

VRA 8 - What are the risks of causing a new outbreak of foot and mouth disease (FMD) by allowing provision of livestock services (other than sheep shearing and sheep dipping) in a Restricted Zone?

1. SUMMARY OF OVERALL RISK

This risk assessment was compiled according to terms of reference provided by the Scottish Government regarding time of delivery, title of veterinary risk assessments (VRAs) and level of detail required. EPIC scientists created a generic framework suitable for the VRAs; collated and updated existing information on risks; filled gaps in the documents (including references where appropriate); and drafted new VRAs where necessary. These documents may require updating as new information becomes available or legislation develops, or if more in-depth assessment is necessary.

The purpose of this document is to qualitatively assess the risk of the specified activity in the face of an FMD outbreak in the UK. The assessment includes proposed actions to mitigate the risks associated with the specified activity, and which could form the basis of license conditions, should the activity be permitted. The summary of overall risk below assumes that the risk mitigation measures in Section 8 are implemented.

DEFINITIONS OF RISK LEVEL (OIE 2004, DEFRA 2011):

Negligible So rare that it does not merit consideration

Very low Very rare but cannot be excluded

Low Rare but could occur

Medium Occurs regularly

High Occurs very often

Very High: Events occur almost certainly

Overall risk: The risk of allowing the activity described is **LOW in the Restricted Zone.**

2. LEGISLATION, DEFINITIONS & ASSUMPTIONS

Statutory disease control requirements are applicable to livestock premises on suspicion and confirmation of FMD. When suspicion of disease cannot be ruled out, and diagnostic samples are taken, a Temporary Control Zone is put in place (TCZ) surrounding the suspect premises. On confirmation of disease, a national movement ban (NMB) is enforced by introducing a national Restricted Zone (RZ). A 3 km Protection Zone (PZ) and 10km Surveillance Zone (SZ) are implemented which place restrictions on movements and activities around infected premises to prevent spread of disease. Later in the outbreak, restrictions may be relaxed either through reducing the size of the RZ or through allowing some resumption of normal activities under licence within the RZ, SZ or PZ. In this VRA, RZ is used to refer to areas which are within the RZ, but do not also fall within the PZ or SZ.

In a RZ, artificial insemination, clipping, embryo transfer, foot-paring, freeze branding, ultrasound scanning and weight recording can be carried out by the occupier of the premises or the occupier's employee. These activities can only be carried out by someone other than the occupier or employee under the authority of a licence granted by an inspector (FMD (Scotland) Amendment Order 2007, paragraph 2).

Disinfectants must be approved for use by the Diseases of Animals (Approved Disinfectants) (Scotland) Order 2008 as amended and used at the FMD Order dilution.

