Scottish Contingency Plan for the Control of Porcine Epidemic Diarrhoea

1. Introduction

1.1. The objective of the Scottish Contingency Plan for the Control of Porcine Epidemic Diarrhoea virus is to identify and contain the virus as quickly as possible.

1.2. The Contingency Plan focuses on the control of Porcine Epidemic Diarrhoea virus but a broadly similar approach could be used to tackle other significant new and emerging diseases, eg. highly pathogenic strains of PRRS from the US or Asia.

1.3. The approach taken to control PEDv will be cascaded as follows:

- Strategic
- Operational
- Tactical
- This document outlines the strategic and operational elements of the Contingency Plan. It does not include tactical activity as this will be contingent on the specifics of the unit, timings and emerging knowledge and will be determined by the UK PEDv Core Group and the Scottish Pig Disease Control Centre

1.4. The Contingency Plan contains a primary and secondary strategy.

- **Strategy 1: Pig Unit Specific Containment**. This will be the initial strategy based on targeted intensive epidemiological investigation, interventions and monitoring.

- **Strategy 2: Industry Containment**. This emergent strategy will be adopted following confirmation that an outbreak has occurred. It is considered that at this point a broader approach to PEDv control and elimination will be required as it is highly likely infections will become more widespread.

2. Delivery of the Contingency Plan

2.1. This is reliant on the following actions/activity being established. Each of these activities is outlined at a strategic and operational level.

1. Early identification of infected site or site(s)
2. Mapping of positive sites and tracings of contacts
3. Identification of source of infection and risk assessment
4. Enhanced monitoring and surveillance to detect any wider spread
5. Enhanced general industry biosecurity
    a. Controlled exposure of herd to virus
    b. Return of herd to virus negative status
6. Monitoring of virus circulation within herd
7. Controlled movements from infected sites
8. Intensive cleaning and disinfection
9. Manure management and fallen stock disposal
10. Confirmation of ‘free’ status

2.2. The effectiveness of the PEDv Contingency Plan is reliant on the support and commitment from the industry and supply chain with much emphasis on:

- Open sharing of information from the outset
- Responsible attitude of affected units both to containing the infection and minimizing the risk to others

2.3. Porcine Epidemic Diarrhoea virus can spread very easily by direct contact with infected pigs or indirect contact with faeces from infected pigs or material contaminated with faeces from infected pigs. With robust national and farm gate biosecurity there is no reason why Porcine Epidemic Diarrhoea virus should ever come in contact with pigs on British farms.

2.4. The UK has remained free of the US and Asian highly pathogenic strains of PRRS for over 20 years. But if PEDv does get on a farm or farms in the UK there would be considerable value to the industry from containing the infection – c.500,000 piglets per year in years 1 and 2 and up to a further 1 million piglets in the following 5 years. A concerted government-industry effort eliminated Aujeszky's disease in the 1980s and freedom from the virus has been maintained.

3. Industry support

3.1. Delivery of the proposed contingency plan will require considerable investment in manpower, testing and diagnostic resources and data collection and analysis.

3.2. On confirmation of a positive case an industry Disease Outbreak Steering Group would be established comprising the following organizations:

- Quality Meat Scotland (QMS)
- Wholesome Pigs Scotland Ltd (WPS)
- SAC Consulting Veterinary Services Edinburgh
- APHA

3.3. The Disease Outbreak Steering Group would implement the initial disease containment strategy. The group would, at that point, review the risk of onward spread. Specific supports would include:

- Scottish Pig Disease Control Centre (SPDCC) set up and running costs
- Mapping of infected units
- Tracing of movements and risk assessment of contacts
- Identify source of infection and advise on control options
- Organize additional testing and monitoring to establish infected sites and wider industry spread
- Practical logistics of farming operations affected by disease containment policies
- Wider industry advice for improving standards of biosecurity
- Temporary suspension of assurance assessments in the infected area

3.4. Quality Meat Scotland and National Farmers Union Scotland has already invested funds to provide producers with free testing of samples at SAC Consulting Veterinary Services Edinburgh.

