Herd Health Programmes

Derek Armstrong
BPEX Veterinary Programme Manager
Where are all the pigs?

- 10,000 pig premises
- 1600 assured farms account for 92% production
- 35 companies account for 50% of breeding herd
- 10 companies account for c. 35% of breeding sows
How are our pigs kept?
(Source: Defra)

No Stalls!

41% sows outdoors

59% sows indoors
How are our pigs kept?

(Source: Based on AFS data)

39% of pigs on fully slatted floors

30% of pigs on partly slatted floors

31% on solid floors with bedding (i.e. straw)
Change in number of holdings

Holdings (000)

- Total pigs
- Dairy cows


Legend:
- Total pigs
- Dairy cows
… The disease, welfare, environment and food safety issues are also changing …

- **Structural changes** (herd size...)
- **Environmental pressures** (IPPC, Nitrates ...)
- **Management practices and new technologies** (feeding, housing, vaccines...)
- **Genetics**: lean pigs, hyperprolific sows...
- **Trade** (feed, semen..., over long distances...)

*F. Madec, 2009*
The changing role of animal health care

- **Focus on Single Animals**
- **Focus on Herd or Flock**
- **Treating Diseases**
- **Increasing Herd Health for Productivity**
- **Focus on Food Production Chain**
- **Standardization and Certification of Herd Health for Food Safety & Food Quality**

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**Th. Blaha, 2009**
Animal Health is not a simple "No" or "Yes", but a complex "Low" or "High".
Start of intensification 
(around 1960)

Current situation 
(around 2009)

Endemic multifactorial, 
production diseases 
(syndromes)

Relative impact of the 
diseases

Parasitism

Can evolve as endemic on farms

Emerging diseases

deg: Siv A/H₁N₁ (1979-80) 
A/H₃N₂ (1984) 
A/H₁N₂ (1994) 
PRRS (1990-91) 
PMWS (1996-99)

Notifiable diseases: 
Sporadic outbreaks

based on Madec and Rose, 2003
The world has changed dramatically since 1951, when WHO issued its first set of legally binding regulations aimed at preventing the international spread of disease. At that time, the disease situation was relatively stable. Concern focused on only six “quarantinable” diseases: cholera, plague, relapsing fever, smallpox, typhus and yellow fever. New diseases were rare, and miracle drugs had revolutionized the care of many well-known infections. People travelled internationally by ship, and news travelled by telegram.
Since then, profound changes have occurred in the way humanity inhabits the planet. The disease situation is anything but stable. Population growth, incursion into previously uninhabited areas, rapid urbanization, intensive farming practices, environmental degradation, and the misuse of antimicrobials have disrupted the equilibrium of the microbial world. New diseases are emerging at the historically unprecedented rate of one per year. Airlines now carry more than 2 billion passengers annually, vastly increasing opportunities for the rapid international spread of infectious agents and their vectors.

In a particularly ominous trend, mainstay antimicrobials are failing at a rate that outpaces the development of replacement drugs.
Pig health

Host

Health

Environment

Agent
Animal health

Host

Disease

Environment

Agent
• Science of genetics has replaced art of animal breeding
• Programmes of intensive selection to achieve rapid progress in raising level of performance of farm livestock
  – Dramatic increases in litter sizes, growth rates, leanness
• Annual genetic progress for pig breeding programmes
  – daily gain of +20 g/day,
  – lean meat % of +0.5% and
  – litter size of +0.2 piglet/litter.
Fat depth of pig carcases by weight range, 1972-2008
• Science of genetics has replaced art of animal breeding
• Programmes of intensive selection to achieve rapid progress in raising level of performance of farm livestock
  – Dramatic increases in litter sizes, growth rates, leanness
• Annual genetic progress for pig breeding programmes
  – daily gain of +20 g/day,
  – lean meat % of +0.5% and
  – litter size of +0.2 piglet/litter.
• Future - molecular genetics enable more genetic change for less heritable, expensive or difficult to measure traits,
  – meat quality
  – health
  – longevity
Agents that cause disease