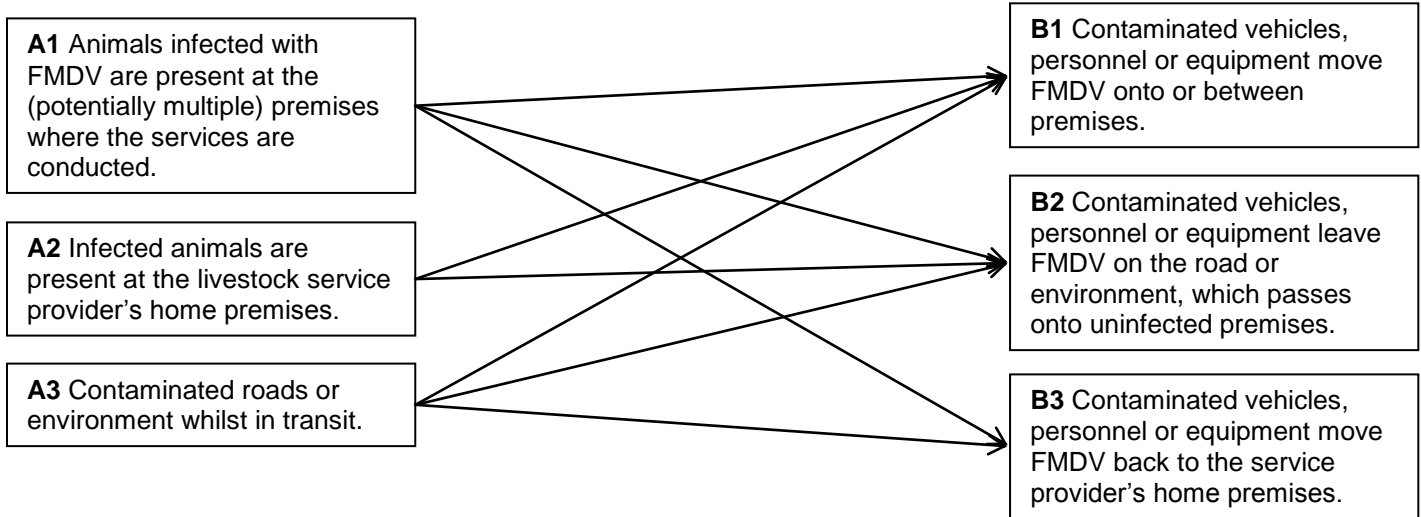
3. HAZARD IDENTIFICATION

(a) Hazard: FMD virus (FMDV)

(b) Specific risk:

Movements of personnel and equipment between premises during a FMD outbreak increase the risk of spreading FMDV to premises that were previously uninfected. However, provision of livestock services which would have a major impact on management if they were not carried out (such as AI or ultrasound scanning) may be necessary.

4. POTENTIAL RISK PATHWAYS



5. EXPOSURE ASSESSMENT

<i>Factors which are likely to affect this probability of exposure are:</i>	<i>Comments and risk estimates if/where appropriate</i>
Infection source: A1 Animals infected with FMDV are present at the (potentially multiple) premises where the services are conducted	
<ul style="list-style-type: none"> Requires animals with undetected or incubating FMD infection, or failure to report FMD 	<ul style="list-style-type: none"> Animals may incubate FMD for 2 to 14 days before the appearance of clinical signs (Sanson 1994), depending on initial dose, route of infection and virus strain. Whilst transmission is most likely around the time of or shortly after the appearance of clinical signs (Charleston <i>et al.</i> 2011), infected livestock may excrete FMDV for several days before the appearance of clinical signs, potentially leading to transmission or contamination prior to disease detection, particularly in cattle and pigs (Burrows <i>et al.</i> 1968, Orsel <i>et al.</i> 2009). FMD in sheep can be difficult to detect clinically as not all animals show clinical signs, and clinical signs are usually mild and short lived (Hughes <i>et al.</i> 2002). There is therefore a higher risk of sheep spreading undetected infection. Inspecting livestock before the arrival of the livestock service provider will reduce the risk of undetected

	infection.
<p>Risk that the premises is infected depends on:</p> <ul style="list-style-type: none"> Proximity to premises with FMD 	<ul style="list-style-type: none"> Risk of a premises being infected is highest if it is adjacent or close to premises with FMD. Once a NMB is in place, most transmission occurs by local spread (<3k from premises with FMD) (Gibbens <i>et al.</i> 2001, Keeling <i>et al.</i> 2001, Haydon <i>et al.</i> 2003). Risk of airborne transmission decreases rapidly with distance from the premises with FMD and is only likely to occur over significant distances if many infected animals (especially pigs) are present (Donaldson and Alexanderson 2001). Premises with FMD may be already detected (“infected premises”), or as yet undetected. In a RZ, there are no detected infected premises. There is a risk of as yet undetected premises with FMD but overall the risk of local transmission is very low.
<ul style="list-style-type: none"> Extent and timing of movements of susceptible animals from areas where FMD is present 	<ul style="list-style-type: none"> Requires movements of infected animals before the NMB, or movements of animals with undisclosed infection by licence. Likelihood of movements having taken place is influenced by type of premises, for example finishing units are likely to move animals in on a regular basis, where as closed high security units would represent the lowest risk. In a RZ transmission is most likely to result from movement of animals with undetected infection before the NMB. Identifying the number and nature of livestock movements from areas where FMD has been detected using livestock movement databases and tracings would allow better quantification of the risk.
<ul style="list-style-type: none"> Stage of outbreak 	<ul style="list-style-type: none"> Early in the outbreak there is increased risk of undetected infection and lack of information on movements.
<ul style="list-style-type: none"> Likelihood of detection and transmission is influenced by FMD virus strain 	<ul style="list-style-type: none"> There are 7 serotypes of FMDV: O, A, C, SAT1, SAT2, SAT3 and Asia 1. The different serotypes (and different strains within each serotype) have different characteristics for example in terms of host species susceptibility, length of incubation period, ease of detecting clinical signs and likelihood of air borne transmission (Kitching and Hughes 2002, Gloster <i>et al.</i> 2008). Much UK research is based on the 2001 outbreak, which was caused by serotype O, strain PanAsia. However future outbreaks may involve other serotypes/strains and therefore present different epidemiological situations. On confirmation of FMDV, the serotype and strain would be identified by The Pirbright Institute. This information would help to inform estimates of risk.
<ul style="list-style-type: none"> Number and species of susceptible livestock 	<ul style="list-style-type: none"> Larger numbers of animals increase the risk that some may be infected, and increases the number that would be exposed if infection were present. Cattle and pigs produce more virus, and present a higher risk of disease transmission during the incubation period. Whilst virus production in sheep is lower, disease in sheep can be difficult to detect (Hughes <i>et al.</i> 2002), meaning that the disease can often spread more widely before detection.
Infection source: A2 Infected animals are present at the livestock service provider’s home premises	
<ul style="list-style-type: none"> Presence of susceptible livestock 	<ul style="list-style-type: none"> If susceptible livestock are kept at the livestock service provider’s home premises, there is a risk of transmission