4. Contingency Plan

1. Early identification of infected site or site(s)

Strategic:

Early identification of pigs affected (or suspected to be) by Porcine Epidemic Diarrhoea virus (PEDv) is critical to the success of any strategy to contain the virus in GB. Delays in diagnosis increase the risk of undetected spread of the virus

Actions at farm level and at industry level flow from the identification of the infected unit. Producers need to report any suspicion of PED as well as confirmed cases as reporting is critical to the strategy to contain and control PEDv

Operational:

Stock-workers will be on the frontline for detection and it is important that farm staff are aware of the signs of the disease and the importance of contacting their vet as soon as possible to get unusual clinical signs checked out. Rapidly spreading diarrhoea with high mortality in young piglets is less likely to be missed than the more transient scour seen in growers and finishers

Farmers need to report any suspicions immediately to their farm vet and send samples to SAC Consulting Veterinary Services Edinburgh without delay. Farmers have been supplied with sampling kits

If the farm vet is the first port of call, they must be aware of the symptoms of PED and act quickly to deliver samples to SAC Consulting Veterinary Services Edinburgh. Ideal samples in a suspected outbreak are pooled, freshly voided, diarrhoeic faeces from affected pigs, packaged and sent according to the SAC sampling kit instruction document, with a completed submission form to SAC Consulting Veterinary Services Edinburgh

SAC Consulting Veterinary Services Edinburgh would report the PEDv PCR result to the submitting farm vet in the usual manner to pass to the farmer. Farmers are strongly encouraged to sign the section of the submission form that gives permission to report the result to the pig industry. This will greatly facilitate disease control by the Scottish Pig Disease Control Centre. Without this permission, SAC Consulting Veterinary Services Edinburgh could not share the farm and submitting vet details beyond the geographical region, clinical signs and type of unit and this could result in accidental onward disease transmission through lack of industry awareness

Resources:

1. Flow Diagram of first steps

2. Mapping of positive sites and tracings of contacts

Strategic:

Once there is a confirmed positive, data from the ScotEID system will be used for tracings and management of the containment strategy

Information on location of infected units, neighboring units and recent contacts will be mapped and used to identify farms at high risk of lateral spread. Following risk assessment more intensive monitoring for signs of disease and more intensive containment biosecurity could also be put in place on any higher-risk farms

Operational:

Scottish Pig Disease Control Centre Responsibilities would broadly include:

1. Utilizing ScotEID database and mapping programs to collect:
    a. Farm location
    b. All pig movements on and off farm in last 30 days
        - Details of supplying farms or markets
        - Details of destination farms, markets, collection centres or abattoirs
        - Details of hauliers
    c. Details of all pig holdings within 5 km of affected farm (including markets, abattoirs, collection centres)
2. Provide immediate support and advice to:
    a. Positive farm and it's vet
    b. Any pig holdings within 5 km of positive farm (including their vets)
    c. Hauliers involved with any movements on/off farm, including farms that haul their own slaughter stock
    d. Any pig holdings associated with movements of any species on/off positive farm (including their vets)
    e. Feed company supplying the farm
    f. Fallen stock company servicing the farm
3. Communicate key information to industry
    a. Knowledge of PEDv breakdown
    b. Further information regarding farm location and details only as permitted legally
4. Provide protocols/guidance on approaches to PEDv prevention, containment and control
5. Assist farmers in developing tailored control plans for their farm
6. Assist with organizing movements of infected pigs
7. Provide advice to abattoirs, hauliers, feed companies and fallen stock collectors on preventing spread of PEDv
8. Liaise with Acoura and Red Tractor to discuss possible temporary suspension of assurance visits in infected areas
9. Record all farms being declared PEDv free after an outbreak

Resources:

1. ScotEID Mapping program

3. Identification of source of infection and risk assessment

Strategic:

Identifying the probable source of infection will be critical to identifying other farms at potential risk. There will be a particular focus on all movements of animals, animal products, animal by-products, people, feed, bedding, equipment and anything else which may have been in contact with pig faeces

Operational:

Scottish Pig Disease Control Centre to begin rapid epidemiological investigation. Time is of the essence as virus in potential source materials may lose infectiousness and memories fade over time

Strategic Operations Team consists of;

a. Farm vet
b. Scottish Pig Disease Control Centre representatives
c. SAC Consulting Services Edinburgh

Standardised Investigation Questionnaire to be used on all positive farms. Canadians found much merit in verbally conducting the questionnaire as enabled different routes of conversation to be followed. Suggest completed by farm vet as has background knowledge of farmer and the farm

Must also include record of movements of other animal species on or off farm if associated with other pig holdings, Scottish Pig Disease Control Centre to obtain from ScotEID

