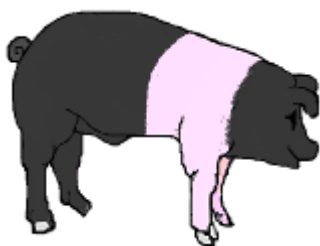


GB surveillance

Pig diseases

Quarterly Report: Vol Q3 2009

Date: 13th November 2009



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

	Page
Highlights	1
Introduction to GB Pilot Report	2
Overview	3
Pig demographics and diagnostic submission rates	7
Notifiable diseases reported	8
Farm visit investigations	9
Food Safety Incidents	9
Endemic disease surveillance	10
Scanning surveillance for new and emerging disease	26
Review of literature (Appendix)	35

Highlights

There were two suspected cases of notifiable disease reported to Animal Health neither of which was confirmed. There was one food safety incident involving pigs.

Pig prices continue to be favourable and directly related to the value of the pound compared with the Euro. This improvement may explain the projected increase in pig numbers being forecast.

There is no evidence that the new neonatal enteric disease reported in Denmark and France is present in the UK.

The sustained reduction in the incidence of PMWS and PCV2 associated disease is very encouraging for pig producers.

No influenza viruses were isolated from pigs during this quarter in England, Scotland and Wales.

There are continued problems with swine dysentery which appear to be centred in the northeast and it is of much concern that another multi resistant isolate has been identified.

1) INTRODUCTION

This is the sixth 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. Until now, the surveillance networks north and south of the Scottish border have reported their findings separately, which reduced the likelihood of early detection of important changes in health in this single epidemiological population. The newly unified GB-wide data resource, coupled with new 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

Pig Prices

At the end of June the price of pig meat was 154.59p/kg, which was 18% above that of June 2008. Sow prices were 109.25p/kg, which was 7% higher than in 2008. Prices in Europe had also risen and by the end of June they were an average of 131p/kg which was still 7% less than a year ago.

In August the price fell to 154.42p/kg, even though there was a reduced number of pigs. July slaughterings were believed to be 733,000 which was 2% down on 2008 and for the whole year so far the slaughter figures are down 4% compared with those in 2008.

In September the price was 149.66p/kg with sows at 113.9p/kg. These changes reflect higher slaughterings and lower summer demand.

Pig Meat Sales

The world demand has shrunk by 11% over the last year, which is thought to have been caused by the world recession. The value of pork has increased during the recession.

Pork imports were 12% lower in January-May particularly from Denmark but Dutch and Belgian imports were higher.

The forecast that Russia will become self-sufficient in poultry meat by 2011 and pork by 2012 will have a marked effect on EU sales, exports and prices.

The biggest UK independent food service management company has committed itself to becoming the first company to provide only British meat with the Quality Assured certification and the Red Tractor (5% is bacon and will soon be supplied from UK sources).

Pig Numbers – forecast

The national pig herd expanded by 5.4% between June 2008 and June 2009. However, the Scottish herd declined by 10% over the same period. There are, according to the June 2009 census, a record number of gilts in pig. BPEX have predicted that pig numbers this year will be down at 9,144,000 but that there will be an increase next year to 9,460,000.

Feed

Soya

The continuing impasse over the use of GM soya in European diets which prevents the use of US products may mean that there is a shortage of vegetable protein at reasonable prices. Price volatility could then follow as the EU imports three quarters of its protein requirement.

Worldwide there is an increase in the production in both North and South America (a rise from 222 to 243 million tons this year). This will more than offset the slight fall in rapeseed production.

Wheat

Far more of the old crop has been carried over than was once thought possible so it would appear that there is plenty of wheat. Milling wheat quality in the UK has been high so it is thought that most millers will be able to satisfy their needs from the UK without major imports. This may leave as much as 2.5m tons available for export during the 2009-2010 season. An

alternative view is that this could all be absorbed by the demand for wheat for bio fuel as the new plants on Humberside and Teesside will each consume over 1 million tons of wheat.

Potential Importation of Weaners into the UK

The reduced market for weaners in the Netherlands and Denmark and limited expansion into Germany together with the large price differential between the price in the UK and the domestic prices has tempted some EU countries into trying to sell weaners into the UK. The National Pig Association is strongly opposed to farmers importing weaners because of concerns about the potential importation of MRSA and new strains of flu, PRRS, PCV2, leptospires, *Actinobacillus pleuropneumoniae*, and *Clostridium difficile*. In the past ferry companies have been reluctant to export live pigs from the UK and many producers are hopeful that they will take a similar approach to the import of live pigs. There is also considerable concern that the new neonatal diarrhoea reported in Denmark and France could be imported into the UK, whatever the aetiology may turn out to be.

Yorkshire and Humberside Health Initiative

Regional health schemes will be based on 10 area health groups in Yorkshire. Each will have responsibility for driving what happens in its own cluster concentrating on the four diseases indicated below. The areas will be divided into grids and each grid will be given a status based on the occurrence of the 4 diseases.

Over a hundred industry people attended a meeting to inaugurate the Yorkshire and Humberside health initiative. In a pilot study the mapping of pigs in Yorkshire will be carried out. The attendees voted on the most important diseases to tackle; swine dysentery (98%), mange (57%), enzootic pneumonia (89%) and PRRS (88%) were selected as the initial focuses for control. The big problem will be proving the status of infection in each herd. It was decided that tests used would be accurate, fast, transparently presented, agreed by the majority of vets, and of a comparable standard. It was also important to use material that was readily available. Most importantly, there is now a Yorkshire and Humberside Health Producer Charter for Swine Dysentery (similar to that in East Anglia).

Defra's Pig Meat Supply Chain Task Force

A pig sector Task Force was set up to run for one year by the Government in February 2009, and is aimed at securing the future of the pig meat industry.

The Pig Meat Supply Chain Task Force will focus on helping the whole supply chain to thrive in a way that is sustainable in the long term. It will bring together key representatives from all sectors in the pig meat supply chain to increase collaboration between Government and the various sectors in the industry.

There are four subgroups in the Pig Meat Supply Chain Task Force, each with their own work plan:

1. Improving Food Labelling,
2. Improving Pig Herd Health,
3. Public Sector Procurement
4. Environmental Requirements.

Term of reference, membership and minutes of the meetings can be found at the following address: <http://www.defra.gov.uk/foodfarm/farmanimal/pigs/task-force/index.htm> .

New Neonatal diarrhoea syndrome reported in Denmark and France

- One of the highlights of the recent ECHPM meeting in Copenhagen was the report of a new neonatal diarrhoea syndrome in Denmark and France. It was characterised by the following:
 - A mortality rate up to 40% in suckling pigs
 - Unknown aetiology

 - Approximately 80% of laboratory submissions to the major Danish laboratory have been associated with this syndrome.
 - In France a study (Sialelli, J-N et al, J. Rech. Porc. (2009) 41, 167-172.) suggested that
 - The herds affected are mainly the high yielding, well-managed herds.
 - There is considerable variability between litters, particularly gilts and second parity sows may be affected.
 - Length of parturition was longer in affected herds than in unaffected herds.
 -
 - Levels of antibodies in colostrum apparently varied although there was no evidence of differences in quality of colostrum.
- No consistent pattern exists in herds.
- No consistent pattern of microbiological observations has been found.

From this French study it was found that the 1st and 2nd parity sows took longer to farrow on affected farms. It may be that this was the reason they had diarrhoea. High numbers of piglets take a long time to be born and gilts tire easily and this may lead to weakened piglets. It could be that the more heterogeneous serum IgG levels in these piglets, was associated with delayed sucking by which time sow levels of IgG had started to fall as the colostrum supply was released. Piglet serum IgG is a reflection of absorption rate of IgG from the newborn gut, related to the colostrum level and this in turn related to the sow's serum level and previous exposure to any pathogens. A whole variety of aetiological factors were suggested but there is no evidence to support any as yet (hyperprolificacy, antibiotic overusage, chilling and nutritional factors, and a variety of pathological agents)

The absence of definitive microbiological findings may be explained by parity distribution, previous exposure to infectious agents, or the presence of some mastitis in gilts associated with complete agalactia of some glands which leads to variable levels of colostrum affecting antibody provision.

B. Svensmark from the Danish Agriculture and Food Council, Laboratory of Swine Diseases, Danish Pig Production commented on the syndrome in Denmark.

They suggested that lesions did not visibly affect the pigs, with normal amounts of milk in the stomach and they were not dehydrated. The small intestines were contracted or atonic and dilated. Hyperaemia or congestion affecting the intestines was rare, contents were yellow and aqueous, the intestinal mucosa had no changes and the lymph nodes were reactive. The colon was without changes and the content was creamy to watery with a yellow colour. The routine examination included aerobic cultivation for *E.coli* with subsequent serotyping and anaerobic culture for *Clostridium. perfringens* type A and C. Some of the pigs were also tested for *Clostridium difficile* and rotavirus.

The findings are shown below for bacteriology and virology

Agent	Total cases analysed	positive
Non-haemolytic <i>E.coli</i>	220	121 (55%)
Haemolytic <i>E.coli</i> (mostly O 8)	220	15 (7%)
Enterotoxigenic <i>E.coli</i>	195	32 (16%)
<i>Clostridium perfringens</i> type A	220	177 (80%)
<i>Clostridium perfringens</i> type C	220	1
<i>Clostridium difficile</i>	63	20 (32%)
Rotavirus	134	16 (12%)

Svensmark's comment suggested 4 things:

- That microbiological testing was not sufficient to explain the problems.
- That histopathology was generally inconclusive.
- That *E.coli* and *Clostridium perfringens* type A are isolated in normal pigs and are therefore not considered to be important.
- That *Clostridium difficile* is not explained under Danish conditions

COMMENT

One of the factors that has to be investigated when dealing with immediate neonatal problems is the milk provision of the sow and it may be necessary to sample for infections in the farrowing sows particularly mastitis, metritis and cystitis.

The microbiological and histopathological results suggest that clostridia may be associated with this condition.

- It was widely isolated from the cases.
- It does not often cause major histopathological lesions so you would not necessarily expect to see anything.
- You have to look at all the potential causes in every case as often their effects are additive so bacterial isolation attempts (aerobic and anaerobic) for both *E.coli* and *Clostridia* spp are necessary and more particularly toxin testing.

In addition, all cases should be subjected to rotavirus identification and examination for coccidia.

There is currently no evidence of this neonatal diarrhoeic syndrome occurring in GB. Further information can be obtained in section 5 and Tables 9, 10 & 11.

INTERESTING SCIENCE –UPDATE FROM THE SCIENTIFIC LITERATURE

See Appendix 1

2.1 Demographics, submissions and carcasses

2.2 Diagnostic submissions and carcasses

Submissions were consistent with QR3 figures for previous years. The high figure for 2008 was caused by a commercial contract increasing diagnostic carcass submissions.