- **Exotic diseases**
  - Classical Swine Fever, Foot and Mouth Disease ...
  - Rinderpest eradicated worldwide 2010
- **Endemic diseases**
  - E.coli, Enzootic Pneumonia, APP, Ileitis, Swine dysentery ...
  - Roundworms, mange, Leptospirosis
- **Emerging diseases**
  - PRRS, PCV2, swine Influenza
  - BSE, Bluetongue
- **Zoonoses** – potential to cause disease in people
  - Salmonella, Campylobacter, Toxoplasma
  - MRSA, Influenza
Exotic disease control

Control measures

• KEEP IT OUT
  – Controls on imports, Quarantine

• FIND IT QUICKLY
  – Early detection: Farmers, Private vets

• STOP IT SPREADING
  – Controls on movements
  – Slaughter policy
  – C&D
  – Vaccination
Endemic disease challenges

- **Antimicrobial resistance**
  - Resistant strains of swine dysentery
  - MRSA
- Resistance is a real threat to the long-term viability of the pig industry.
- **Limited number of chemically active groups available**
  - Huge cost of R & D and registration of new products for food animals
  - Voluntary ban on cephalosporins and fluoroquinolones in Denmark
- **Alternatives - vaccines and biological control agents**
  - R&D cost – focus on international markets
- **Must use current products sparingly and wisely.**
- **Regional/national disease elimination a serious option**
THE FIVE WELFARE FREEDOMS
  – Freedom from fear and distress
  – Freedom from pain injury and **disease**
  – Freedom from hunger and thirst
  – Freedom from discomfort
  – Freedom to express normal behaviour

• Consumer expectation
  – High quality of life

• Premium for ‘high’ welfare

• Disease control ‘more challenging’ in high welfare systems

• Regional/national disease elimination a serious option
Food safety challenges

- 1 in 4 pigs in UK carry Salmonella at slaughter
  - Highest level of S. Typhimurium in finisher pigs in the EU
- Prevalence stable over past decade
  - No impact of Salmonella Control Programmes
- Levels in breeding herds above EU average
  - High levels in Denmark and Netherlands
- Despite high levels in breeding herd in DK and NL levels in finishing pigs below EU average
  - Liquid feeding; fully slatted systems; AIAO; hygiene....
- EU regulation requires targets for finishing and breeding pigs and a National Control Plan
Trend of ZNCPig regional results

Regional Positive + Weak Positive Results - 01/06/2008 to 01/03/2010

Legend:
- England
- Scotland
- NI Assured
- NI Non-Assured
Prevalence (%) of *Salmonella* positive production holdings

- High: 70
- Low: > 0
- 0
- No data (MS)
- No data (non-MS)
Prevalence in production holdings
Figure 1. Observed prevalence of slaughter pigs infected with *Salmonella* spp. in lymph nodes in EU and Norway, 2006-2007.

EFSA survey 2007
Figure 6. Observed prevalence of carcasses contaminated with *S. Typhimurium*.
of 17 November 2003

ANNEX I

Specified zoonoses and zoonotic agents for which Community targets for the reduction of prevalence are to be established pursuant to Article 4

<table>
<thead>
<tr>
<th>1. Zoonosis or zoonotic agent</th>
<th>2. Animal population</th>
<th>3. Stage of food chain</th>
<th>4. Date by which target must be established (*)</th>
<th>5. Date from which testing must take place</th>
</tr>
</thead>
<tbody>
<tr>
<td>All salmonella serotypes with public health significance</td>
<td>Herds of slaughter pigs</td>
<td>Slaughter</td>
<td>48 months after the date of entry into force of this Regulation.</td>
<td>18 months after the date referred to in column 4</td>
</tr>
<tr>
<td>All salmonella serotypes with public health significance</td>
<td>Breeding herds of pigs</td>
<td>Primary production</td>
<td>60 months after the date of entry into force of this Regulation.</td>
<td>18 months after the date referred to in column 4</td>
</tr>
</tbody>
</table>

(*) These dates are based on the assumption that comparable data on prevalence will be available at least six months before the establishment of the target. If such data were not available, the date for the establishment of the target would be postponed accordingly.
It is important that pigmeat maintains a reputation as a safe and wholesome product
- Control processes to enhance food safety must be applied at every stage from plough to plate.

