Department
for Environment
Food & Rural Affairs

Porcine Epidemic Diarrhoea

UK Perspective

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25th September 2014

UK Perspective

- Why UK is concerned
- UK history of PEDv
- Our scanning surveillance in GB
- Current situation
- What we are doing to manage our risks
  - prevent disease from entering
  - prevent onward spread => endemic
- What we would like to learn here.

Last major notifiable disease outbreaks (2000 CSF, 2001 FMD) had immediate effect on UK pork exports

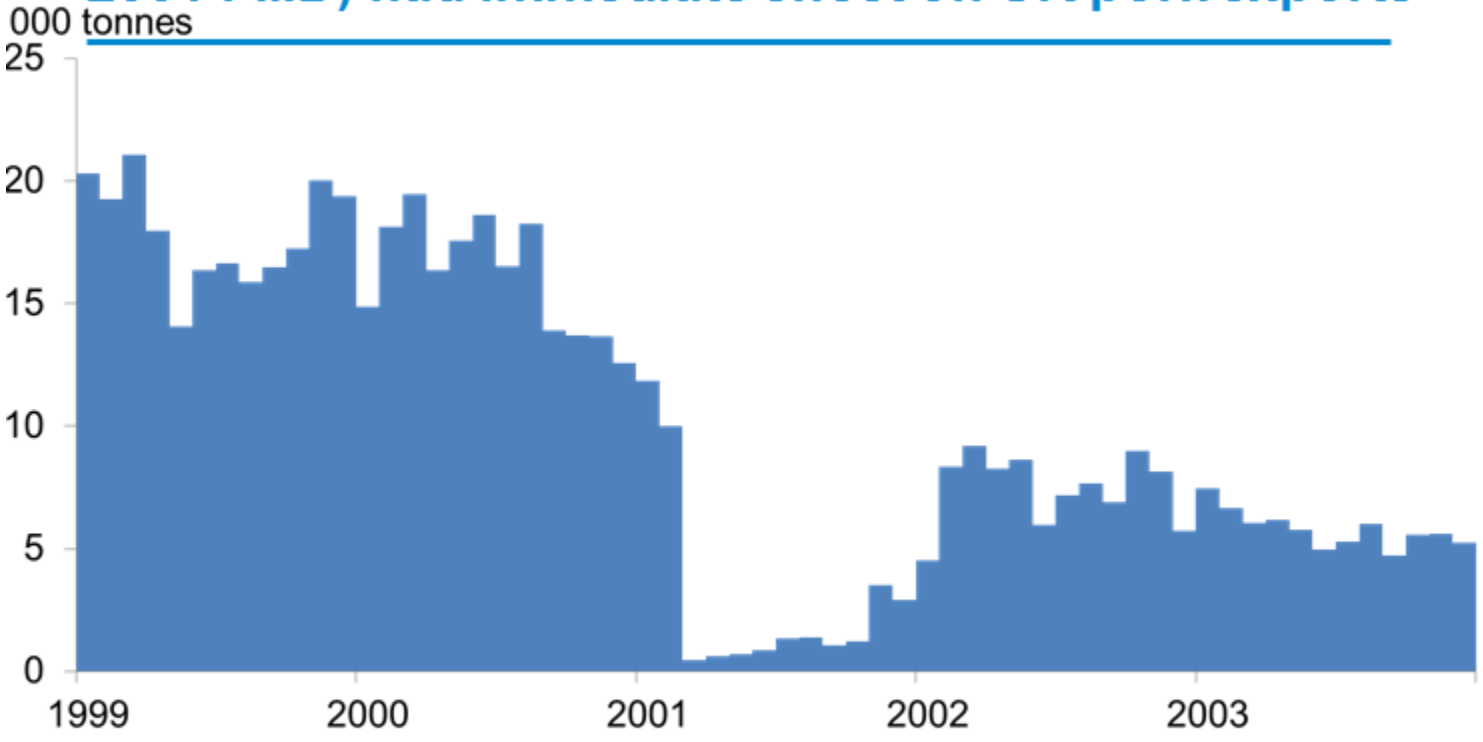

Chart: UK monthly exports of fresh & frozen pork (volumes) *Source: HMRC*

2013 value of exports the highest since 1997, with a total of almost £330 million