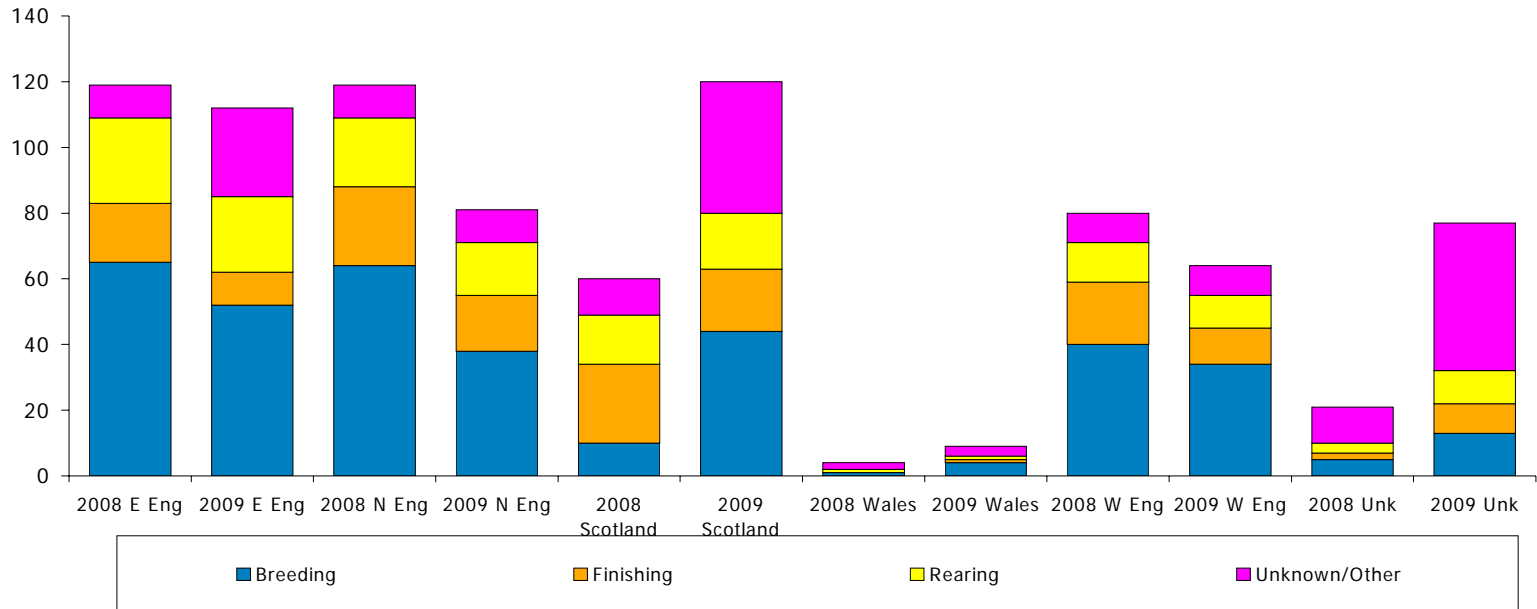
Table 1: Pig Submissions and Carcasses, 2005-2009 (Q3 only)

Quarter - Sep	Jul	Submissions			Carcasses		
		E&W	Scotland	Total	E&W	Scotland	Total
2009		237	229	466	189	107	296
2008		305	99	404	263	86	349
2007		247	70	317	193	42	235
2006		261	156	417	214	50	264
2005		260	112	372	235	65	300

Table 2: Pig Diagnostic Submissions 2005-2009 for England, Scotland and Wales

All Years 2005-2009	Breeding	Finishing	Rearing	Unknown/Other	Sum:
Eastern	219	93	136	126	574
Northern	191	102	75	47	415
Scotland	72	51	37	194	354
Wales	15	8	10	11	44
Western England	162	78	55	41	336
Unknown	36	21	26	165	248
Sum:	695	353	339	584	1,971

Figure 1 GB Diagnostic Submissions, July - September 2009 (right) and 2008 (left)



2.2 The Meteorological Office report

Temperatures in July were close to or slightly above the (1971-2000) mean for that month – more so in Scotland (+0.8°C) than elsewhere. In August and September, temperatures were again above the average – more so in Scotland (+1.3°C in September) and the north of England (+0.9°C in August and September) than in southern GB.

Rainfall in July was exceptionally high: 275% of mean for Wales, 239% for England and 161% for Scotland. By contrast, in August, rainfall in England and Wales was slightly below the mean but in Scotland was 183%. September was dry in all parts of GB: 41% of mean for Wales, 44% for England and 87% for Scotland. (Information courtesy of the Met Office.)

2.3 Notifiable Disease Reported

Suspect vesicular disease was reported in August following the detection of vesicles on the snouts of 3 sows submitted for post-mortem examination. This was investigated by the local Animal Health Office (AHO) both at the regional laboratory and on the farm of origin and ruled out on clinical grounds.

A practitioner made a report in August to their local AHO who then contacted their nearest regional laboratory. There was an outbreak of pyrexia and abortions in gilts for which Aujeszky's could not be ruled out, after other viral tests undertaken on necropsy material from three gilts gave negative results. These animals were negative when tested for Aujeszky's.

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**

Quarter 3 Jul - Sep	Breeder	Breeder Fattener	Breeder Rearer	Breeder / Rearer / Fattener	Fattener	Other	Rearer	Rearer Fattener	Total Visits
2009	1	0	1	5	0	3	0	0	10
2008	0	0	1	0	2	2	1	0	6
2007	2	0	1	0	4	7	0	4	18
2006	3	0	0	0	14	8	3	13	41
2005	0	1	2	0	5	4	0	3	15
Total	6	1	5	5	25	24	4	20	90

Visits undertaken this quarter were primarily salmonella advisory visits at the request of the producer.

2.5 Food Safety Incidents

Bracken poisoning was tentatively diagnosed in a group of five-month-old fattening pigs. The suspected source of bracken was young fronds in a woodland area. Four pigs presented in respiratory distress and died two weeks after moving into the woodland. At post mortem the lungs were oedematous and histology confirmed chronic myocardial necrosis. The latter is non specific but chronic bracken ingestion can lead to thiamine deficiency which causes myocardial necrosis in pigs. The other possible differential was vitamin E deficiency but this diagnosis was not supported by laboratory analysis. The pigs have since been moved out of the woodland and no further deaths occurred.

Bracken poisoning advice

- Bracken is sometimes eaten by food-producing animals.
 - Bracken contains some genotoxic or possibly genotoxic substances including ptaquiloside, kaempferol and shikimic acid.
 - Ptaquiloside from bracken ingested by food producing animals (eg dairy cows) can be passed into milk that might be consumed by humans. No information is available on the amount of ptaquiloside and other possibly genotoxic substances that may be left as residues in other animal-derived foods.
 - The level of human exposure to these substances should be kept as low as is reasonably practicable.
 - Available data suggests a withdrawal period of at least 4 days for ptaquiloside in milk.
- Further studies are required to be able to specify a withdrawal period prior to slaughter for human consumption of meat and offal.

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.

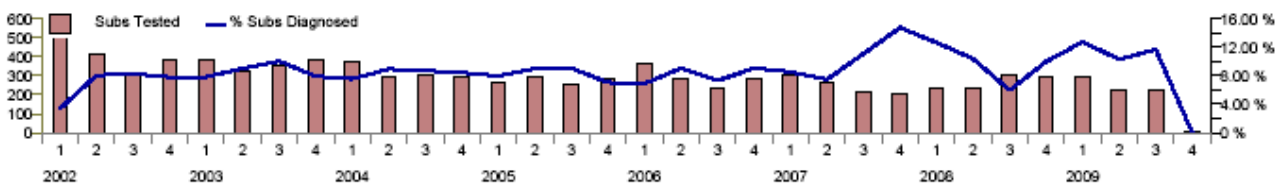
3.1) Salmonella and Salmonellosis

Details of the rate of diagnosis of salmonellosis from diagnosable submissions from GB are shown in table 4 and figure 2. The figures for the forth quarter of 2009 are incomplete.

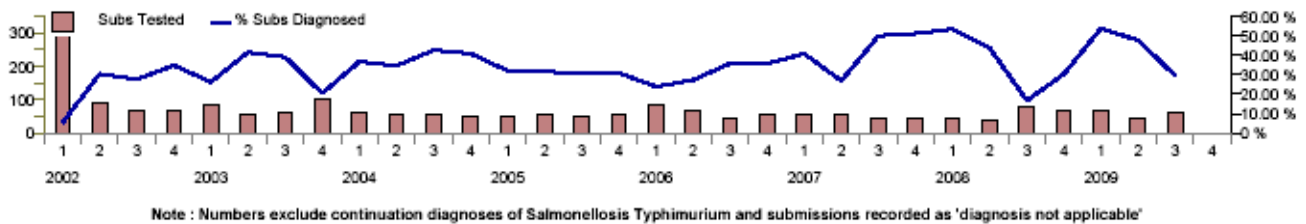
Table 4 and figure 2: Percentage of samples where salmonellosis was diagnosed for each quarter 2002 to 2009

GB Seasonality For Salmonellosis In Pigs

		Qtr 1	Qtr 2	Qtr 3	Qtr 4	Total
2002	Num Tested	591	410	303	385	1,689
	% Diagnosed	3.38 %	8.05 %	8.25 %	7.79 %	6.39 %
2003	Num Tested	384	322	349	380	1,435
	% Diagnosed	7.81 %	9.01 %	10.03 %	7.89 %	8.64 %
2004	Num Tested	371	292	299	297	1,259
	% Diagnosed	7.55 %	8.90 %	8.70 %	8.42 %	8.34 %
2005	Num Tested	264	290	254	284	1,092
	% Diagnosed	7.95 %	8.97 %	9.06 %	7.04 %	8.24 %
2006	Num Tested	364	288	233	288	1,173
	% Diagnosed	6.87 %	9.03 %	7.30 %	9.03 %	8.01 %
2007	Num Tested	305	268	217	204	994
	% Diagnosed	8.52 %	7.46 %	11.06 %	14.71 %	10.06 %
2008	Num Tested	238	232	302	291	1,063
	% Diagnosed	12.61 %	10.34 %	5.96 %	9.97 %	9.50 %
2009	Num Tested	291	224	223	1	739
	% Diagnosed	12.71 %	10.27 %	11.66 %	0.00 %	11.64 %
		2,808	2,326	2,180	2,130	9,444



Note : Numbers exclude continuation diagnoses of Salmonellosis and submissions recorded as 'diagnosis not applicable'

Figure 3: GB seasonality for *Salmonella Typhimurium* 2002 - 2009

There has been little change in the incidence of salmonellosis during 2009 thus far, nor indeed compared with 2008, except Q3 2008, in which there was an unexplained fall in percentage diagnosed. There has been, however, an apparent upward trend in percentage diagnosed since 2002, and this is undergoing statistical evaluation.

The percentage of submissions diagnosed with *Salmonella Typhimurium* does fluctuate as shown in figure 3 above.

Salmonella Choleraesuis var Kunzendorf was identified as an isolate that was cultured by the submitting veterinary practice from splenic tissue of a six-month-old gilt that died suddenly. The gilt was from a batch of pigs that had been delivered to the unit two to three weeks previously. *Salmonella Choleraesuis* is a rare isolate in the UK with only six cases in pigs since 1999, from four holdings. Interestingly, this organism had been isolated from the same unit 10 years previously. It is not known whether it has continued to exist on the farm during this period.

Salmonella Typhimurium phage type 120 was isolated from carcasses submitted. Thirteen out of 800 eight-week-old pigs were found dead overnight in outdoor cosikennels on a unit where pigs were weaned outdoors from an indoor breeding unit. Four dead pigs were submitted and in three of these there was a necrotic typhlocolitis, with the organism isolated from direct cultures of large intestine.

The typically more prevalent phage types of *Salmonella Typhimurium*, U288 and PT193, were isolated three times and once respectively. Clinical signs typically included scour and increased mortality in pigs between six and ten weeks of age.

A salmonella advisory visit was made to a 250-sow breeder finisher unit with a history of clinical salmonellosis associated with *Salmonella Typhimurium* U288. The farm was in the middle of a partial depopulation to improve its health status. *Salmonella Typhimurium* was isolated from pens, which had undergone cleaning, and disinfection. The organism was also recovered from sampled sites on the farm and a large mouse population was identified. The importance of rodent control and removing all organic matter prior to disinfection was emphasised and acidification of sow feed was being considered upon repopulation.

In another case, three live 12-week-old grower pigs were submitted with a history of clinical signs of disease in growing pigs unless chlortetracycline was added to the feed. One of the three pigs showed an extensive enterocolitis and *Salmonella Typhimurium* phage type U288 was isolated. Interestingly this isolate was sensitive to tetracycline despite its use on the unit. Salmonella control measures were discussed in addition to the routine acidification of feed.

Five Zoonoses National Control Plan (ZNCP) requested support visits were made. Samples collected during these visits yielded *Salmonella Typhimurium* from 3 units (PT 193 in two out of three) together with *S. Derby* (one case), *S. Dublin* (one case). Other isolates were an unidentified Group B (one case), and *S. Panama* (one case).

The IDEXX Meat Juice (MJ) ELISA now includes salmonella Group D antigens, in addition to the previous Group B and C1 antigens.

The significance of this was first noted following the request for ZNCP support visit to a unit with consistently high MJ ELISA scores. Twenty-six out of the 200 samples collected were found to contain group D salmonellae and these were subsequently identified as *Salmonella Panama*. There has been one other isolation of *S. Panama* from pigs since 2003.