No economic drivers for producers or processors to reduce Salmonella
- Pride in Premium Product
- Risk management – cf. BP, Edwina Currie
- Feed measures increase cost and/or reduce performance
  - Meal; organic acids; barley replacing wheat ... (liquid feed)

Hygiene, management and biosecurity requirements for salmonella control are the same as for other diseases

Programmes for regional/national health improvement can make a contribution to Salmonella control
Key costs of disease

- Mortality
  - Deaths; abortions; culling
- Carcase quality and food safety
  - condemnations; trim; effect on carcase value
  - Salmonella, Campylobacter
- Medicine costs
  - Antimicrobials
  - Vaccines
- Pig performance
  - Average daily gain
  - Food conversion ratio
- Regional/national disease elimination a serious option
A major concern for more than 50% of farms in the EU
  - despite broad use of vaccines + AB...

Pathogens involved:
    *Past. multocida*, *S. suis*... + SIV + PRRSV + PRCV + PCV2

*Mycoplasma hyopneumoniae*: pivotal role in Pneumonia; widely spread.

Interaction of risk factors ... that relate to:
  - Housing
  - Herd management
  - Hygiene

Regional/national disease elimination a serious option

F. Madec, 2009
Post-weaning enteric disorders

• A problem on many farms:
  – unstable situation, peaks of problems,
  – despite c. 90% of the pigs being medicated at weaning

• Pathogens involved: E. Coli(s) (enterotoxigenic strains (ETEC)… + ??
  – But ETEC also found on farms where no disease (and no antimicrobial use…)

↓

• Interaction of risk factors … that relate to:
  – Nutrition (digestive physiology)
  – Gut flora (composition)
  – Environment of the piglet before and at weaning…

• = a cascade of events that, combined, favour ETEC proliferation beyond pig « resistance »….

• Regional/national disease elimination not an option
  – Hygiene, feeding, management, environment
BPHWS – launched 2003

- ‘An industry where the health of pigs and their welfare is optimised in a way that contributes significantly towards competitiveness and sustainability.’

- Developed by BPEX, National Pig Association, Pig Veterinary Society and MLC
British Pig Health and Welfare Strategy

- Create a Health and Welfare Council
- Establish health & disease status
- Communicate disease surveillance information to industry
- Intervention studies on control/eradication & Technology Interaction
- Biosecurity
- Tackling new diseases
- Risks/consequences of emerging pig issues
- Training farmers and specialists
- Targeted pig research
BPEX Pig Health Scheme

- Lesion scoring on line using trained assessors
- Information recorded on handheld IPAQs
- Information sent to producers, vets, and abattoirs within a week
Comments: Slapmarks unclear

Extensive Enzootic Pneumonia-like lesions were found in greater than 30% of pigs examined. Veterinary advice should be sought as this suggests that there is suboptimal control of infection. DLWG reductions of between 6% and 50% may have occurred as a result of this during the finishing period (depending on the onset and duration of disease). This could be equivalent to an extra 4 to 35 days to reach slaughter weight!

Extensive Poplar Dermatitis lesions were found in pigs examined with some individual pigs observed with scores of 2 or 3 (extensive and severe lesions). Veterinary advice should be sought since mange is a possible cause for these lesions, particularly if there is evidence of scratching among finishing pigs. FCR rates may be reduced by up to 10% if mange is present. This could equate to an extra 9kg of extra feed per affected finisher.