Essential that standardised answers from questionnaire are entered in same format onto a database to enable searches and trend analysis. WPS would be responsible for entering the answers from the Investigation Questionnaire

Samples of material suspected as potential sources of infection should be taken and refrigerated pending decisions on testing (covered in **SOP 2**)

Resources:

1. Investigation Questionnaire
2. WPS PED database

SOP 1: Investigation of a Porcine Epidemic Diarrhoea breakdown

SOP 2: Sampling strategy and collection, handling and storage of samples for use in investigation of a Porcine Epidemic Diarrhoea breakdown

4. Enhanced monitoring and surveillance to detect any wider spread

Strategic:

On confirmation of the identification of PEDv in the UK an immediate program of targeted testing should be carried out to check for PED in high risk areas such as; markets, abattoirs, collection centres, fallen stock, fell mongers and haulier yards

Cleaning and disinfection should be stepped up when positive samples are discovered at those locations. This will help identify how widely the virus has spread, if at all. Information on pattern and degree of spread will be very useful in making decisions on where to target resources to best contain and control the virus within the UK

Environmental sampling at the industry service providers should be useful but will have limitations. Regular random sampling in regions or compartments which don't have PED may be sufficient but if PED is diagnosed in the UK, sampling at the large sites should be on a daily basis. It will be important to set out what the objectives of the program are (i.e. prevalence, proof of negative status, etc) and then set the sampling based upon those objectives. It will also be important to have an exit strategy established from the beginning

Operational:

Pilot sampling should be carried out in advance of any outbreak to identify practical arrangements for sampling – who, where, when, what, how – and to establish any baselines and level of false positives arising from testing

Experience in the pilot should be used to develop and review **SOP 2** on sampling strategy and collection, handling and storage of samples for use in investigation of a Porcine Epidemic Diarrhoea breakdown

Resources:

SOP 2: Sampling strategy and collection, handling and storage of samples for use in investigation of a Porcine Epidemic Diarrhoea breakdown, including surveillance sampling

5. Enhanced general industry biosecurity

Strategic:

On confirmation of the identification of PEDv in the UK, general industry biosecurity should move to the highest alert status. Standards of biosecurity at farm gate and quality of cleaning and disinfection of pig lorries would have to be stepped up

Operational:

Farm level (ref **SOPs 4, 5 and 6**):

- All farms should enforce a clear line of separation at all farm entrances
- Restrict all unnecessary visitors
- Visitors should only cross the line of separation if they follow Danish entry protocols (see **SOP 4**)
- Farm staff who inadvertently cross the line of separation eg step on to a lorry should also follow Danish entry protocols before re-entering the unit
- Vehicles onto farm pose particular risk (knackerman, feed lorries, visitors etc)
- No pig lorry should be allowed on pig farm without an intact seal linked to a current certificate of cleaning and disinfection
- Consider using separate boots and overalls for loading pigs or putting overalls in the wash as soon as finish cleaning up the loading area after loading pigs
- Cleaning the loading area should be part of the SOP for loading so it is done immediately not as a separate operation

Abattoir/collection centre/market level (ref **SOP 3**):

- Standard of lorry washing of particular note
- Correct detergents and disinfectants must be used
- No water recycling permitted
- No lorry should leave an abattoir without audit and certification of the level of cleaning and disinfection followed by sealing

Resources:

SOP 3: General industry biosecurity standard
SOP 4: Farmgate biosecurity – people
SOP 5: Farmgate biosecurity – vehicles
SOP 6: Farmgate biosecurity – line of separation, loading
SOP 7: Cleaning and disinfection of vehicles

6. Development of a tailored virus elimination strategy

Strategic:

The overall goals of the strategy for affected units should be to:

1. Contain infection within the unit
2. Reduce any risk of spread to other units
3. Eliminate PEDv from affected farm
4. In order to return the unit to producing virus-free weaners as quickly as possible

Options include:

a. Controlled exposure of herd to virus
b. Partial depopulation - repopulation
c. Depopulation - repopulation

Depopulation of a unit is only likely to be economically realistic if there is reasonable certainty that only 1-5 units have been affected at the time of first identification of the virus or where other diseases are present that it would be desirable to eliminate. This option is unlikely to be used since there would be no offer of compensation to farmers

Operational:

The Disease Outbreak Steering Group should make an initial assessment of the options for containment and control of PEDv from an affected farm. International consultants with previous experience of managing the disease may also prove useful

A decision on whether to use controlled exposure of the herd to the virus should be taken without delay. As it is improbable that viral spread within the unit could be contained controlled exposure is preferable to natural exposure. The only realistic alternative is depopulation of the site, and this is only likely to be economically realistic where other significant diseases are present on the farm

To reduce the level of virus production it may be necessary to consider euthanasia of piglets from non-immune sows at birth and/or create a four week free of farrowing window

Intensive cleaning and disinfection will be needed on-farm to remove all traces of the virus and prevent viral exposure to piglets. This will include emptying all slurry channels and cleaning and disinfection of pits beneath slats. Pig flow and procedures may need to be adapted on farm to create the potential for all-in:all-out management by building. It may also be necessary to create clean and dirty areas on farm with separate footwear, overalls and equipment as cleaning and disinfection of the unit progresses

Resources:

SOP 8: Containment, control and elimination of infection (Indoor/Outdoor)
SOP 9: Controlled exposure of herds to virus

7. Monitoring of virus circulation within herd

Strategic:

Monitoring of virus circulation within the positive herd will be necessary to assess when the target of virus free weaner production has been achieved

Operational:

Sampling and testing for monitoring of virus circulation in herds should be included in **SOP 2** for Sampling strategy and collection, handling and storage of samples for use in investigation of a Porcine Epidemic Diarrhoea breakdown

Resources:

SOP 2: Sampling strategy and collection, handling and storage of samples for use in investigation of a Porcine Epidemic Diarrhoea breakdown

2a - wider on-farm testing after initial confirmation

2b - wider industry surveillance sampling

2c - monitoring of virus circulation within herd

8. Controlled movements from infected sites

Strategic:

Any movement of pigs or pig faeces from a positive site poses a great risk to further spreading the PED virus, but movement restrictions are unlikely to be imposed

A responsible voluntary approach to movement controls is critical

Operational:

Ideally there should be no movement of pigs or pig faeces (or other species of animals that may move to a holding with pigs) from a PEDv infected farm until plans have been put in place to control the risk of virus spread. This might include identifying biosecure locations to which weaners could be moved with appropriate intensive cleaning and disinfection of vehicles involved in the movement. Alternatives, such as temporary weaner accommodation on the site could also be considered

As PED is not a food safety risk finished pigs could move to abattoir for processing ideally at the end of the week with more intensive cleaning and disinfection of vehicles, the lairage and of the washing facilities at the abattoir

Any movement would require a joint commitment from the farm, haulier and destination (farm or abattoir only) and would need to be planned in advance with agreement from all parties and all risks assessed. The lorry driver in particular is key to the success

The Scottish Pig Disease Control Centre could take a role in advising or co-ordinating movements with a check list of things to consider

Resources:

SOP 10: Controlled movements from infected sites

9. Intensive cleaning and disinfection

Strategic:

Essential to eliminate PEDv from the farm once all animals have been rapidly exposed to it. Strict cleansing and disinfection protocols must be followed to return farm to negative status

Operational:

The effective elimination of PEDv is reliant on high quality cleansing and disinfection

Pig flow and procedures may need to be adapted on farm to create the potential for all-in:all-out management by building. It may also be necessary to create clean and dirty areas on farm with separate footwear, overalls and equipment as cleaning and disinfection of the unit progresses

Cleaning includes emptying all slurry channels and cleaning and disinfection of pits beneath slats. Chlorine gas has been used effectively in North America, although with obvious personal safety considerations. Removing manure from the farm is also critical (see 10)

Dirt inactivates most disinfectants and dirt also physically protects the virus. As well as helping to make cleaning more effective detergents have some effect on PED virus and should become a standard routine. Detergents must always be used in addition to disinfection, not a replacement. Surfaces should be "white glove" clean before applying disinfectant

PEDv is inactivated by most virucidal disinfectants, including phenols, peroxygen, chlorine, sodium hydroxide (2%), formalin (1%), sodium carbonate (4% anhydrous or 10% crystalline, with 0.1% detergent), ionic and non-ionic detergents, strong iodophors (1%) in phosphoric acid

Information on disinfectants effective against PEDV should be maintained as an annex to the contingency plan

Drying is critical. Heating to 70^{o}C for 10 minutes would be ideal as this inactivates the virus but vehicles and buildings should be completely dry before reuse to minimise risk