At a ZNCP Steering Group meeting on 21st October, the annual rolling average Meat Juice ELISA scores for England and Wales (47%), Northern Ireland (34%) and Scotland (23%) were presented. These values have remained virtually constant since December 2007. The England and Wales results reflect the high rate of salmonella isolation from ZNCP derived faeces samples over the past five years.

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 project 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	14		

Porcine brucellosis was discussed at the recent Community Reference Laboratory (CRL) meeting in Portugal (September 2009). The VLA agreed to compare ELISA methods with other EU laboratories and standardise assays against the (pending) OIE International Standard *Brucella suis* serum in 2010. There is additionally a EU standard, which will be evaluated at this time. There was a presentation from the Danish Veterinary Institute which highlighted the difficulties associated with serology for *Brucella suis*. Thirty five per cent of the pigs in a herd destined for export were positive to CFT, RBT and SAT or a combination of these tests.

AFSSA France (the Community Reference Laboratory) presented results regarding analysis done on the specificity of 4623 porcine brucellosis tests. In these tests the VLA cELISA was most specific (98.31%) compared to a commercial cELISA kit (97.43%), RBT (97.36%) & FPA (lowest specificity 95.25%).

Sensitivity results (composed of 1799 acutely infected animals) showed FPA was the most sensitive test (92.28%) an iELISA least sensitive (60.31%), RBT 83.13% & VLA cELISA 68.36%. An additional 694 (chronic) infected animals that gave different results, the most sensitive test was the iELISA (84.65%), FPA (83.75%), VLA cELISA, 76.75% & RBT 67.27%.

There were discussions about reviewing the cut off criteria for these assays and the CRL reporting this data.

3.3) Streptococcal Infections

Table 6: Number of isolates of Streptococcus suis and their serotype for Q3 2006 to 2009

Year	1	2	3	4	5	7	8	9	10	12	14	16	33	U/T	Total
2005	2	8	3			1								2	16
2006		3								1			1		5
2007		19	3	1		3		4	1			1			32
2008	2	11	1	2	1	2	1	3			1			1	25
2009	2	7			2	1						1		5	18

UT = Untypable

Streptococcus suis type 2 was, as usual, the predominant serotype recovered. The isolation pattern was similar to previous years during this quarter. There have been no porcine bacteria of note submitted to Bury St Edmunds for determinative bacteriology during this quarter.

3.4) PMWS

The decline in quarterly percentage of relevant diagnostic submission with a diagnosis of PMWS continued for Q3 for GB (see histogram figure 4) as was seen for the previous quarter. England and Wales recorded the lowest rate of diagnosis (1.9%) since 2002 Q2 this year and this was followed up with no VIDA diagnoses for Q3 which is a first since 2002 (see figure 5 below) and also since the outbreak began in 1999. After the rise in cases for Q2 in Scotland discussed in the last quarterly report there was only one case in Q3, back to the lower levels which have been seen in Scotland since 2006.

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

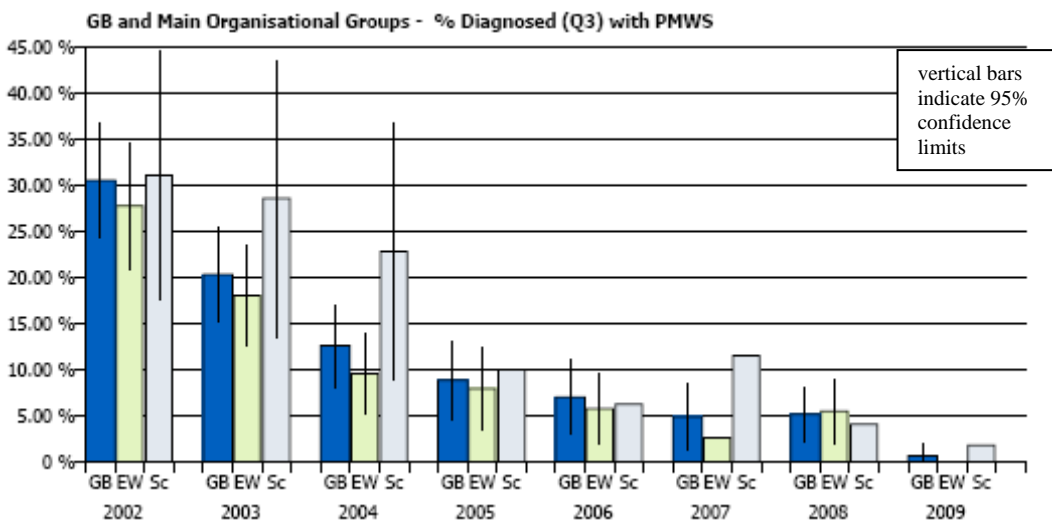
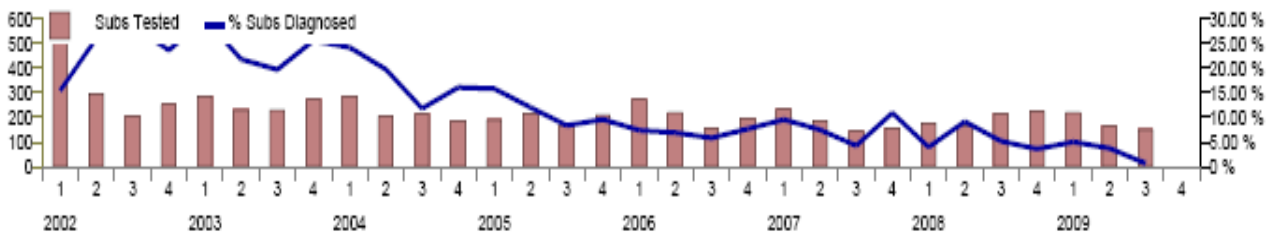


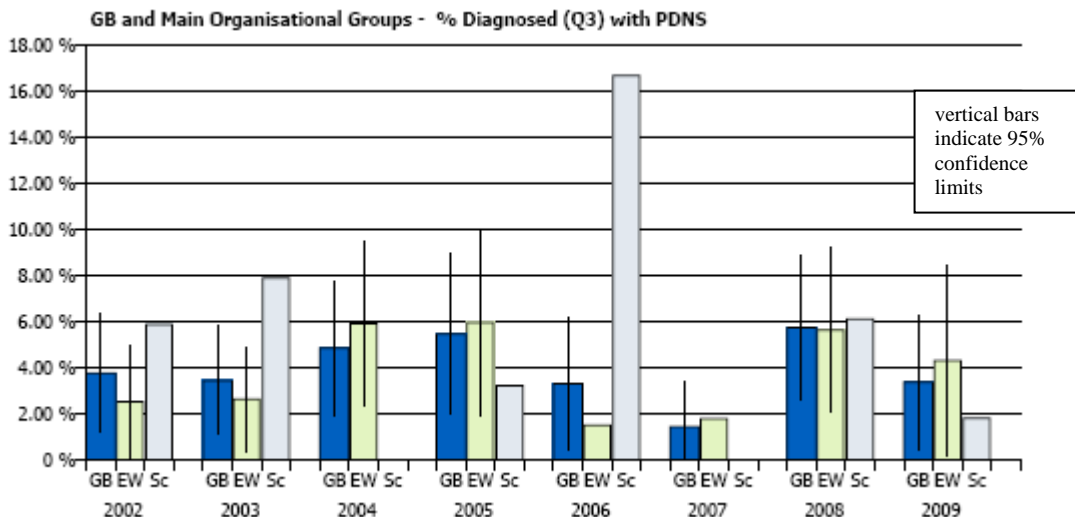
Figure 5: Numbers of submissions tested and percentages diagnosed with PMWS for all quarters since 2002



3.5) Porcine Dermatitis Nephropathy Syndrome (PDNS)

Cases of PDNS remained low this quarter (see histogram figure 6), although they have been at a slightly higher frequency than Q2 for the last two years.

Figure 6: Percentage of diagnosable submissions confirmed with PDNS in the third quarters of each year 2002 - 2009



3.6) Porcine Circovirus Associated Disease

In common with the findings for other PCV2 associated diseases there was only one further case of PCV2 associated pneumonia to add to the previous three cases this year.

3.6) Porcine Reproductive and Respiratory Syndrome (PRRS)

The quarterly percentage of relevant diagnostic submission with a diagnosis of PRRS showed a marginal decrease, which was not statistically significant, on the same quarter last year (see histogram, figure 7). This data includes diagnoses of pneumonia associated with PRRS, systemic PRRS and foetopathy. The diagnostic rate for this quarter (5.4%) has returned from the peak in Q2 close to that of the previous quarter (Q1) (see figure 8)

Figure 7: Percentage of diagnosable submissions with PRRS in the third quarters of each year 2002 – 2009

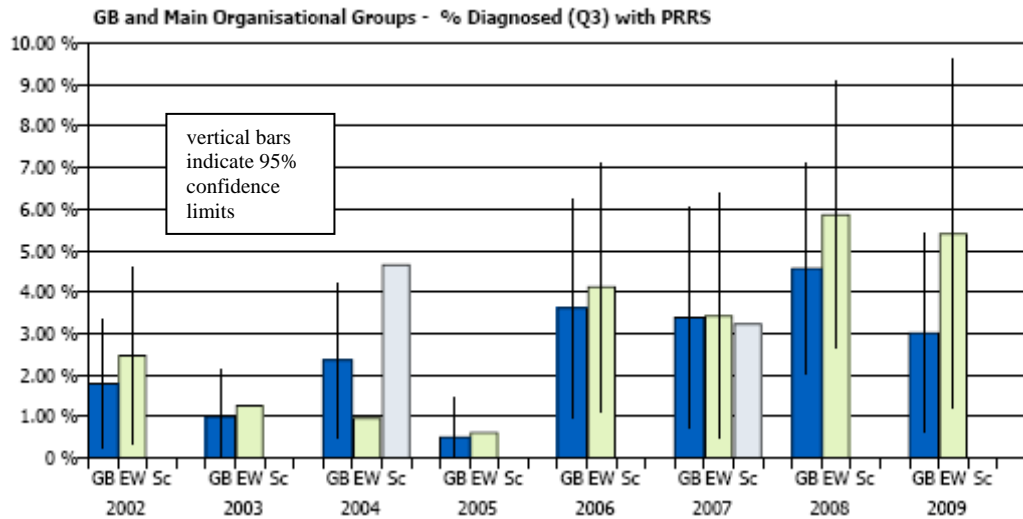
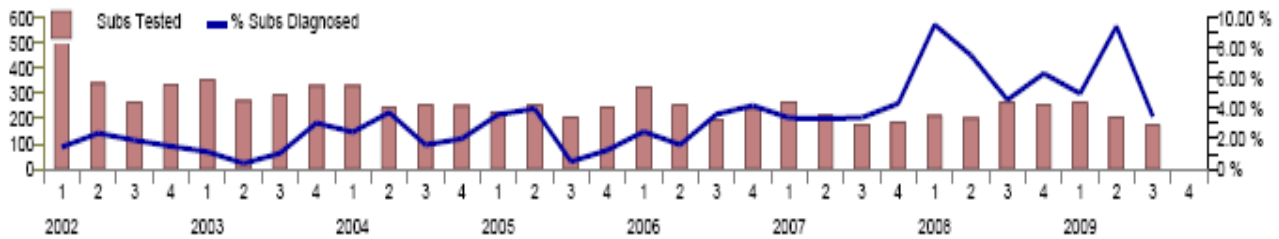


Figure 8: Numbers of submissions tested and percentages diagnosed with PRRS for all quarters since 2002

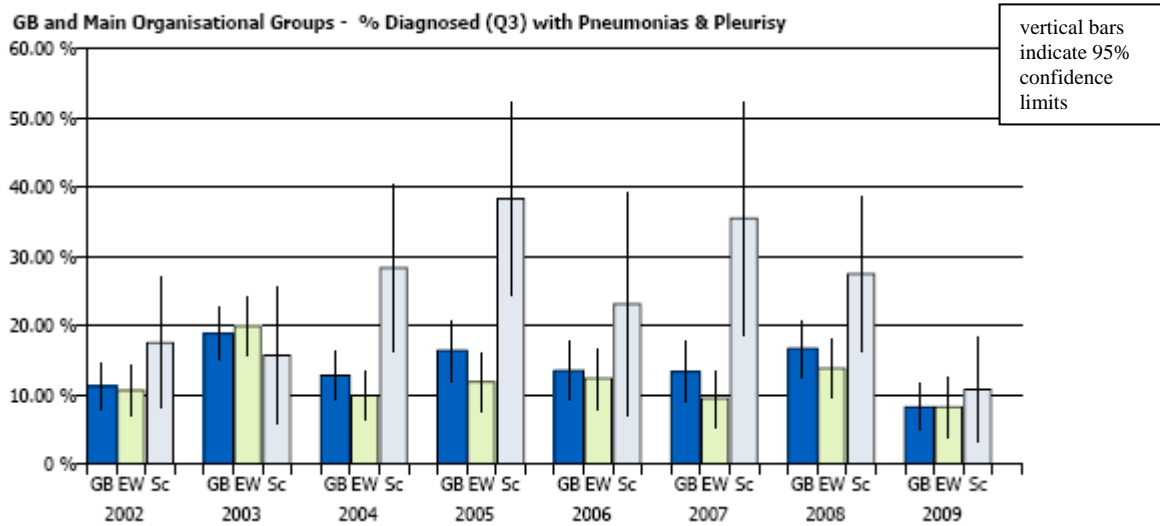


In one case concurrent *Streptococcus suis* infection was found. There was coughing, wasting, lameness and deaths in eight-week-old weaners. Three wasted pigs which had shown respiratory distress were examined. There were profuse growths of *Streptococcus suis* isolated from the lungs of all pigs and PRRS was detected in the spleens by PCR. This is not the first time that PRRS infection has predisposed to disease with other infectious agents.