Pleurisy has been found in more than 10% of pigs examined. Veterinary advice should be sought regarding further diagnosis of

For all enquires regarding BPHS contact the administration centre on 01453 233184 or e-mail bphs@sac.co.uk

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### BRITISH PIG HEALTH SCHEME

**ABATOIR MONITORING PROGRAMME**

**INDIVIDUAL UNIT DATA**

<table>
<thead>
<tr>
<th>Summary</th>
<th>Lungs</th>
<th>Liver</th>
<th>Other</th>
<th>Body</th>
<th>Skin</th>
</tr>
</thead>
<tbody>
<tr>
<td>EP Ave Score</td>
<td>&quot;Viral&quot; %</td>
<td>PP Chronic %</td>
<td>PP Acute %</td>
<td>Abscess %</td>
<td>Pyaemia %</td>
</tr>
<tr>
<td>6,05</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Pigs Affected</td>
<td>33</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

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**KEY**

- **EP**: Enzootic Pneumonia
- **"PP"**: Pleuropneumonia-like
- **"Viral"**: Viral-type distribution
- **MS**: Milk Spot
- **HS**: Hepatic Scarring
- **PC**: Pericarditis
- **PT**: Peritonitis
- **PL**: Pleurisy
- **PD**: Poplar Dermatitis
- **Tail**: Tail-bitten

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Page: 1

Date Created:
How BPHS results are used

If Yes What - Producers?

- Review ed Vaccine Policy: 47%
- Review ed Worming Policy: 50%
- Review ed Other Medication: 19%
- Review ed General Health Plan: 11%
- Changed Production System: 3%
- Changed Nutrition: 3%
- Changed C&D: 19%
- Other: 25%
- Other: 3%
Changes in severe Enzootic Pneumonia-like lesions detected through BPHS

Marked reduction in the occurrence of severe EP-like lesions (score >9). (Sanchez, 2010)
Pleurisy in Pigs:  
Associated risk factors and impact on health, welfare and performance.
Lungs from a pig affected by pleurisy.
Open-chest view of a pig affected by pleurisy.
1. **Individual pig data:**
   - Correlated individual presence of visceral or parietal pleurisy to individual trimmed carcass weight (1366 pigs).
   - No account taken of severity.
   - Presence of parietal pleurisy equated to 1.42kg reduction in carcase weight.
   - **£2/affected pig** (based on April 09 price) on lost carcass weight.
2. **Batch level data**

For a typical batch with 10% prevalence of pleurisy:

- Cost in terms of reduced carcass weight and increased age at slaughter
  - 0.7kg carcass weight x 145p = 101p/pig
  - 2.6d extra to slaughter = 130p/pig

**Total cost = £2.30/pig at batch level**
Indicative case scenario:

- Prevalence of pleurisy in consignment of pigs was 10%
- Herd of origin had consistent BPHS scores >10% over 2 years.
- Costs were extrapolated from one consignment to entire batch of 1191 pigs.
- Costs:
  - **Necessary reduction in line-speed** was 8.5% equating to extra 25min to kill entire batch (usual 271min became 296min). Total cost impact (1 x additional slaughterman/trimmer for entire batch (£35), 25 min extra overtime for entire slaughter team (£199) and MHS team (£106)) was approx. £340
  - **Cost of disposal** of Category 2 Animal Byproduct (trimming): £14
  - Final approximate cost per pig = 29.8p/pig assuming 10% prevalence.
Total Carcase Weight On The Truck Per Sow is What Really Matters
Meeting the target spec.
Regional Health Improvement Programmes

- Pig health is a major welfare issue
  - Freedom from disease
- Pig health is a major food safety issue
  - Antimicrobial resistance; MRSA
  - Zoonoses – Salmonella
- Pig health is a major environmental issue
  - Poor performance increases carbon footprint
- Pig health is a major economic issue
  - Increases costs; reduces performance
Regional Health Improvement Programmes