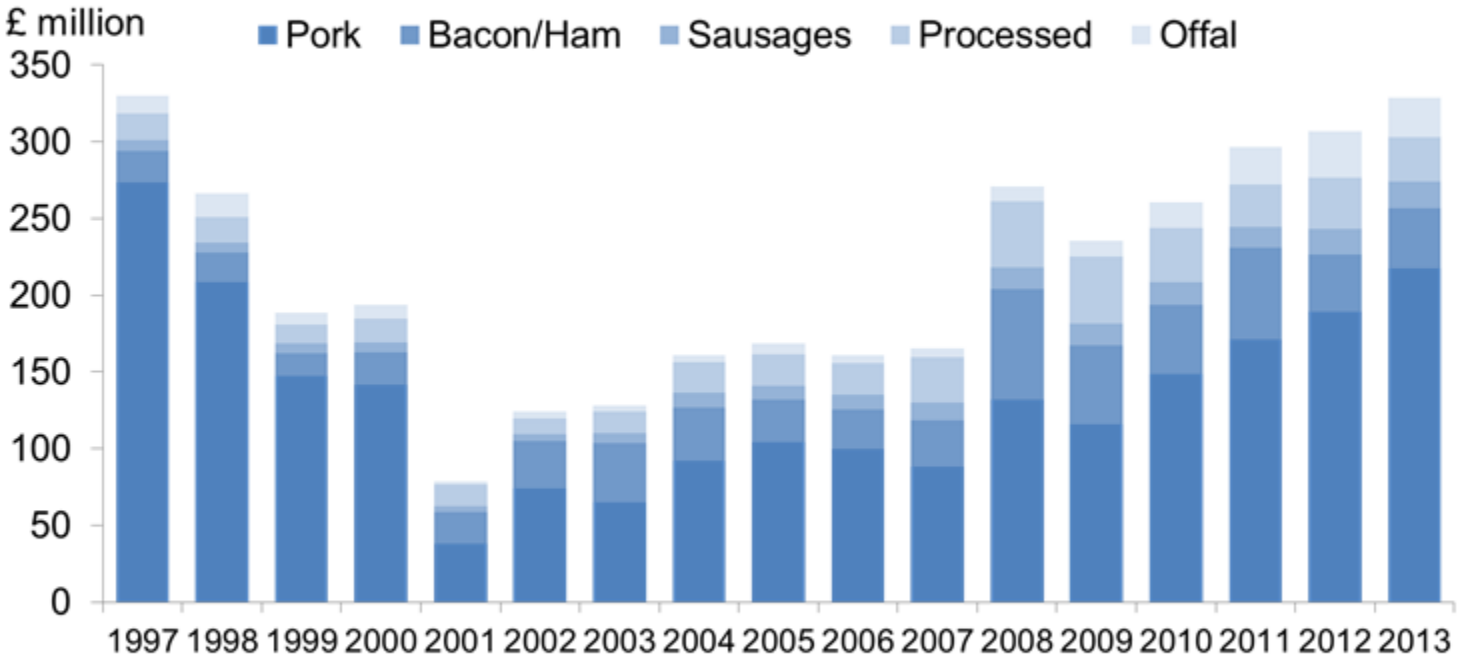

Chart: UK exports of pig meat products (value) *Source: HMRC*

Porcine Epidemic Diarrhoea - Emerging or re-emerging

- **First reports associated with PEDV infection from UK in 1971**
  - Retrospective - PEDV not isolated until 1977
  - Disease limited to growers and finsihers
  - Referred to as "epidemic viral diarrhoea" as TGEV had been ruled out as a cause
- **Acute non-TGE outbreaks in Europe 1976**
  - Disease apparent in all ages including suckling pigs
  - Referred to as "epidemic viral diarrhea type 2"
  - Coronavirus-like agent associated with outbreaks
  - Koch's postulates fulfilled using isolate CV777–
- **Names porcine epidemic diarrhea and PEDV proposed in 1982**
- **Prior to 2013, PED occurred sporadically in Europe and Asia?**

Risk assessment – PEDv diagnosis in GB

http://www.defra.gov.uk/ahvla-en/category/publications/disease-surv/vida

		2000	2001	2002	2003	2004
787	PDNS - Porcine Dermatitis Nephropathy Syndrome	88	25	49	40	43
	Group 2 Diseases of the digestive system					
109	*Clostridium perfringens* Type A disease (Welchii)	9	9	4	16	10
116	*Clostridium perfringens* Type B disease (Welchii)	3	3	7	8	1
117	*Clostridium perfringens* Type C disease (Welchii)	6	4	6	4	4
121	Enteric colibacillosis	175	100	100	99	99
122	Colibacillosis oedema disease	0	0	0	0	0
186	*Colstridium perfringens* necrotic enteritis	NR	NR	NR	NR	NR
231	Transmissible gastroenteritis	0	0	0	0	0
233	Vomiting and wasting disease	0	0	1	0	0
234	Porcine epidemic diarrhoea	7	0	1	0	0
235	Rotavirus infection	44	31	32	36	24
312	Coccidiosis	20	10	8	13	11
318	Cryptosporidiosis	4	1	2	3	0
320	Helminthiasis	11	6	4	14	6
491	Hepatosis dietetica	4	1	1	4	4
659	Colitis due to *Brachyspira pilosicoli*	33	25	35	26	38
882	Gastric ulceration	12	4	3	15	19