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 GB with a non-statistically significant decrease for England and Wales and Scotland separately (see histogram, figure 9). The rate of diagnosis is again the lowest for this quarter since 2002 as reported for last quarter and is a further decrease from the previous two quarters of 2009.

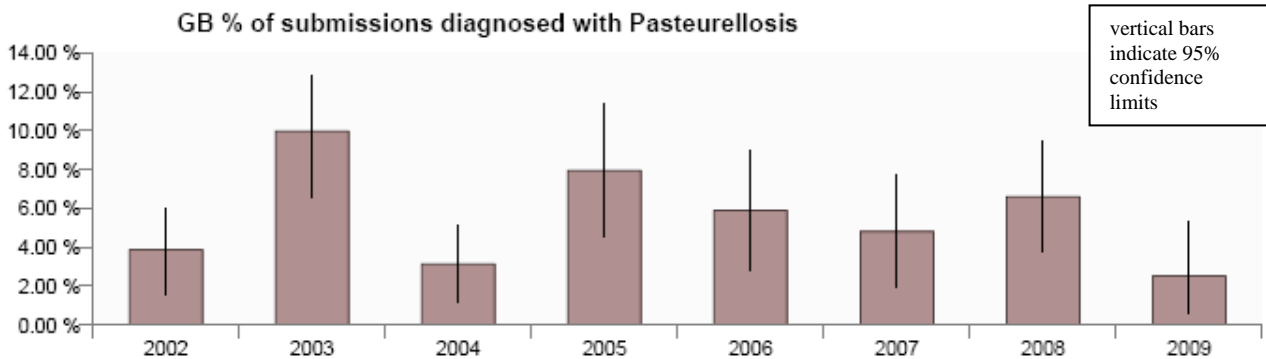
Figure 9: Percentage of diagnosable submissions with pneumonias and pleurisy in the second quarters of each year 2002 – 2009



3.7.1 Pasteurellosis

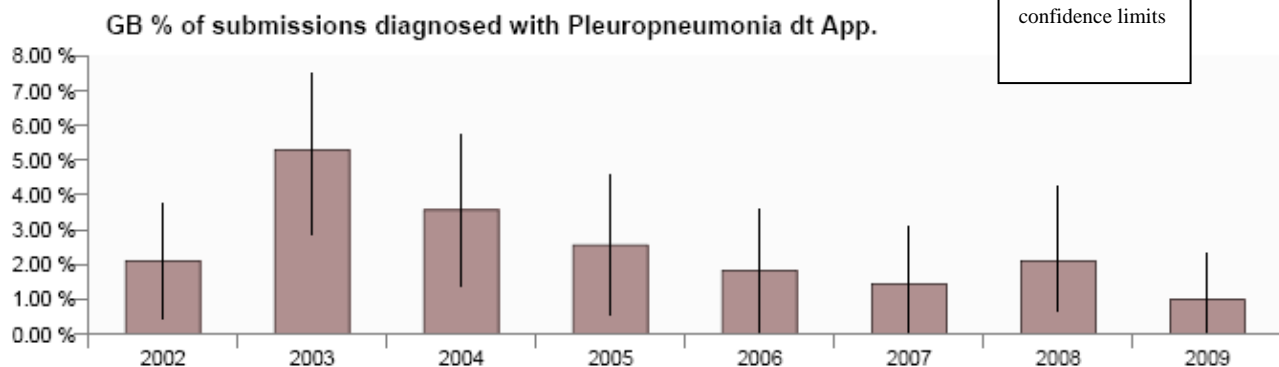
The fall in pneumonias and pleurisy is reflected in figures for pasteurellosis as might be expected and as shown in figure 10

Figure 10: Third quarter diagnostic rates for pasteurellosis 2002 – 2009



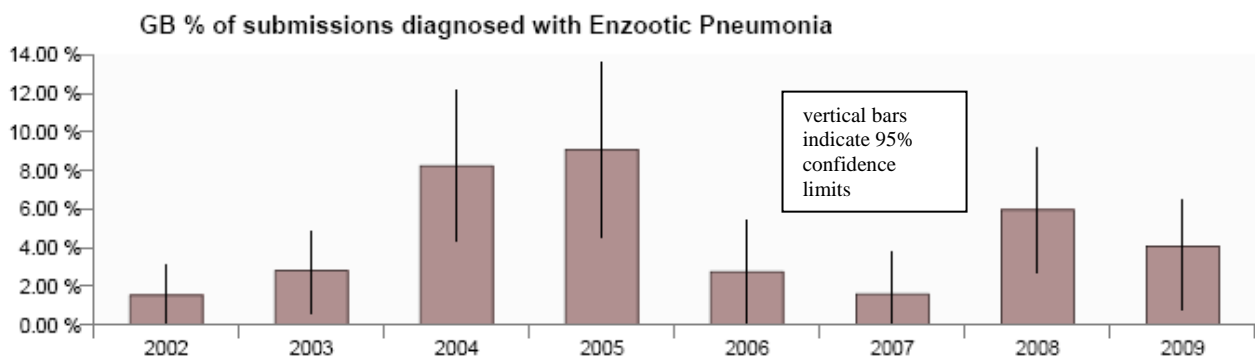
3.7.2 Actinobacillosis

The fall in pneumonias and pleurisy is again reflected in figures for diagnoses of *Actinobacillus pleuropneumonia* (APP) pneumonia. Figure 11 shows a decrease, not statistically significant, compared with all third quarters since 2002.

Figure11: Third quarter diagnostic rates for actinobacillosis 2002 – 2009

3.7.2 Enzootic pneumonia

QR3 was the same as was reported for Q2; there was a non-statistically significant decrease in the diagnostic rate for enzootic pneumonia when compared with the same quarter last year. (see histogram, figure 12).

Figure 12: Third quarter diagnostic rates for enzootic pneumonia 2002 – 2009

In one case reported from a breeding herd coughing was described initially in adults with occasional cases having mucopurulent nasal discharges. This progressed to affect most litters typically from four weeks of age. Coughing, increased respiratory rate and thumping respiration were all described. A severe chronic proliferative bronchointerstitial pneumonia was seen. Submitted pigs had prior antibiotic treatment, however *Mycoplasma hyopneumoniae* was detected in the lungs from two six-week-old pigs. No PRRS or swine influenza was found. During the first two quarters of 2009 in England and Wales eleven cases were recorded as pneumonia due to *M.hyorhinis* with a further three following in Q3. This follows the introduction of a new VIDA code as discussed in the last report.

3.7.4) Swine Influenza

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 (4.5%)	33	1 (3.0%)	27	0 (0%)	53	3 (5.7%)	201/8 (4.0%)
2008	84	4 (4.8%)	64	4 (6.3%)	72	2 (2.8%)	152	3 (2.0%)	372/13 (3.5%)
2009	76	3 (3.9%)	103	2 (1.9%)	79	0 (0%)	-	-	-

Pandemic H1N1 2009 virus

- Although the number of cases are relatively few, there is now a global distribution with eleven countries confirming pandemic H1N1 2009 virus infection in pigs.
- The first European cases of pandemic H1N1 were reported in pigs in Northern Ireland (three cases) and this included a range of clinical presentation from generally mild to subclinical infection.
- Contact with infected humans has been proved in a small number of cases and hypothesised for several further cases. However, pig-to-pig transmission must be considered extremely likely between herds when there is movement of pigs.
- All of the pandemic H1N1 viruses analysed to date show characteristics very closely related to contemporary viruses from human and there is therefore no evidence of further re-assortment events following infection of pigs.
- Whilst vigilance for the potentially developing situation in pigs is important, there is no evidence to date inferring any increased risk through re-assortment or mutation in the pandemic virus for humans following spread to pig populations.
- Endemicity with pandemic H1N1 2009 virus in pigs must be considered highly likely in a relatively short time frame.
- To date, there is only one reported case of human infection acquired from exposure to infected pigs (Ireland).

3.7.4.1 Current situation in Europe

- VLA together with AFBI – N. Ireland have now confirmed infection (Sept to Oct) with pandemic (H1N1) 2009 virus in three independent herds in Northern Ireland. The first unit was a weaner to bacon unit and the infection appeared some three weeks prior to the initial collection of samples whereby there was moderate respiratory disease noted, especially in the weaners. For further information, view the UK report to the OIE (http://www.oie.int/wahis/public.php?page=single_report&pop=1&reportid=8451). The second herd is approximately 10 km from case one. It is understood that possibly both of these herds sourced gilts from the Republic, but they were essentially described as units of high health with good biosecurity. The third herd was detected through routine export screening of pigs prior to shipment to Ukraine. These were predominantly five-month-old gilts with no obvious clinical presentation on the farm.

- It will be important to keep abreast of these developments, since there may be significant implications for use of clinical algorithms for potential detection of infection. At the present time there is no information on the immune status of these herds in Northern Ireland, but from other work, the presence of antibody to unrelated influenza strains may ameliorate infection. See item 3.7.4.4 below.
- All of the viruses analysed to date show characteristics very closely related to contemporary viruses from humans and there is therefore no evidence of further re-assortment events following infection of pigs.
- It should be stressed that humans as the potential source of infection in these cases has not been demonstrated and amongst the staff working on the units, no influenza-like illness was initially reported. Given the further developments, it must be considered a strong possibility that there is already widespread infection in pigs in Northern Ireland. There is no evidence for increased risk from movement of pigs to Great Britain. There is a need to continue to monitor this situation as it may change. Analysis is still in progress for the virus from case three, but preliminary results indicate similar findings to those of cases one and two.
- Further to cases in Northern Ireland, two unrelated cases of infection have been reported in the Republic of Ireland. In the first case, there was mild respiratory infection and the pigs became infected from a confirmed human case. In addition, subsequent occupational exposure to infected pigs has resulted in influenza like illness in human contact – preliminary diagnosis of pandemic H1N1 with analysis ongoing.
- Norway; at least eight confirmed cases in pigs. Some linkage reported with humans presenting with influenza like illness, however, given the number of cases, pig to pig transmission has almost certainly been occurring.
- Great Britain; no cases have been detected but Defra's surveillance programme continues to operate and a small number of respiratory diseases cases from pigs have been analysed at VLA in recent weeks, all with negative results for the pandemic virus.

3.7.4.2 Global situation

There have been a number of other case reports:

- Canada, one well publicised case in Alberta in April, followed by several 'other reports' which have not been formally reported to the OIE.
- Argentina two cases, both reported to the OIE.
- Australia four cases, one of which has been reported to the OIE. One of these cases did provide a strong epidemiological link through the confirmation of an infected human working on one of the pig premises.
- USA; one confirmed case in a pig that was exhibited at a fair, potential association with human cases.
- VLA has recently confirmed pandemic (H1N1) 2009 virus in pigs in quarantine in Singapore which derived from Indonesia.
- Japan; one case of H1N1 infection, awaiting confirmation of pandemic virus.