• Health improvement recognised as essential for long-term industry survival
• Regional Health Improvement Programmes planning started in 2008
  – Funding from BPEX
  – Access funding from Regional Development Programme for England
• Underlying principle
  – Together we stand divided we fall
• The larger the disease free area
  – the longer the average to disease breakdown
  – the longer the payback period on investment
DIRECT VALUE:

- ↓ % mortality
- ↓ % culled
- ↓ abortions
- ↓ medicine costs
- ↓ condemnation losses

Performance improvement

- ↑ farrowing rate
- ↑ weaned pigs/litter
- ↑ Average Daily Gain
- ↓ Feed Conversion Ratio

Baptista, 2010
Benefit of Health Improvement

Benefit of a health intervention

Direct value

Baptista, 2010
Benefit of Health Improvement Programmes

INDIRECT VALUE: Virus exposure risk reduction

- Reduction of virus shedding (viral load)
- Reduction in strain genetic variation
- Reduction of risk of emergence of “new variants”
- Substantial reduction in risk of breakdown if done on an area or regional basis

Baptista, 2010
Benefit of Health Improvement

Benefit of a health intervention

Direct value

Indirect value

Baptista, 2010
Regional Health Improvement Programmes

- Disease **ELIMINATION** where it makes sense today
  - Low prevalence and low density areas
  - Swine dysentery
- Disease **CONTROL** where elimination does not make sense today
  - High prevalence and high density areas
  - Directly improving the ongoing performance of pigs
  - Indirectly reducing the “load – diversity – new variant emergence” of wild-type virus in **CONTROL** areas and reducing the long term risk of viruses getting back into **ELIMINATION** areas

Baptista, 2010
RHIP Phase 1: Feasibility

• SEVEN KEY POINTS FOR SUCCESS
  1. Technical feasibility
  2. LEADERSHIP AND COOPERATION
     • FARMERS AND VETS
  3. FUNDING FOR PRODUCERS
  4. Information sharing
  5. Local co-ordination
  6. Supporting institutions
  7. Reporting mechanisms

Baptista, 2010
• IDENTIFICATION OF PIG-RELATED SITES

Objective
• Identify the general characteristics of the pork industry in the region

Baptista, 2010
• REALITY CHECK

• Determine disease prevalence and strain distribution in area

• Evaluate risk from pig and transport movements and systems flow

• Determine risk of breakdown by analysis of on-farm biosecurity

• Categorise sites

Baptista, 2010
Regional Health Improvement Programmes
- Sharing of disease status information - vet survey
Improving pig health: Improving biosecurity assessment

- Completed by producers
- Ask about what is being done, not what the ideal is
- Internal and external risks
- Tailored control plan
- Reviewed on regular basis
Objective

- Design disease control strategies for the farm and neighbouring farms
- Involve allied support industries

Baptista, 2010
Central elements for succes

1. High level of biosecurity
2. Motivated farmer
3. The right procedure, for the right disease!
4. Plan in advance
   - Who will do intensive C&D, ordering new inventory, replacement stock, planning for holidays......
EXECUTION AND MONITORING

Objective

• Carry out and monitor disease control strategies by farm and neighbourhood
• REGIONAL MANAGEMENT – PARALLEL ACTIONS
• Establish regional biosecurity programme
• Pursue continued funding
• Update farm data
• Ongoing diagnostics and status change
• Sequential biosecurity surveys
• Set up farm-based research projects
• Modelling results and information generation

Baptista, 2010
Regional Health Improvement Programmes

- Sharing of disease status information - vet survey
- Promoting awareness of biosecurity
- Access to better diagnostics
- Formation of producer clusters
- Support tools: Evaluate costs and benefit of on-farm improvements
- Steering groups - best use of resources, leadership
Area Regional Control in US

AASV position statement on PRRS eradication:

- “Eradication of PRRS from the North American pig population is the long-term goal”.
Area Regional Control in U.S.

