreak (W. Loeffen., *et al*, Vet Micro., 136, 240-245).

A paper by R. Vrancken., *et al* (2009, Journal of General Virology, 90, 1335-1342) suggested that experimentally infected pigs with CSF could be treated with a powerful antiviral agent (a viral polymerase inhibitor). On day 33 it was not possible to isolate infectious virus from the tonsils. This technique could be used to reduce the spread of the virus in pigs in the early stages of infection. Virus titres at the peak of infection were also very much lower than in the untreated group.

Differentiation of vaccine strains of CSF and field strains of CSF using real time RT-PCR has been described by I. Leiffer., *et a*l (2009, Journal of Virological methods, 158, 114-122). This could be very useful in eradication schemes.

A recent study of the possibility of using a meat juice ELISA to diagnose swine fever was undertaken by V.Kaden., *et al* (2009, Dtsch Tieratzl Wschr, 116,173-179). It showed the tests were useful but were less sensitive than serum but for the diagnosis of CSF in wild boar where meat is the only possibility it was a very useful test.

E. Weesendorp., *et al* (2009, Vet. Micro., 135, 222-230) have looked at the quantification of CSF virus in aerosols originating from pigs infected with strains of high, moderate, and low virulence. The higher the dose of virus or the virulence of the strain the more rapidly the virus was found in the aerosol.

HEPATITIS E: A study of 32 piglets from 11 farms using nested RT-PCR (Vasickova., *et al*, 2009, Res. Vet Sci. 87,143-148) showed that seven of the farms had at least one pig that was positive and that all the swine HEV isolates belonged to the genotype III (this genotype can be found in humans, pigs, and other animal species).
The study of HEV in 148 wild boars in Germany (Schielke., *et al*, 2009, Virology Journal, 6.58.) showed that the virus was present in all ages and classes of stock, all of genotype IIIi and that the virus was 97.7% homologous in nucleotides to a human HEV patient in Germany. The authors considered that wild boar had to be considered as a potential reservoir for human infection especially as the virus was more prevalent in the rural areas.
A high prevalence in the Spanish pig population since 1985 has been shown by Casas., *et al* (2009, Vet. Microbiology, 135, 248-252). In it, 204 out of 248 farms were considered to be infected by having at least one positive pig. The authors concluded that although there is a high rate of infection in the pigs, the rare occurrence of the condition in humans suggests that the transmission to humans is not very frequent.

SALMONELLAE: In a paper by Dorr., *et al* (2009, Appl. Env. Micro., 75, 6, 1478-1486) the antibiotypes were studied in a variety of sites and it was shown that some of these only occurred in lairages and lorries. Some genotype clusters were not found on farms. The findings emphasised the role of various environmental factors including lorry washes and lairages.
An interesting paper by Szabo., *et al* (2009, Appl Env. Micro., 75,9, 2621-2628) showed that the probiotic *E. faucium* fed to pigs enhanced the course of infection in weanling pigs challenged with *Salmonella* serovar Typhimurium DT104 but it also resulted in a higher level of specific antibodies to the serovar.
Experiments on the feeding of in-feed egg yolk antibodies on *Salmonella* shedding, bacterial antibiotic resistance and health of pigs (Mathew., *et al*, 2009, J of Food Production, 72, 2, 267-273) showed that the antibiotic treated pigs had a lower level of shedding but their *E.coli* were more resistant to antibiotics. Health and performance indicators did not differ between the groups.
A study of salmonellae in a very small Wisconsin slaughter plants (Algino., *et al*, 2009, Journal of Food Production, 72, 4, 714-721) showed that salmonellae carriage was reduced by chilling carcases two days before fabrication and improving carcase-handling hygiene.
A study of the prevalence of salmonellae on pig carcases and in pork joints in Ireland [E.A. Gonzalez Barron., *et al* (2009, Journal of Food Protection, 72, 274-285] showed that a model

predicted a presence of four per cent and the actual level was 3.3 per cent. Sensitivity analysis reinforced the value of final rinsing and chilling in removing salmonellae from the final product whereas hygiene practices during the actual jointing process seemed to have a lesser effect.

DISEASE ERADICATION: An interesting paper by J. Szancer (2008, Pig Journal, 61, 1-5) looked at the two techniques widely used in Denmark to control disease: - a) total depopulation and b) partial depopulation and medication. All the factors in making decisions are discussed. Total depopulation has almost 100% success but is very expensive. Partial depopulation has a success of around 90% for *B. hyodysenteriae* and *M. hyopneumoniae* but with *A. pleuropneumoniae* the success rate is around 10% after two years. Freedom from *L. intracellularis* is around two years.

WELFARE: In a year long study, in the USA, of the environment, length of journey and type of trailer and their affects on the mortality and morbidity of pigs being transported to slaughter (2.7 million pigs), it was found that mortality increased when ambient temperatures were over 20°C. The percentage of pigs unable to walk on arrival increased below 5°C. The journey time and the waiting time at the processing plant influenced the percentages of dead and injured pigs unable to walk.