GB National Database

1.1 VIDA (GB) Overall Changes in DNR rates for Pigs by Syndrome to Q2 for 2012 and prior years

GB	Overall			Prior years (2008 onwards)			2012					
Syndrome	DNR	Subs	% DNR	DNR	Subs	% DNR	DNR	Subs	% DNR	diff	SE Yr - Yr	z
Circulatory	5	63	7.94 %	4	51	7.84 %	1	12	8.33 %	0.49 %	8.67 %	0.06
Enteric	156	794	19.65 %	130	652	19.94 %	26	142	18.31 %	-1.63 %	3.68 %	-0.44
Mastitis	0	2	0.00 %	0	1	0.00 %	0	1	0.00 %	0.00 %		
Musculo-skeletal	13	121	10.74 %	10	100	10.00 %	3	21	14.29 %	4.29 %	7.43 %	0.58
Nervous / Sensory	17	147	11.56 %	16	128	12.50 %	1	19	5.26 %	-7.24 %	7.86 %	-0.92
Reproductive	127	172	73.84 %	101	135	74.81 %	26	37	70.27 %	-4.54 %	8.16 %	-0.56
Respiratory	28	528	5.30 %	27	435	6.21 %	1	93	1.08 %	-5.13 %	2.56 %	-2.00
Skin	6	67	8.96 %	6	64	9.38 %	0	3	0.00 %	-9.38 %	16.87 %	-0.56
Systemic & Misc	85	1,020	8.33 %	60	830	7.23 %	25	190	13.16 %	5.93 %	2.22 %	2.67
Unknown (999,990,991,980,970	44	49	89.80 %	39	43	90.70 %	5	6	83.33 %	-7.36 %	13.19 %	-0.56
Urinary	1	23	4.35 %	1	18	5.56 %	0	5	0.00 %	-5.56 %		

- Statistically significant increases in DNR = red
- Statistically significant reductions in DNR = green
- Triggers an investigation to see if a potential threat exists
- A similar analysis is made by presenting clinical sign

Analysis of DNR GB Pig Submissions

2.1a Overall GB Changes in DNR rates for Pigs by Presenting Sign to Q2 for 2013 and prior years

	Overall			Prior years (from 2008)			2013					
Presenting Sign	DNR	Subs	% DNR	DNR	Subs	% DNR	DNR	Subs	% DNR	diff	SE Yr-Yr	z
	0	1	0.00 %	0	0		0	1	0.00 %	0.00 %		
ABORTION	105	141	74.47 %	90	122	73.77 %	15	19	78.95 %	5.18 %	10.75 %	0.48
DIARRHOEA	121	579	20.90 %	115	522	22.03 %	6	57	10.53 %	-11.50 %	5.67 %	-2.03
EYE	1	1	100.00 %	1	1	100.00 %	0	0		-100.00 %		
FNDDEAD	89	595	14.96 %	75	520	14.42 %	14	75	18.67 %	4.24 %	4.41 %	0.96
GIT_XDIARR	5	24	20.83 %	4	23	17.39 %	1	1	100.00 %	82.61 %		

DNR not increased from submissions from cases of diarrhoea.

Historic PEDv Testing

Undertaken by main Government funded laboratory:

- Of samples taken between June 2007 and July 2012, PED antibody ELISA detected 94/206 (46%) as +ve.
- Of serum samples in 2012, PED antibody was detected in 8/55 (15%).

(Samples taken for export/diagnostic purposes so a selected population)

2013 PEDv Seroprevalence Study

- National structured sample at pig level
- Samples taken for another survey and tested for PEDv retrospectively.
- Sampled over 4 month period January to May 2013.
- Abattoirs representing 80% all slaughtered finishing pigs in GB.
- Caecal contents of seropositive pigs tested for PED virus. Viral nucleic acid **NOT** detected.
- **9% samples were seropositive**

GB pig herd is largely naïve to PED.

Early detection of PED virus

Pig Expert Group, Virology, Surveillance & Laboratory Services

- Raise awareness of clinical presentation and refine tests
  - Material kindly provided by University of Minnesota

No PED virus detected in samples from diarrhoeic pigs in 124 diagnostic submissions June 2013 and September 2014

Joint-funded Defra Pig Surveillance & BPEX

development, virus characterisation

- Sequencing of any positives to identify novel PED variant

Strategies to Protect UK Herd

1. Prevent disease introduction:

- Identify and assess risk pathways:

  live pigs; blood containing products; fomites

  http://www.defra.gov.uk/animal-diseases/files/poa-ped-20130724.pdf
- Working with EU & Member States
- Import protocols – quarantine, testing.
- Sourcing of commodities

Industry, Vets & Government internationally working together sharing evidence & understanding

Strategies to Protect UK Herd

2. Prevent onward spread

- Early detection and action
- Where and when 1st cases – data sharing
- Incentives – having confidence people will take action.
- Infected farm – prevent onward spread
- Disease free farm – increased biosecurity

Industry, Vets & Government internationally working together sharing evidence & understanding

Knowledge Gaps

- Cross protection
- Effective disinfectants
- Diagnostics – quicker
- Blood products – effective treatment
- Virus stability
- Disease epidemiology
- Vaccines

We appreciate the work you are doing to address these and the benefit we in the UK have derived from your sharing of information

THANK YOU:

- USDA for initiating and hosting this conference
- Everybody but especially USA & Canada for openly sharing information
- Susanna Williamson, AHVLA for support, slides, & expertise
- Derek Armstrong, BPEX for support, slides & expertise

More than words can say