In the majority of cases, links to humans are purely circumstantial. It is important to consider that pig to pig transmission will become increasingly a greater likelihood for spread of virus in pigs.

3.7.4.3 Information relating to field presentation of pandemic (H1N1) virus in pigs

Based on the information presented above, the clinical algorithms for influenza in pigs in use for the UK scanning surveillance programme should continue to be followed. However, we need to be mindful that there is a possibility especially in older pigs that presentation may be subclinical. Furthermore, we do not fully understand yet the potential consequences of prior immunity to other H1N1 viruses upon infection with pandemic H1N1 virus in pigs (this will be addressed through item 3.7.4.4 below).

3.7.4.4 Future initiatives

A UK initiative from the research councils (BBSRC, MRC, Wellcome Trust) and Defra is funding two proposals to strengthen the scientific evidence base. The projects are being delivered by a strong UK consortia with the best available expertise and skills. One of them covers a 'field population' study to better understand the dynamics of influenza infection per se in pig herds, but also specifically to gain further insights should pandemic (H1N1) virus be detected in GB pig populations. The second project, entitled the 'model project', is to use in-vivo systems and study the impact of prior immunity on infection with pandemic (H1N1) virus. In this study, pigs will be prior immunised by natural exposure to endemic, contemporary avian-like swine H1N1 virus. Through the use of virological, pathological, immunological, host response and modelling data we will be able to provide a model of comprehensive data on the dynamics of infection in pigs.

EU FP7 call:

i) a coordinated action designed to establish and maintain the previous swine influenza surveillance network and increase its remit, providing more detailed analysis in a timely manner of viruses detected through these programmes. VLA are leading a proposal for submission under this call and have recruited 25 partners to the project; these mainly include EU member states, key institutes involved in swine influenza surveillance but also some global membership including USA and China.

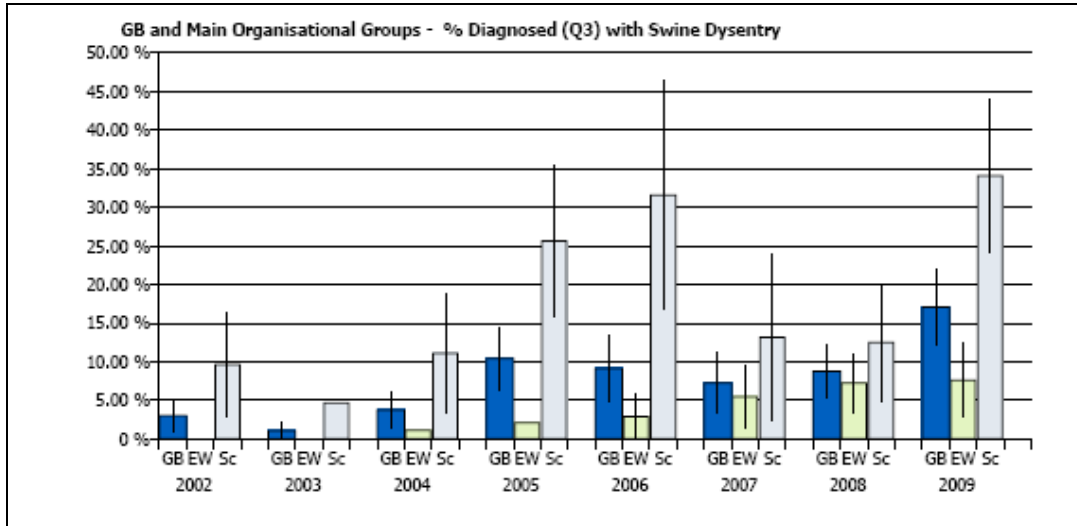
ii) The second theme is to address research questions in relation to pathogenesis, host range and interspecies transmission of influenza with respect to pigs and other animals. [VLA is participating in a proposal being submitted under the coordination of the University of Ghent]. There is substantial resource for these projects available with one million Euros for the former and five million Euros for the latter.

3.8) Alimentary Disease

3.8.1) Swine Dysentery (*B. hyodysenteriae*)

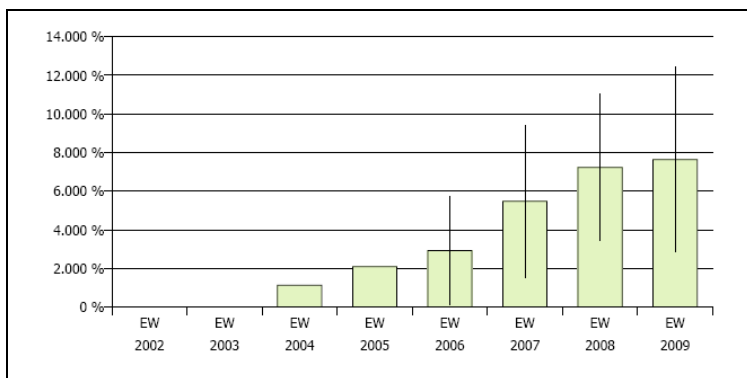
Nine cases of swine dysentery (SD) were diagnosed by the VLA in England and Wales in Q3 of 2009, while 30 diagnoses were made in Scotland. Recent trends in the percentage of diagnosable submissions which are diagnosed with SD in the two regions, are shown in figure 13 below.

Figure 13: Percentage of diagnosable submissions diagnosed with swine dysentery in Scotland, England and Wales 2002-2009.



Evidence that this disease has assumed greater prominence in recent years is provided by figure 14 below, which shows a year-on-year increase in the percentage of diagnosable submissions diagnosed with SD in England and Wales since 2002.

Figure 14: Percentage of diagnosable submissions diagnosed with swine dysentery in England and Wales 2002-2009.



Of the diagnoses made in England and Wales, four (44%) were made by Thirsk. On the basis of this and other information, it is considered that this disease is particularly prevalent in Yorkshire at present. This would appear to be in contrast to the situation in East Anglia, as no diagnoses have been recorded by VLA Bury St. Edmunds in the last two quarters. Three of the four units from which the diagnosis was made this quarter are specialist finisher units, where there is always the opportunity to ensure that cleaning and disinfection is assiduously attended to between batches, if an all-in all-out policy is adhered to. This is an advantage often not shared with farrow-to-finish units.

Unfortunately, a strain of *B. hyodysenteriae* showing *in vitro* Minimum Inhibitory Concentrations (MICs) well in excess of 'clinical break points' for four commonly used antimicrobial agents (tiamulin, valnemulin, tylosin and lincomycin), was isolated by Thirsk this quarter, from one of these specialist finisher units. Clinical response to these antimicrobials on-farm was, as one would expect, moderate. The unit has since been depopulated and close monitoring of the incoming pigs for any evidence that the organism has carried over, is planned. The emergence of strains of *B. hyodysenteriae* with resistance characteristics to commonly used therapeutic drugs is reported worldwide; most recently by a study on Spanish isolates, which documented an increasing trend in the MIC values for almost all the antimicrobials used in the treatment of swine dysentery, when comparing recent isolates (2006-7) to those recovered in earlier years (2003-4) (Hidalgo *et al.* 2009).

In all cases this quarter, diagnoses of SD were made from faeces samples alone, and in all cases, no other diagnosis was made.

Relevant publications

Multilocus sequence typing (MLST) of *B. hyodysenteriae* strains could be a tool with much potential when mapping outbreaks and during epidemiological studies (perhaps of resistant strains) and it is the subject of a recent paper by La *et al.* (La, Nyree *et al.* (2009)). It is suggested that MLST data can provide evidence for likely transmission of strains between farms, which could be an interesting angle in the light of recent industry-led moves to improve pig health by tackling significant endemic pig diseases in a concerted manner.

Another potential vector of swine dysentery and related organisms, the mallard duck, was the subject of a recent paper (Jansson *et al.* (2009)). Although the reference strain of *B. hyodysenteriae* (of porcine origin) was not able to colonise the intestinal tract of ducklings, other strongly haemolytic *Brachyspira* species ("*B. suanatina*" and *B. hyodysenteriae* of mallard origin) were able to do so, and transmission between infected and uninfected ducks was seen. The authors conclude that strongly haemolytic *Brachyspira* species may well cross the species barrier between pigs and birds.

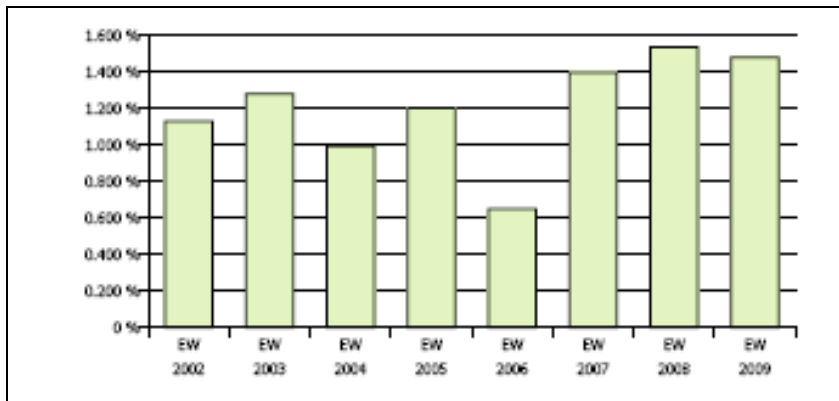
References.

1. Hidalgo, A., Caravajal, A., Garcia-Feliz, C., Osorio, J. & Rubio, P. (2009) Antimicrobial susceptibility testing of Spanish field isolates of *Brachyspira hyodysenteriae*. *Research in Veterinary Science*, 87, 7-12.
2. Jansson, D.S., Rasback, T., Fellstrom, C. & Feinstein, R. (2009) Experimental challenge of mallards (*Anas platyrhynchos*) with *Brachyspira hyodysenteriae* and *Brachyspira suanatina* isolated from pigs and mallards. *J. Comp. Path.* *In press.*
3. La, T., Nyree, D.P. *et al.* (2009) Multilocus sequence typing as a tool for studying the molecular epidemiology and population structure of *Brachyspira hyodysenteriae*. *Veterinary Microbiology*, 138, 330-338.

3.8.2) Porcine Intestinal Spirochaetosis (*Brachyspira pilosicoli*)

Only two diagnoses of colitis due to causes other than salmonellas and swine dysentery were made this quarter. Both cases were associated with *Brachyspira pilosicoli*. No significant trends are seen in this category in the last seven years (figure 15 below).

Figure 15: Trends in the proportion of diagnosable submissions diagnosed with colitis not due to SD or salmonellosis, Q3, 2002-2009.



The presenting clinical sign in one case was wasting, and *B. pilosicoli* was present alongside *Lawsonia intracellularis* and *Salmonella typhimurium*. In the other case from England and Wales, *B. pilosicoli* was the only pathogen identified from faeces samples submitted to investigate a diarrhoea problem.

No trends were seen in Scottish data.

3.8.3) *Lawsonia intracellularis* infections

Both Scotland and England/Wales saw a drop in the percentage of submissions which tested positive for *Lawsonia intracellularis* infection this quarter compared with 2008.

Two cases were recorded in England and Wales, both in post weaned pigs with wasting as the presenting sign. *Brachyspira pilosicoli* and salmonellosis were also identified in one case.

3.8.4) Colibacillosis

Although the percentage of submissions with generalised colibacillosis increased in England, Wales and Scotland, this increase was not statistically significant.

Five cases of enteric colibacillosis were diagnosed in England & Wales this quarter, four presenting with diarrhoea and one with general malaise. Three cases typically involved neonates with colostrum deprivation implicated as a significant predisposing factor. Another scour outbreak involved five-week-old preweaned saddlebacks in a very small herd and the final case was seen in three-month-old pigs with concurrent mycoplasmal pneumonia.

Dual infection with rotavirus was identified in diarrhoeic four-day-old pigs.

3.8.5) Neonatal enteric disease

No statistically significant changes were seen this quarter compared with the same quarter in 2008 for clostridial disease diagnoses in England, Wales or Scotland but there was a drop in the percentage of submissions diagnosed with clostridial disease in England & Wales.

Clostridium perfringens type A disease was diagnosed twice in England & Wales this quarter. A litter of day old pigs presented with malaise, 9/13 dying. The other case involved four-day-old pigs where 40 of 180 were scoured and five deaths occurred.