PORCINE CIRCOVIRUS: D. Wiederkehr., *et al* (2009, Vet. Micro., 136,27-35) have looked at the genotypes of the PCV2 virus in Switzerland from 1973 to 2005 using histology, IHC and PCR and have found that since the epidemic began the virus shifted from PCV2a to PCV2b and specifically to 1 genotype sub-group (PCV-2b-Ch) which may account for their increasing virulence. Their findings suggest that the PCV2 genome plasticity is a major contributing factor for PMWS disease manifestation.
H.B. Kim., *et al* (2009, Vet. Rec., 164, 599-600) recognised that there were differences in efficacy of disinfectants for PCV2. Eight were tested and it was shown that Virkon S, Clorox bleach and sodium hydroxide were the most effective virucidal agents against PCV2. It is also inactivated by formalin.
M. Genzow., *et al* (2009, Canad. J. Vet. Res., 73, 87-90) showed that pigs vaccinated with PRRS vaccine had lower levels of PCV2 viraemia at 13 weeks of age than unvaccinated pigs

when measured using qPCR but no effect in pigs of 4-12 weeks old. Also PRRS vaccinated pigs had a lower viral load when peak wasting disease was observed in the herds.

PRRS: A production region model to assess the airborne spread of PRRS has been described (A. Pitkin., *et al*, 2009 , Vet. Micro., 136, 1-7) in which it is suggested that air filtration techniques combined with all the available information on biosecurity could be used to keep a unit free from PRRS.
T. Okinaga., *et al* (2009, Vet. Rec., 164, 455-459) have looked at unexpectedly positive PRRS IDEXX ELISA results and found that if these are subjected to simple competitive and blocking ELISAs (derived from the IDEXX ELISA) and IFAT tests then most of the positive results were then negative (100% by IFAT and 89% by the other ELISAS). The competitive (97.7%) and blocking (96.5%) ELISAs detected more positive sera than did the IFAT (90.9%). The results suggested that most of the unexpected positive results were false positives.

E. Silva-Campa., *et al* (2009, Virology, 387, 373-379) have shown that PRRS modulated the behaviour of T-regulatory cells. The virus can establish early in infections and modulate Th3 regulatory cells as a mechanism for modulating the immune response.
Y-T. Peng., *et a*l (2009, Vet Micro,136, 359-363) were able to show that when immature bone marrow-derived Dendritic cells were exposed to PRRSv they were able to significantly increase the rate of secretion of IL-1, IL-6, IL-8, IL-10, and IFN alpha but not IL-12 or TNF-alpha.
C-H Liu., *et al* studied the mRNA expression of TOLL-like receptors (TLR) using semi-quantitative RT-PCR in pigs exposed to PRRSv (2009, Vet. Micro., 136, 266-276) and found that the virus increased the secretion of IL-1beta and IL-6 by the alveolar macrophages. Infection also tended to upgrade the production of TLR2, 3, 4, 7, and 8.
Houseflies were shown to provide some level of risk for the transport and transmission of PRRSv between pig populations under field conditions (A. Pitkin., *et al*, 2009, Canad. J. Vet. Res., 73 91-96).

***MYCOPLASMA* INFECTIONS:** A recent Polish review (M.Truszczynski, 2009, Med. Wet., 65, 223-227) has described *M. suis* formerly known as *Eperythrozoon suis*. It is part of a cluster of *in vitro* uncultivatable haemotropic mycoplasmas named *M. suis*. It attaches to the surface of RBCs where it replicates. It causes haemolytic anaemia but the development of signs may take several months or may not develop. Affected piglets will have skin pallor, icterus, unthriftiness, poor weight gain, and susceptibility to other infections. As a result of infections, cold agglutinins of IgM class are produced. Diagnosis is by the LightCycler real-time PCR. In addition, the paper reports the recombinant expression of p40 and p70 antigens of *M. suis* in *E.coli* which has enabled the production of ELISAs which are highly specific and sensitive.

***MYCOPLASMA HYOPNEUMONIAE*:** E. Redondo., *et al* (2009, J. Comp. Path., 140, 260-270) experimentally infected pigs with *Mycoplasma hyopneumoniae* (MH) and followed the histopathological lesions from day 7 to 35 and correlated them with expression of cytokines. They found that there were significant increases with IL-!alpha, IL-1beta, IL-8, TNF alpha and INFgamma. Lymphoid markers (CD4+ and CD8+) IgA and IgG were also increased. Both the lesions and the signals decreased beyond 35 days.

D.Calus., *et al* (2009, Journal of Applied Micro.,106, 1951-1956) showed that the *in vitro* virulence of *M. hyopneumoniae* does not correlate with the *in vitro* adhesion as assessed by the microtitre plate adherence assay. This suggests that mechanisms other than adherence may be responsible for differences in virulence.

WILD BOAR: Two real-time RT-PCRs have been developed to genetically distinguish between field strains of classical swine fever virus and the marker vaccine. This is a considerable

advantage in any wild boar vaccination programme (L.Liu., *et al*, 2009, Journal of Virological methods, 159, 131-133).