	to the other premises visited.
<ul style="list-style-type: none"> Cleansing and disinfection of vehicle, personnel and equipment on leaving premises 	<ul style="list-style-type: none"> FMDV is very sensitive to approved disinfectants and good biosecurity will reduce risk of virus transfer to roads via fomites such as personnel, vehicles and equipment.
Infection source: A3 Contaminated roads or environment whilst in transit	
<ul style="list-style-type: none"> Proximity to premises with FMD 	<ul style="list-style-type: none"> Risk of contaminated roads is high if route passes close to premises with FMD. Risk can be reduced by not allowing route to pass through PZ or SZ. Roads in a RZ would not be close to identified infected premises, but there may be premises with FMD that are as yet undetected.
<ul style="list-style-type: none"> Biosecurity of local premises, cleansing and disinfection procedures in place 	<ul style="list-style-type: none"> FMDV is very sensitive to approved disinfectants and good biosecurity will reduce risk of virus transfer to roads via fomites such as personnel, vehicles and equipment.
<ul style="list-style-type: none"> Survival of FMDV on road 	<ul style="list-style-type: none"> FMD can survive on average for 2 to 3 months in bovine faeces at 4°C. Survival duration increases with decreasing temperatures and presence of organic material and varies with virus strain (reviewed by Bartley <i>et al.</i> 2002).
Risk of transmission: B1 Contaminated vehicles, personnel or equipment move FMDV onto or between premises	
<ul style="list-style-type: none"> Cleansing and disinfection of vehicle before enters premises 	<ul style="list-style-type: none"> See A1.
<ul style="list-style-type: none"> Number of premises visited 	<ul style="list-style-type: none"> Increasing number of premises visited per day increases risk of contact with infected animals and increases risk of FMDV transmission to uninfected premises. For example: Cattle AI: An itinerant inseminator travels between roughly 20 premises a day, coming into direct contact with cattle. Ovine AI/ET: AI/ET of sheep involves the synchronization of recipient ewes, usually using progesterone sponges and a subsequent surgical procedure, usually conducted on farm, to inseminate or implant embryos. The latter procedure requires a surgical team, under the supervision of a veterinary surgeon, to travel between premises (up to 3-4 a day in peak season) and conduct surgically sterile procedures on recipient ewes. Cattle inseminators therefore have the potential to spread any virus faster (SG VRA 13).
<ul style="list-style-type: none"> Number and species of animals exposed to livestock service provider 	<ul style="list-style-type: none"> Risk of exposure to infected animals is influenced by number of livestock contacted. For example the risk associated with a vet administering to one animal, or AI technician seeing a few animals would be lower than for ultrasound scanning for pregnancy diagnosis in sheep where a whole flock may require scanning. Undetected infection is most likely in sheep.
<ul style="list-style-type: none"> Ability to cleanse and disinfect personnel, equipment and vehicles between premises 	<ul style="list-style-type: none"> Since personnel will be handling livestock, the highest risks of transmitting FMDV between premises are associated with personnel and equipment. Appropriate cleansing and disinfection of outer garments and hands, and changing clothing between premises reduces the risk. There is evidence for FMDV transmission even with these precautions, but only for some FMDV strains, and from clinically infected pigs. This risk was removed by showering (Amass <i>et al.</i> 2003, Amass <i>et al.</i> 2004). The risk of FMDV transmission on equipment will be reduced or eliminated if equipment can be appropriately