Rotavirus was diagnosed three times this quarter in England & Wales. One outbreak involved four-week-old suckling animals where six out of 24 were diarrhoeic.

3.8.6) Gastric ulceration

Three diagnoses of gastric ulceration were made this quarter, once in conjunction with *Pasteurella multocida pneumonia* in 16-week-old pigs and another in conjunction with *Salmonella typhimurium* U288 and PRRSv infections in 12-week-old pigs. The third case was baffling as it occurred in a group of 460 16-week-old organically reared pigs showing malaise and diarrhoea. 30 animals died. The batch was reared outside then finished inside in deep straw yards but no obvious stressors could be identified. In contrast, previous batches fed conventional food and managed the same, as this problem batch had experienced no clinical disease.

3.8.7) Parasitological disease

There were no cases of helminthiasis recorded this quarter in England & Wales. Coccidiosis was diagnosed by faecal examination from a batch of five diarrhoeic 2-month-old pet pigs.

3.8.8) Miscellaneous

A fatal case of splenic torsion in a young sow was seen in a herd with four recent sudden in a group of 46 sows. No predisposing factors were identified. One case of small intestinal torsion, unusually in a pre-weaned pig, was diagnosed in England & Wales this quarter.

3.8.9) Rectal Stricture

This condition was not diagnosed in England and Wales during this quarter.

3.9) Mycoplasmas

3.9.1) *Mycoplasma* Surveillance

Sixty seven samples from 36 cases were submitted to the group. All identifications were from lung samples. Pure *M. hyopneumoniae* was identified on five occasions. In addition *M. hyopneumoniae* was also identified mixed with *M. hyorhinis* twice, and mixed with *M. hyorhinis* and *M. arginini* once. *M. hyorhinis* was detected four times and *M. arginini* once.

3.9.2) *Mycoplasma* News from Publications

Li *et al.* (2009) studied the interactions between *M. hyopneumoniae* and porcine tracheal ciliated cells. They showed that the *Mycoplasma* proteins may interact specifically with the aconitase, lamin A/C and peroxiredoxin of the porcine tracheal ciliated cell thus enabling them to penetrate into ciliated cells where they interfere with metabolic pathways and critical cellular processes. Peroxiredoxin was also recognised by Machado *et al.* (2009) as having a possible role in protecting the DNA against reactive oxygen species either generated by *M. hyopneumoniae* or the host as one of the strategies to neutralise the pathogen.

Reference

Li *et al.* (2009). Proteomic analysis of the interactions between *Mycoplasma hyopneumoniae* and porcine tracheal ciliated cells. *Appl. Biochem Biotechnol.* Aug 12 E pub ahead of print.

Machado *et al.* (2009). A peroxiredoxin from *Mycoplasma hyopneumoniae* with a possible role in H₂O₂ detoxification. *Microbiology.* 155: 3411-3419.

3.10) Reproductive Diseases

The number of submissions for investigation of reproductive diseases was similar to the previous quarter (see table 8 below), with no seasonal increase to account for “summer infertility”. Disease was associated with metritis twice, porcine parvovirus once and *Streptococcus* sp. once.

Table 8: Number of pig submissions for diagnosis of reproductive diseases - all quarters 2006 to 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	17	17			11*	9*	10		

* data revised on farmfile since previous quarterly report.

3.11) Nervous Diseases

There were no outbreaks of nervous disease of note during this quarter.

4) UNUSUAL AND NEW DISEASES

There were no unusual or new diseases 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. For a full account of the methodology, please consult: <http://vla51/ScanningSurveillance/Home.aspx>

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 in mind. 'Prior years' refers to pooled data for years 2004-2008 for VLA only data, and to data for 2008 for GB VIDA data.

5.1) Overall VIDA DNR rates

The overall percentage of pig diagnostic submissions from VIDA for the first nine months of 2009 (to third quarter, Q3) where a diagnosis was not reached (DNR) was 20.8% (164/787). This was significantly increased from data to Q3 for prior years in which DNR was 15.8% (125/791).

When data for VLA and SAC was separated, there was a significant increase in DNR for overall VLA data (23.3%) but not for overall SAC data (15.4%).

There was no significant increase in overall DNR rate for any individual syndrome to Q3, 2009 compared to 2008 for VIDA (GB), VLA or SAC data.

There was no significant increase in DNR to Q3, 2009 for respiratory syndrome or for submissions with respiratory disease as a presenting sign. DNR for respiratory syndrome remains low at 7.6% (9/118) and for respiratory disease as a presenting sign at 14.3% (10/70). Both these DNR rates are higher than in 2008 but not significantly.

As in first and second quarters of 2009, there was a significant increase in VIDA DNR rate for submissions with a presenting sign of wasting to Q3, 2009 (17.7% (14/79) compared to prior years (5.7%, 4/70). This increase was significant for VLA but not SAC data which had DNR rates for wasting as a presenting sign of 15% (9/60) and 26.3% (5/19) respectively compared to 3.3% (2/60) and 20% (2/10) in 2008.

Tables 12 and 13 give GB, VLA and SAC DNR rates by syndrome and presenting sign to Q3, 2009 compared to 2008.

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

Fourteen of 70 submissions with a presenting sign of wasting were not diagnosed to Q3, 2009. The DNR submissions were reviewed in Q2, 2009 and this exercise was repeated.

Analysed by quarter, the DNR was significantly increased only in January to March when 7 of the 14 DNR were submitted. Finishing pigs were highlighted as the category of pig with a significant increase in DNR. Twelve of the undiagnosed submissions were from housed pigs (although housed pigs are over-represented and constitute 58 of the 79 submissions with wasting as presenting sign).

Several regions were represented (Eastern, Northern and Western England, Wales, Scotland), however only Northern England was highlighted as having a significant increase in DNR from 4.4% (1/23) in Q3, 2008 to 28% (5/18) in Q3, 2009. Nine of the undiagnosed submissions were to VLA, five were to SAC. Submissions were from pre- and post-weaned pigs.

Using Vladimir data on 11/11/09, the details of undiagnosed VLA submissions with wasting as a presenting sign coded as having reasonable testing, were reviewed. At this date, 16 such submissions were found (further submissions having been updated since the DNR analysis on VIDA data was performed on 20/10/09). The details of nine are given below in table 9; seven are not included as the samples comprised faeces, swabs or tissues only and, as such, in fact only limited testing was possible.

Table 9: Undiagnosed VLA submissions with wasting as a presenting sign for the first nine months of 2009

Submission	Age	History	Comment
14-P0143-01-09	6 weeks	Diarrhoea and wasting	Enteritis undiagnosed
17-P0184-03-09	13 days	Prewaning diarrhoea from 8do and wasting. 40 sow unit, up to 20% mortality, 90% morbidity. Poor response to antibiotic. Housed.	Histopath suggestive of past rotaviral enteritis but chronic case, virus not detected. PME of earlier cases advised.
15-P0134-01-09	5 weeks	Wasting	Bacterial enteritis/colitis, earlier insult suspected
15-P107-01-09	7 and 21 days	Low birth weights, splayleg and increased preweaning mortality	Hepatitis dietetica-like lesions, problem on farm resolved
24-P254-02-09	24 weeks	Whole of one litter wasting	Fibrous polyserositis, too chronic for diagnosis
16-P025-06-09	4 weeks	Postweaning wasting and diarrhoea on 2000 head breeder-finisher, PCV2 vaccinated. Housed.	Three bright, alert pigs submitted live in fair body condition, pyrexia in one, minimal gross lesions, Haemophilus parasuis isolated from one lung. Pigs submitted possibly not typical of herd problem.
16-P0152-07-09	4 days	Piglets fading and dying at 4-5 days old over last 5-6 months with some scour. Mortality 15%. Majority recover. Housed.	Histopathology pointed to a bacterial enteritis, possible enterotoxigenic <i>E. coli</i> . Feedback from VIO: case history and pathology not considered typical of description of new enteric syndrome in Europe.
15-P0251-07-09	12 days	150 sow breeder-finisher. 2 pigs dead after wasting from 2 litters. Housed.	Liver rupture and haemorrhage, and enteritis, cause not determined. No intestinal histopathology done due to autolysis.
27-P0078-09-09	11 weeks	Ongoing underperformance of growing pigs. PCV2 vaccinated. Housed.	Minimal gross lesions. Histopath evidence of colitis in one and Brachyspira pilosicoli isolated – considered inconclusive with respect to herd problem.

Review of these provides no evidence of a common presentation, history or pathology to suggest that the increased DNR for pigs presented with wasting is due to the emergence of a new disease or syndrome.

5.3) DNR for neonatal pig enteric submissions from January to September 2009

Although there was no overall significant increase in DNR for either enteric syndrome or diarrhoea as a presenting sign during the first 9 months of 2009, DNR analysis of VIDA data showed a significant increase in undiagnosed enteric syndrome for neonatal submissions with 12 of 27 undiagnosed (44%) compared to 2 of 16 undiagnosed (13%) in 2008. There was also a significant increase in undiagnosed submissions from rearing pigs with diarrhoea as a presenting sign (36.5% compared to 14.9% in 2008) and in neonatal pigs with diarrhoea as a presenting sign, DNR increased from 13% in Q3, 2008 to 42% in Q3, 2009.

Using VLA data which compares the first 9 months of 2009 to the same period in the previous 5 years, there was also an increase in undiagnosed enteric syndrome for neonatal submissions (42% compared to 29% in prior years) but this increase was not statistically significant.

In view of the reports from some northern European countries (France and Denmark) of an increase in unexplained neonatal enteric disease which is proving difficult to control, the details of the undiagnosed neonatal and preweaned submissions for enteric syndrome and with diarrhoea as a presenting sign were examined.

At 21/10/09, 10/25 (40%) VLA neonatal enteric submissions were DNR from Jan-Sept 2009, a total of 35 neonatal enteric submissions were received for testing in this period, 10 received limited testing. This compares with 2/15 (13%) neonatal enteric submissions being DNR for the same period in 2008 during which a total of 24 neonatal enteric submissions were received for testing.

At 21/10/09, 8/21 (38%) VLA neonatal submissions with diarrhoea as a presenting sign were DNR from Jan-Sept 2009, a total of 32 neonatal submissions with diarrhoea as presenting sign were received for testing in this period, 11 received limited testing. This compares with 3/16 (19%) DNR neonatal submissions for the same period in 2008 during which a total of 24 neonatal submission with diarrhoea as presenting sign were received for testing.

When combined, these DNR represent a total of 11 undiagnosed VLA submissions. The details of these were reviewed and are given in table 10. All these DNR submissions were from housed neonatal pigs. Undiagnosed preweaned enteric and diarrhoea (as a presenting sign) submissions were also reviewed as in table 11.

There is no evidence from these of a new or emerging syndrome. However, there is a significant increase in the proportion of undiagnosed neonatal enteric submissions and, as the European neonatal enteric disease syndrome described appears difficult to characterise with no clear case definition, this will be kept under review and further investigation of future undiagnosed neonatal enteric cases will be undertaken.