Leave buildings empty for as long as possible to allow drying and sunlight to eliminate residual viral infectivity. Looking at North American experience to gauge if a realistic time could be specified

Waterlines should be cleaned and disinfection

Rodent control precautions should be evaluated and improved as required

Repainting or whitewashing should be considered for difficult to clean areas eg. wood

Resources:

SOP 11: Intensive cleaning and disinfection of unit following breakdown

10. Manure management and fallen stock disposal

Strategic:

PED virus transfers via faeces and survives in manure for extended periods of time. Any object that becomes contaminated with pig manure can be a source of infection for pigs. It is critical to prevent PED from being moved from farm to farm during manure spreading and this may impact on the timing of application and where manure should be spread

Similarly dead-stock pose a significant threat for spreading virus and should be handled, stored and disposed of quickly and biosecurely

Operational:

Manure Management:

- If using a contractor then must explain the potential risks
- Good communication with those who may have pigs locally at risk is essential
- It may be possible to identify areas where the potentially contaminated manure can be spread at least risk
- Plans should be drawn up for entrance and exit to the site with minimal cross-over with the path for the manure spreading and the rest of farm traffic or areas used by farm staff
- Explain clearly the routes that will be used to transport manure to fields
- Agree in advance how any manure spills, particularly on public roads, are to be handled
- Additional time will need to be factored in for cleaning and disinfection of equipment used in manure spreading
- Options for longer-term storage to allow time for virus to die off may also need to be considered

Fallen Stock:

- The ideal scenario is obviously on-farm incinerators, and it may be worthwhile considering hiring a mobile incinerator during the peak of an outbreak
- If this is not possible special arrangements should be agreed with the fallen stock collector
- Fallen stock should be placed in sealed containers at an agreed collection point outside the unit
- The outsides of the containers should be rinsed and disinfected once filled and sealed
- They should be collected either as a separate collection at the end of the day or as the last collection at the end of the day
- Ideally vehicles normally used for other species should be used for collecting high risk material
- The material should be taken to a secure location for incineration
- Collection should only be by companies specifically approved to transport high risk material with procedures in place to thoroughly wash and disinfect vehicle and all equipment used
- All contaminated protective gear should also be properly cleaned or disposed of to ensure no virus is transferred to other farms
- The same criteria is applicable to fallen stock of other species on a PED positive farm, as they pose the same risk of contamination by carrying infected pig faeces

Resources:

SOP 12: Manure management

SOP 13: Fallen stock

11. Confirmation of 'free' status

Strategic:

Following return of farms to production of virus-free weaners ongoing monitoring for clinical signs and testing for virus should be planned for up to 6 months to check that the virus has been eliminated or that re-emergence of the virus is detected as quickly as possible. If virus persists in a herd, it may be necessary to extend surveillance. A negative status entails two successive negative monthly herd tests and no clinical evidence of PEDV for at least 8 weeks

Operational: Testing to confirm freedom of PEDv is essential to the elimination strategy The Scottish Pig Disease Control Centre would be responsible for keeping updated records of farms now considered 'negative'
Resources: **SOP 14:** Confirming return to disease ‘free’ status

	Standard Operating Protocols	Responsibility	Target Date
SOP 1:	Investigation of a Porcine Epidemic Diarrhoea breakdown		
SOP 2:	Sampling strategy and collection, handling and storage of samples for use in investigation of a Porcine Epidemic Diarrhoea breakdown To include - **2a -** wider on-farm testing after initial confirmation - **2b -** wider industry surveillance sampling - **2c -** monitoring of virus circulation within herd		
SOP 3:	General industry biosecurity standard		
SOP 4:	Farm gate biosecurity – people		
SOP 5:	Farm gate biosecurity – vehicles		
SOP 6:	Farm gate biosecurity – line of separation, loading		
SOP 7:	Cleaning and disinfection of vehicles		
SOP 8:	Containment, control and elimination of infection - **8a**: Indoor herds - **8b**: Outdoor herds		
SOP 9:	Controlled exposure of herds to virus		
SOP 10:	Controlled movements from infected sites		
SOP 11:	Intensive cleaning and disinfection of unit following breakdown		
SOP 12:	Manure management		
SOP 13:	Fallen stock		
SOP 14:	Confirming return to disease 'free' status		