ARC Projects in U.S. July 2010
Lower costs to remain the global low cost producer

- Competitors are PRRS-negative
  - Brazil, Chile
- Canada, Denmark only deal with mild strains
- US regions (eg. Ohio, Pennsylvania)
MN PRRS Eradication Task Force: Road Map to Success

**Goals**

- **Short Term** (years 1-5)
  - Area Mapping
  - Biosecurity Assessments
- **Medium Term** (years 3-15)
  - Differential Diagnostics
  - Demonstration Projects
  - Immune Measures
  - Persistence
  - Vaccine Development
- **Long Term** (years 12-20)
  - Genetic Resistance

**Research**

**Monitoring**

**Application**

**Communication**

**Successes**

- Initiate discussion
- Organize MN PETF
- Write materials
- Raise awareness
- Build teams
- Communicate results

**Regional Projects**

**Expansion of Regional Projects**

**Establishment of PRRS (+) and (−) Regions**

*Slide courtesy of S. Dee, 2009*
Madec 20-point plan

**Farrowing**
1. All-in / all-out strictly applied
   - Empty slurry pit, clean & disinfect between batches
2. Wash sows & treat for parasites before farrowing
3. Cross-fostering
   - Limit to that which is necessary
   - Within 24 hours of farrowing only

**Post Weaning**
4. Small pens (<13 pigs) solid partitions
5. Empty slurry pit, clean & disinfect, strict all-in / all-out
6. Lower stocking density
   - (3 pigs / m²)
7. Increased space at the feeder
   - + 7 cm / piglet
8. Improved air quality
   - (NH₃ < 10ppm, CO₂ < 0.15%)
9. Improved temperature control
10. No mixing of batches
## Madec 20-point plan

### Grower / Finishing
11. Small pens, solid partitions
12. Empty slurry pit, clean & disinfect, strict all-in / all-out
13. No mixing of pigs from the post-weaning pens
14. No re-mixing between finishing pens
15. Reduce stocking density: over 0.75m² / pig
16. Improved air quality & temperature

### Others
17. Appropriate vaccination programme for other diseases on farm
18. Sensible flow within buildings
   - (air, animals, people)
19. Strict hygiene
   - (tail & teeth clipping, injections...)
20. Early removal of sick pigs
   - ➔ hospital room or euthanase
### Changes in management: effect on losses

<table>
<thead>
<tr>
<th>Farm</th>
<th>No of recommendations effectively applied (/20)</th>
<th>% losses (Weaning to slaughter)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Before changes</td>
<td>After changes</td>
</tr>
<tr>
<td>1</td>
<td>8</td>
<td>15</td>
</tr>
<tr>
<td>2</td>
<td>7</td>
<td>19</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>13</td>
</tr>
<tr>
<td>4</td>
<td>7</td>
<td>16</td>
</tr>
</tbody>
</table>

(Dr F Madec, AFSSA)
Conclusions and future strategies

- The pig sector is changing – disease control will need to adapt
- Whole chain communication is key to future sustainability
  - establishing networks, promoting honesty
Keys to success

LEADERSHIP,
COMMUNICATION,
COLLABORATION

Baptista, 2010
Keys to success

LEADERSHIP,
COMMUNICATION,
COLLABORATION,
AND... MORE LEADERSHIP,
COMMUNICATION,
AND COLLABORATION!!!
• Started in 1983 as joint Government-industry initiative
  – Administered by MAFF
  – Funded by pig producers
  – Pig Disease Eradication Fund Ltd.
  – Compulsory slaughter of over 500 herds and 440,000 pigs

• Despite bitterness, acrimony and politics
  – Financial disaster(?) – cost £27 Million
...producers and veterinary surgeons WORKING TOGETHER with their neighbours and business partners so that together they achieve greater sustained improvement in health and productivity in their neighbourhood than anyone can achieve ON THEIR OWN ....

Baptista, 2010
Thank you for your attention