PRRSv infection in 531 wild boars from 52 hunts was studied in Germany by G.Reiner., *et al* (2009, Vet Micro., 136, 250-258). A total of 15.9% of the wild boars were positive. There was no correlation with age or weight, nor with density of production units, domestic pigs or wild boars. The isolated viruses were 99.3% homogeneous with EU virus and 97% homogeneous with the American virus. The authors concluded there was only a weak correlation between wild boar infection and domestic pig production.
Baits using wild boar feed, wheat flour, paraffin, saccharose and cinnamon-truffle powder have been shown to be useful for vaccinating wild boars. They were stable at 42°C for at least 3 days and the recombinant *E.coli* used in the vaccine was excreted in the faeces of these pigs to show that the vaccine had worked. It is therefore possible to vaccinate 2-4 month old wild boar piglets.
In a study of feral pigs in Texas (A.C.Wyckoff., *et al*, 2009, J. Wildlife Dis., 45, 422-429) it was found that feral swine do have contact with domestic pigs but that on the whole they do not travel far to such units. A few simple management techniques such as a double fence should stop the nose to nose contacts. Reduced human activity and darkness provide the increased opportunity for contact. Reduction of the feral swine in the local area around a facility would be very beneficial to provide a buffer zone as they do not appear to travel far.

BRACHYSPIRAE: A. Hidalgo., *et al* (2009, Res. Vet. Sci., 87, 7-12) studied the MICs of Spanish field isolates of *B. hyodysenteriae* and found that most isolates showed poor susceptibility to erythromycin, tylosin, clindamycin, and lincomycin. Reduced susceptibility to both tiamulin and valnemulin was also noticed. A comparison of isolates from 2006-2007 with

those from 2000-2004 showed that there was an increasing trend in the MICs for all the antimicrobials.

***CAMPYLOBACTER*:** A recent study of antimicrobial resistance (10 drugs) in *Campylobacter* species in Canadian grow-finish pigs (L. R. Rosengren, 2009, Journal of Food Protection, 72, 482-489) has shown that 125 of the strains (405) were susceptible to all 10 drugs, 10% were resistant to ciprofloxacin and 71% were resistant to each of clindamycin, azithromycin and erythromycin. There was considerable clustering of resistance within herds which may help herd interventions. The study illustrates the need for the judicious use of antimicrobials.

***E. COLI*:** It is usually thought that *E.coli* F18ab-positive strains express Shiga toxins and that the ac-positive strains express enterotoxins but work by C. DebRoy., *et al* (2009, J. Vet. Diag. Invest., 21, 359-364) has shown that both variant types may carry genes for Shiga toxins and/or enterotoxins. Monoclonal antibodies could not distinguish the strains carrying the 2 variants and therefore it is possible that both may be involved in causing oedema diseases or post-weaning enteritis.
A multiplex PCR has been developed for detecting 5 different adhesins (K88, K99, 987P, F41 and F18), 3 enterotoxins (LT,STaP and STb) and the Shiga toxin (Stx2e) associated with *E. coli*. The assays are simple to perform and should be used for the genotypic classification of *E. coli* isolates responsible for oedema disease and diarrhoea (T.A.Casey & B.T.Bosworth, 2009, J. Vet. Diag., 21, 25-30).

Chilling was generally shown to reduce the level of *E.coli* on carcases but in some cases it increased the numbers of *E. coli*. O157H7 was absent before the chilling processes but present on 0.21% after chilling and was obtained from 0.63% of faecal samples. The study was carried out in 4 Irish abattoirs (M. Lenahan., *et al*, 2009, J. Appld. Micro., 106, 1512-1520).

In a study using bacteriophages for the prevention and treatment of diarrhoea due to experimental enterotoxigenic *E. coli* infection with O149:H10:O4 it was shown that all of the 6 phages tested showed significant prophylactic activity against diarrhoea and shedding of the

ETEC. A combination of three phages also moderated the course of the diarrhoea. In the therapeutic mode a combination of two phages reduced the development of diarrhoea and the number of challenge bacteria in faeces without an apparent reduction in the normal *E.coli*.

***ACTINOBACILLOSIS PLEUROPNEUMONIA*:** A study of *A. pleuropneumoniae* serotype 9 (APP) and *M. hyopneumoniae* in SPF pigs (2009, C. Marois., *et al*, 2009, Vet. Micro., 135, 283-291) showed that sensitivity to APP was related to the age of the pig. Pigs infected at 6 weeks showed all the typical signs of APP but those infected at 10 weeks did not but showed a high seroconversion on ELISA testing. Pigs affected with *M. hyopneumoniae* at 6 weeks and APP 4 weeks later were also most severely affected. This suggests that APP may be clinically unnoticed but can be potentiated by *M. hyopneumoniae*.
M-S Chien., *et al* (2009, Vet. Micro., 135, 327-333) have suggested that the Apx1 toxin may facilitate APP as it impairs the host defence mechanism by causing apoptosis in pulmonary alveolar macrophages.

ACUTE PHASE PROTEINS: These were monitored in pigs following experimental APP infection (K.S Skovgaard., *et al*, 2009, Vet. Res., 23-35). Extra-hepatic acute phase protein responses paralleled those in the liver. This suggests that these responses are a more generalised systemic response rather than just liver specific responses.