Table 10: Undiagnosed VLA neonatal pig enteric submissions to Q3, 2009

Submission number	Age of pig	Sample type	History	Comments
17-P0235-02-09	0 days	Faeces x 1	Diarrhoea. Housing not known.	Limited testing
27-P0091-02-09	3 days	Live pigs x 2	25% pigs affected with diarrhoea in 4000 pig herd. Mortality very low but growth retarded. Housed.	Same farm as 27- P0273-03-09 Histopath pointed to bacterial enteritis, possibly E coli. Feedback from PVS: see below
27-P0273-03-09	3 days	Live pigs x 3	Same farm as 27-P0091-02-09	Same farm as 27-P0091-02-09 Histopath again suggestive of bacterial enteritis. Feedback from PVS: ongoing fluctuating problem over last 12 years. Responds well to antibiotic treatment. Has resolved at present. Farm visit and further PME planned with local RL for future when problem recurs.
15-P0218-03-09	7 days	Bacterial cultures x 2	Two to 7 day old pigs scouring with 5% morbidity, 3% mortality. Housing unknown.	Limited testing, cultures from private lab
14-P0403-03-09	5 days	Dead pigs x 2	Five of 8 pigs died from a pharmaceutical company challenge trial. Housed.	Necrotic enteritis, suggestive of clostridial disease, not confirmed by toxin testing.
15-P248-05-09	7 days	Live pig x 1	18 month history of sporadic sudden deaths in one week old pigs on 120 sow indoor unit. Housed.	Unusual severe mucosal necrosis involving whole intestine, ? Fusobacter. VIO not suspicious of new syndrome in Europe. Feedback from PVS: problem self limiting and has resolved completely after cleaning and disinfection of building.
27-P0033-06-09	4 days	Live pig x 1 Dead pigs x 2	Scour in a group of 80 piglets. Housed.	Histopath pointed to a likely viral cause with villus stunting

Submission number	Age of pig	Sample type	History	Comments
23-P0192-06-09	0 days	Live pigs x 3	Scour up to 1 week old on 800 sow unit. Housed.	Alpha clostridial toxin id in 1 pig - possible clostridial disease in this pig, not detected in other two.
14-P453-06-09	10 days	Dead pigs x 3	Scour and lethargy in 7-10 day old pigs – Berkshire breed. Housed.	Preweaned pigs coded as neonatal. Possible coccidiosis, autolysis prevented useful histopath
16-P0152-07-09	4 days	Dead pigs x 3	Piglets fading and dying at 4-5 days old over last 5-6 months with some scour. Mortality 15%. Majority recover. Housed.	Histopathology pointed to a bacterial enteritis, possible enterotoxigenic <i>E. coli</i> Feedback from VIO: case history and pathology not considered typical of description of new syndrome in Europe.
14-P0047-08-09	1 day	Live pigs x 2	Scour affecting whole litter, sometimes all litters in a batch affected, sometimes just a few litters. Housed.	Clostridial enteritis suspected from gross lesions, no toxins detected, colostral intake satisfactory. Histopath: acute multifocal neutrophilic enteritis. PVS feedback: problem still ongoing though not apparent at last vet visit. Agreed further PME free of charge, awaiting submission.

Table 11: Undiagnosed VLA preweaned pig enteric submissions to Q3, 2009

Submission number	Age of pig	Sample type	History	Comments
24-P0136-02-09	2 weeks	Faeces x 1	Diarrhoea. Mixed housing	Limited testing
17-P0176-03-09	2 weeks	Faeces x 2	Diarrhoea preweaning on small housed breeding unit.	Limited testing.
17-P0184-03-09	13 days	Live pig x 1	Scour and wasting from 8 days old on 40 sow herd, 20% mortality, 90% morbidity	Histopath showed atrophic enteritis suggestive of viral, possible rotavirus or coccidiosis, history suggestive of coccidiosis. Submission of cases earlier in the course of disease recommended.
15-P0456-03-09	3 weeks	Faeces x 1, Swab x 1	Diarrhoea. Housed.	Limited testing
23-P0521-04-09	3 weeks	Swab x 1	Diarrhoea and wasting	Limited testing
15-P0048-09-09	17 days	Bacterial culture x 1	Preweaning diarrhoea on 600 sow unit.	Limited testing. Untypeable <i>E.coli</i> submitted.

Table 12: VIDA Overall Changes in DNR rates for Pigs by Presenting Sign to Q3 for 2009 and prior years (2008)

Presenting Sign	Overall			Prior years (from 2008)			2009			diff	SE Yr-Yr	z
	DNR	Subc	% DNR	DNR	Subc	% DNR	DNR	Subc	% DNR			
ABORTION	57	75	76.00 %	27	38	71.05 %	30	37	81.08 %	10.03 %	9.86 %	1.02
DIARRHOEA	79	328	24.09 %	32	157	20.38 %	47	171	27.49 %	7.10 %	4.73 %	1.50
EYE	0	1	0.00 %	0	1	0.00 %	0	0		0.00 %		
FNDDEAD	29	282	10.28 %	14	150	9.33 %	15	132	11.36 %	2.03 %	3.62 %	0.56
GIT_XDIARR	2	9	22.22 %	2	8	25.00 %	0	1	0.00 %	-25.00 %		
HEALTHY	0	3	0.00 %	0	1	0.00 %	0	2	0.00 %	0.00 %		
ILL_THRIFT	0	1	0.00 %	0	1	0.00 %	0	0		0.00 %		
LAME	4	57	7.02 %	2	29	6.90 %	2	28	7.14 %	0.25 %	6.77 %	0.04
MALAISE	12	71	16.90 %	3	31	9.68 %	9	40	22.50 %	12.82 %	8.97 %	1.43
MASTCLIN	0	4	0.00 %	0	4	0.00 %	0	0		0.00 %		
MUSC_SKEL	1	6	16.67 %	0	3	0.00 %	1	3	33.33 %	33.33 %		
NERVOUS	7	49	14.29 %	3	22	13.64 %	4	27	14.81 %	1.18 %	10.05 %	0.12
OTHER	20	181	11.05 %	13	83	15.66 %	7	98	7.14 %	-8.52 %	4.68 %	-1.82
RECUMBT	3	18	16.67 %	2	11	18.18 %	1	7	14.29 %	-3.90 %		
REPRO	20	36	55.56 %	8	17	47.06 %	12	19	63.16 %	16.10 %		
RESPIR	16	154	10.39 %	6	84	7.14 %	10	70	14.29 %	7.14 %	4.94 %	1.45
SKIN	2	30	6.67 %	2	20	10.00 %	0	10	0.00 %	-10.00 %		
UNKNOWN	19	123	15.45 %	7	61	11.48 %	12	62	19.35 %	7.88 %	6.52 %	1.21
URINARY	0	1	0.00 %	0	0		0	1	0.00 %	0.00 %		
WASTING	18	149	12.08 %	4	70	5.71 %	14	79	17.72 %	12.01 %	5.35 %	2.24
	288	1,578	18.31 %	125	781	16.80 %	184	787	20.8 %	5.04 %	1.95 %	2.59

VLA Prec	Overall			Prior years			2009			diff	SE Yr-Yr	z
	DNR	Subc	% DNR	DNR	Subc	% DNR	DNR	Subc	% DNR			
ABORTION	52	68	76.5 %	24	35	68.57 %	28	33	84.8 %	16.3 %	10.3 %	1.58
DIARRHOEA	64	255	25.1 %	29	133	21.80 %	35	122	28.7 %	6.9 %	5.4 %	1.27
EYE	0	1	0.0 %	0	1	0.00 %	0	0		0.0 %		
FNDDEAD	17	191	8.9 %	8	105	7.62 %	9	86	10.5 %	2.8 %	4.1 %	0.69
GIT_XDIARR	2	8	25.0 %	2	7	28.57 %	0	1	0.0 %	-28.6 %		
HEALTHY	0	3	0.0 %	0	1	0.00 %	0	2	0.0 %	0.0 %		
LAME	3	51	5.9 %	2	26	7.69 %	1	25	4.0 %	-3.7 %	6.6 %	-0.56
MALAISE	9	66	13.6 %	2	29	6.90 %	7	37	18.9 %	12.0 %	8.5 %	1.41
MASTCLIN	0	4	0.0 %	0	4	0.00 %	0	0		0.0 %		
MUSC_SKEL	1	6	16.7 %	0	3	0.00 %	1	3	33.3 %	33.3 %		
NERVOUS	7	39	17.9 %	3	19	15.79 %	4	20	20.0 %	4.2 %		
OTHER	9	28	32.1 %	4	11	36.36 %	5	17	29.4 %	-7.0 %		
RECUMBT	3	18	16.7 %	2	11	18.18 %	1	7	14.3 %	-3.9 %		
REPRO	15	27	55.6 %	6	14	42.86 %	9	13	69.2 %	26.4 %		
RESPIR	12	130	9.2 %	4	67	5.97 %	8	63	12.7 %	6.7 %	5.1 %	1.32
SKIN	2	22	9.1 %	2	14	14.29 %	0	8	0.0 %	-14.3 %		
UNKNOWN	17	102	16.7 %	7	54	12.96 %	10	48	20.8 %	7.9 %	7.4 %	1.06
URINARY	0	1	0.0 %	0	0		0	1	0.0 %	0.0 %		
WASTING	11	120	9.2 %	2	60	3.33 %	9	60	15.0 %	11.7 %	5.3 %	2.21
	224	1,140	19.65 %	87	584	18.33 %	127	648	28.26 %	6.93 %	2.35 %	2.94

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

SAC	Overall			Prior years			2009			diff	SE Yr-Yr	z
	DNR	Subs	% DNR	DNR	Subs	% DNR	DNR	Subs	% DNR			
ABORTION	5	7	71.4 %	3	3	100.00 %	2	4	50.0 %	-50.0 %		
DIARRHOEA	15	73	20.5 %	3	24	12.50 %	12	49	24.5 %	12.0 %	10.1 %	1.19
FNODEAD	12	91	13.2 %	6	45	13.33 %	6	46	13.0 %	-0.3 %	7.1 %	-0.04
GIT_XDIARR	0	1	0.0 %	0	1	0.00 %	0	0		0.0 %		
ILL_THRIFT	0	1	0.0 %	0	1	0.00 %	0	0		0.0 %		
LAME	1	6	16.7 %	0	3	0.00 %	1	3	33.3 %	33.3 %		
MALAIQE	3	5	60.0 %	1	2	50.00 %	2	3	66.7 %	16.7 %		
NERVOUS	0	10	0.0 %	0	3	0.00 %	0	7	0.0 %	0.0 %		
OTHER	11	153	7.2 %	9	72	12.50 %	2	81	2.5 %	-10.0 %	4.2 %	-2.40
REPRO	5	9	55.6 %	2	3	66.67 %	3	6	50.0 %	-15.7 %		
RESPIR	4	24	16.7 %	2	17	11.76 %	2	7	28.6 %	16.8 %		
SKIN	0	8	0.0 %	0	6	0.00 %	0	2	0.0 %	0.0 %		
UNKNOWN	2	21	9.5 %	0	7	0.00 %	2	14	14.3 %	14.3 %		
WASTING	7	29	24.1 %	2	10	20.00 %	5	19	26.3 %	6.3 %		
	86	438	14.84 %	28	187	14.21 %	37	241	15.35 %	1.14 %	3.41 %	0.33

Table 13: VIDA Overall Changes in DNR rates for Pigs by Syndrome to Q3 for 2009 and prior years

GB	Overall			Prior years (2008 onwards)			2009			diff	SE Yr - Yr	z
	DNR	Subs	% DNR	DNR	Subs	% DNR	DNR	Subs	% DNR			
Circulatory	1	32	3.13 %	0	15	0.00 %	1	17	5.88 %	5.88 %		
Enteric	111	532	20.86 %	49	257	19.07 %	62	275	22.55 %	3.48 %	3.53 %	0.99
Mastitis	0	4	0.00 %	0	4	0.00 %	0	0		0.00 %		
Musculo-skeletal	6	75	8.00 %	2	36	5.56 %	4	39	10.26 %	4.70 %	6.27 %	0.75
Nervous / Sensory	11	86	12.79 %	7	44	15.91 %	4	42	9.52 %	-6.39 %	7.20 %	-0.89
Reproductive	88	113	77.88 %	38	52	73.08 %	50	61	81.97 %	8.89 %	7.83 %	1.13
Respiratory	14	290	4.83 %	5	172	2.91 %	9	118	7.63 %	4.72 %	2.56 %	1.84
Skin	3	38	7.89 %	1	24	4.17 %	2	14	14.29 %	10.12 %		
Systemic & Misc	30	567	5.29 %	14	285	4.91 %	16	282	5.67 %	0.78 %	1.88 %	0.40
Unknown (999,990,991,980,970)	24	30	80.00 %	9	11	81.82 %	15	19	78.95 %	-2.87 %		
Urinary	2	17	11.76 %	0	9	0.00 %	2	8	25.00 %	25.00 %		

SAC

Syndrome	Overall			Prior years (2008 onwards)			2009			diff	SE Yr - Yr	z
	DNR	Subs	% DNR	DNR	Subs	% DNR	DNR	Subs	% DNR			
Circulatory	0	11	0.00 %	0	2	0.00 %	0	9	0.00 %	0.00 %		
Enteric	30	203	14.78 %	13	87	14.94 %	17	116	14.66 %	-0.29 %	5.03 %	-0.06
Musculo-skeletal	2	13	15.38 %	0	6	0.00 %	2	7	28.57 %	28.57 %		
Nervous / Sensory	0	18	0.00 %	0	7	0.00 %	0	11	0.00 %	0.00 %		
Reproductive	11	16	68.75 %	5	7	71.43 %	6	9	66.67 %	-4.76 %		
Respiratory	3	74	4.05 %	1	47	2.13 %	2	27	7.41 %	5.28 %	4.78 %	1.11
Skin	0	13	0.00 %	0	8	0.00 %	0	5	0.00 %	0.00 %		
Systemic & Misc	4	113	3.54 %	3	51	5.88 %	1	62	1.61 %	-4.27 %	3.49 %	-1.22
Unknown (999,990,991,980,970)	15	19	78.95 %	6	8	75.00 %	9	11	81.82 %	6.82 %		
Urinary	1	3	33.33 %	0	1	0.00 %	1	2	50.00 %	50.00 %		

VLA

Syndrome	Overall			Prior years (2008 onwards)			2009			diff	SE Yr - Yr	z
	DNR	Subs	% DNR	DNR	Subs	% DNR	DNR	Subs	% DNR			
Circulatory	1	21	4.76 %	0	13	0.00 %	1	8	12.50 %	12.50 %		
Enteric	81	329	24.62 %	36	170	21.18 %	45	159	28.30 %	7.13 %	4.75 %	1.50
Mastitis	0	4	0.00 %	0	4	0.00 %	0	0		0.00 %		
Musculo-skeletal	4	62	6.45 %	2	30	6.67 %	2	32	6.25 %	-0.42 %	6.24 %	-0.07
Nervous / Sensory	11	68	16.18 %	7	37	18.92 %	4	31	12.90 %	-6.02 %	8.97 %	-0.67
Reproductive	77	97	79.38 %	33	45	73.33 %	44	52	84.62 %	11.28 %	8.24 %	1.37
Respiratory	11	216	5.09 %	4	125	3.20 %	7	91	7.69 %	4.49 %	3.03 %	1.48
Skin	3	25	12.00 %	1	16	6.25 %	2	9	22.22 %	15.97 %		
Systemic & Misc	26	454	5.73 %	11	234	4.70 %	15	220	6.82 %	2.12 %	2.18 %	0.97
Unknown (999,990,991,980,970)	9	11	81.82 %	3	3	100.00 %	6	8	75.00 %	-25.00 %		
Urinary	1	14	7.14 %	0	8	0.00 %	1	6	16.67 %	16.67 %		

APPENDIX 1 SCIENCE REVIEW**Foot and Mouth Disease**

A rapid on-farm test for FMD using a chromatographic strip assay has been developed by T-S Chen et al (2009), J. Vet. Med. Sci, 71, 703-708) and the test time is about 1 hour.

Trichinella

A new commercial ELISA for the detection of porcine antibodies to *Trichinella* spp has been described (C.F. Frey et al, (2009), J. Vet.Diag. Invest., 21, 692-697).The sensitivity and specificity of a test protocol in both the ELISA and Western Blot were 95.9% and 99.9% respectively. There was also a lower limit of detection than used with the routine artificial digestion test.

PMWS

A major review of the latest on porcine circoviruses is provided by S.Ramamoorthy & Xiang-Jin Meng in the Animal Health Research Reviews, (2009), 10(1) 1-20. It highlights the fact that although vaccination works not much is known about the virus and its methods of immunosuppression.

A recent paper on ultrastructural findings in PMWS affected pigs in their lymph nodes (C.Rodriguez-Carino & J.Segales, (2009), Vet. Pathol., 46, 729-735.) suggests that lymphocyte depletion is the striking feature and that the inclusion bodies seen in the macrophages should be classified as virus factories.

Individual risk factors for PMWS using a hierarchical Bayesian survival analysis (N. Rose et al (2009) Prev. Vet. Med., 90, 168-179) showed that piglets were more likely to show PMWS if infected early with PCV2 (before seven weeks) and if weaned early (before 21 days) Piglets born to seronegative sows or sows where PPV/Erysipelas vaccination may not have occurred were more likely to develop PMWS. PCV2 immunity from the sow tended to delay the onset of PMWS.

A retrospective study of PCV2 in Germany has shown that the PCV2 virus was present from 1962 and was low until 1984. It increased between 1985 and 1998 and the first PMWS and PDNS cases were observed in 1985 (B. Jacobsen et al (2009), *Vet. Micro.*, 138, 27-33). Sequence analysis has shown no changes in the virus over this period so that the altered pathogenicity of the virus is associated with environmental changes or co-infections during this time.

A study of PMWS in a Hungarian herd (I. Szabo et al, 2009, *Vet. Rec.*, 165, 143-146.) with several thousand sows showed 2034 sows inseminated with semen from 13 Landrace boars produced 16,013 piglets. Of these 4.97% were stillborn and 0.97% were mummified. PMWS developed in 7.87% of the piglets. The different boars produced different proportions of the pigs with PMWS (varied from 3.06-15.6%), stillborn from 1.76 to 8.52% and mummified from 0 to 3.22%. Previous authors have always said that pigs of Anglo-Saxon origin were always more susceptible. This report shows that the male lines also have an important influence on the development of PMWS.

Induction of PMWS in pigs from PMWS unaffected herds was shown following mingling with pigs from PMWS affected herds (C.S. Kristensen et al (2009) *Vet. Micro.* 138, 244-250). The pigs had high titres to PRRS as well as PMWS. In many cases the PCV2 could not be confirmed in the affected pigs (40%) probably because the virus titres were by then very low due to destruction of infected cells. It is possible that the strain of PCV2, rate of excretion of PCV2 by "donor" animals and the presence of other infectious agents may have influenced the outcome of the experiment.

Four genetic types of PCV2 virus have been described in China (PCV-2a, PCV-2b, PCV-2d, and PCV-2e (F.Wang et al, (2009) *Virus Res.*, 145, 151-156.)

PCV2 positive cells were detected by ISH in formalin-fixed, paraffin-embedded tissue when the optimal time for fixation was 1-3 days. After this the number of cells declined but even after 730 days a few cells remained positive in the lymph nodes (Y.Ha & C.Chae (2009), *J.Vet. Diag. Invest.*, 21, 649-654.) This was more sensitive than IHC ($p < 0.05$) (D.Kim et al(2009), *J.Vet.Med.Sci.*, 71, 1001-1004).

Reproductive failure was experimentally induced in sows via artificial insemination with semen spiked with PCV2 (D. Madson et al, (2009) *Vet. Pathol.*, 46, 707-716.). All the sows showed viraemia 7-14 days after insemination. None of the sows inseminated with PCV2a became pregnant (did not return to oestrus so may have resorbed the products of conception later) but the sows inseminated with PCV2b farrowed normally but the piglets were viraemic at birth. Stillborn foetuses had lesions of congestive heart failure, Mummified foetuses had a crown – rump length of 7-27cm indicating death at 42-105 days and PCV2 antigen was detected by IHC in all stillborn, mummified and live piglets except 1 live piglet. In addition some of the stillborn also had PCV2 antigen in the fibroblasts and smooth muscle cells.

Acute phase proteins and PMWS have been investigated by Grau-Roma et al, (2009) *Vet. Micro.*, 138, 53-61. They have shown that pig-major acute phase protein may be a better indicator of PMWS status than haptoglobin. Since the acute phase protein response occurred some weeks before the start of clinical signs it suggests that it could be used to assess the development of PMWS.

PRRS

P. Xia et al (2009) have elucidated further the role of the GP5 protein in the interaction of PRRSV with target cells. This protein acts with the M proteins to form infectious PRRSV. It is crucial for viral particle assembly. It also appears to interact with the host cell receptor sialoadhesin for entry into PAM cells, the in vivo target for PRRSV. Heparin sulphate is also a PRRSV receptor that mediates virus attachment. The M protein is also heparin-binding. It is therefore likely that the initial attachment is through heparin binding followed by a gradual increase in interactions with sialoadhesin. The GP5 is also the major target for neutralising antibodies. The pathogenicity of different virulent PRRSV isolates may be related to the character of the GP5 protein.

Zhou and co-workers (L.Zhou et al 2009, Virus Research, 145, 97-105) have shown that 3 strains of the highly pathogenic PRRSV isolated from pigs in China in 2006 were shown to have a unique 30 amino acid discontinuous deletion in the Nsp2 gene. They suggested that this development was a gradual evolution accumulation from the Chinese domestic viruses.

In a second paper (Y-J Zhou et al, 2009, Virus Research, 144, 136-141) they describe the existence of 159 different genotypes of the North American type and that these existed in 6 sub-genotypic isolates.

N-H. Chen et al (2009, Journal of Virol. Meth. 161:192-198) have shown that a duplex real-time RT-PCR assay is a promising tool for identifying either the normal US strains of PRRSV from the high pathogenicity strains and can be completed in just 2 hours.

Swine Influenza

Procedures to eliminate H3N2 infection from a herd in NW Mexico were described recently (M. Torremorell et al, (2009) Vet. Rec. 165, 74-77). Replacement animals were stopped temporarily, and changed to quarterly deliveries with animals from negative resources. The nursery was totally depopulated and the herd tested by HI has remained negative for 20 months. There has been an improvement in mortality, growth rate and feed efficiency.

Bacterial Flora

The use of chlortetracycline as a growth promoter caused a change in the ileal flora (E.Rettedal et al , 2009, Appl.Env. Micro., 75, 5489-5495.) of pigs with a decrease in the abundance of *Lactobacillus johnsonii*, *Clostridiales*, and *Turicibacter* and increases in *Lactobacillus amylovorus*.

J.M.Heo et al (2009, J.Anim. Sci., 87,2833-2843) showed that feeding a diet with a reduced protein content reduced the incidence of post-weaning diarrhoea when given an enterotoxigenic strain of *E.coli* (O149:K91:K88) after weaning. Infection was associated with decreased indices of protein fermentation in the distal gastro-intestinal tract but did not compromise the growth of weaner pigs in the 4-week period after weaning.

Campylobacter jejuni

Previous studies have shown infection with trichuris which produces a robust T-helper 2 immune responses has been associated with an exacerbation of campylobacteriosis. The swine model produces bloody diarrhoea and inflammation in the lamina propria facilitating invasion of

Campylobacter organism into undifferentiated crypt and villus epithelial cells next to the trichuris worms in the epithelium (I.S.Mansfield et al (2003), Am.J.Trop. Med. Hyg., 68, 70-80. In this new study, (G.Parthasarathy and L.S.Mansfield, 2009, Microbial Pathog., 47, 38-46) it was shown that IL-4 (which together with IL-10) is commonly produced in parasitic infections was shown to enhance the invasion of campylobacters into pig intestinal cells. This experiment used recombinant IL-4. (IL-4 has been shown to specifically down regulate IL-1alpha, IL-1beta, TNF-alpha and nitric oxide *in vitro*).

MRSA

It has been found that although 89% of pigs were found to harbour *Staphylococcus aureus* in Switzerland none were found to have MRSA which is in contrast to Canada and the Netherlands (A.Riesen & V.Perreton, 2009, Schweiz. Arch. Tierheilk., 151, 425-431.). A few strains did show a multi-resistance pattern belonging to the genetic linkage *spa* type *t034* which is the dominant clone in Switzerland. This type is predominant in Denmark whereas the *t011* and *t108* are pre-dominant in the Netherlands. These types already circulate in pigs and humans in these two countries.

Hepatitis E

An immunohistochemical technique has been developed by Y-H. Lee et al (2009, Vet. Journal, 182, 131-138) which consistently detects HEV antigen in liver. Antigen is detected much less frequently in other tissues such as lymph node, spleen and intestine.

Transport

A huge study in Texas looked at the transport of 16,323 trailer loads of pigs (2,730,754 pigs) (M.A.Sutherland et al Vet. Rec., 165, 13-18). The effects of month of transport are probably related to cold. The number of dead on arrivals at the abattoir were related to temperature increasing as it rose above 20 C. The % of pigs unable to stand increased below 5 C. Humidity had no effect. The percentage of dead on arrival increased from 30 minutes to 4 hrs. Long waits at the abattoir and transporting pigs of both sexes were also found to be deleterious.