	<p>cleaned and disinfected with an approved disinfectant, or if possible disposed of on the premises.</p> <ul style="list-style-type: none"> • Appropriate cleansing and disinfection of vehicle will reduce risks of passing FMDV to roads or other premises.
Risk of transmission: B2 Contaminated vehicles, personnel or equipment leave FMDV on the road or environment, which passes onto uninfected premises	
<ul style="list-style-type: none"> • Cleansing and disinfection of vehicles, personnel and equipment on leaving premises 	<ul style="list-style-type: none"> • Appropriate cleansing and disinfection with an approved disinfectant will reduce risks of contamination
Risk of transmission: B3 Contaminated vehicles, personnel or equipment move FMDV back to the service provider's home premises	
<ul style="list-style-type: none"> • Number of premises visited, number of susceptible animals contacted, infection risk of each premises 	<ul style="list-style-type: none"> • See B1.
<ul style="list-style-type: none"> • Cleansing and disinfection of vehicles, personnel and equipment 	<ul style="list-style-type: none"> • Appropriate cleansing and disinfection will reduce risks of contamination.
<ul style="list-style-type: none"> • Contact between vehicles and equipment and susceptible livestock 	<ul style="list-style-type: none"> • Preventing contact will reduce risk.

6. CONSEQUENCE ASSESSMENT

Spread of FMD to uninfected premises.

7. RISK MANAGEMENT OPTIONS

Livestock services such as AI and ET require operatives to come into direct contact with livestock and travel between premises with their respective equipment. This presents a risk of moving FMDV between premises if undisclosed infection is present. Highest risks are associated with visiting multiple premises, particularly where sheep are present and may harbour undetected infection, and insufficient cleansing and disinfection between premises.

Risk management options:

- (i) Do not allow any livestock services to resume.
- (ii) Allow resumption of livestock services essential to welfare or management under certain conditions, allowing single visits only, or insisting on mandatory periods between visiting different premises.
- (iii) As above but allow multiple visits per day.
- (iv) Allow resumption of all livestock services under certain conditions.

Non-essential services such as AI, ET and ultrasound scanning present an unnecessary risk in the early stages of the outbreak. Once the risk of undetected premises has reduced and data on movements and livestock tracings is available, the risk can be better quantified. If the risk is perceived to be low, livestock services can resume in the RZ. Option (iii) is likely to be the most appropriate at this stage, as long as appropriate cleansing and disinfection are carried out to reduce the risk of transmission between premises.

Overall the risk is low in the RZ, provided mitigation measures are observed.

This risk level was assigned based on scientific literature available and expert opinion where appropriate by considering the risk pathways and the factors affecting each risk pathway, as listed in sections 4 and 5.

8. SUGGESTED RISK MITIGATION MEASURES

Before allowing the resumption of livestock services that are essential for welfare or management reasons in the RZ, livestock movement and tracings data should be collected and analysed to assess the risk that undisclosed infection is present in the area of interest. If the risk is low, livestock services including AI, ET, veterinary services and foot paring represent a low risk, provided the following risk mitigation strategies are in place:

A. Before arrival

- (i) Visits should be limited to those considered essential for management.
- (ii) Stockmen should check animals for signs of FMD before the livestock service provider arrives on the premises.

B. Whilst at the premises

- (i) On arrival at any premises, all trailers and vehicles must be cleansed and disinfected. Approved disinfectants must be used at the correct concentration.
- (ii) If possible, livestock service providers should park their vehicles at the premises entrance and take onto the premises only the equipment needed.
- (iii) Clean protective clothing must be worn that can be appropriately cleansed and disinfected between visits, or else new protective clothing worn on each occasion.
- (iv) All equipment used must be appropriately cleansed and disinfected before work starts with an approved disinfectant.
- (v) Livestock to be handled on the premises must consist only of the animals to be treated.

C. On leaving premises

- (iv) All equipment used must be appropriately cleansed and disinfected at the end of a premises visit with an approved disinfectant. Any equipment that cannot be cleansed and disinfected appropriately, or used equipment for disposal, should be disposed of on the premises.
- (vi) A contract work book (e.g. a logbook) should be produced and maintained and signed by the owner of each flock/herd to confirm that disinfection has been conducted.
- (iii) All trailers and vehicles must be appropriately cleansed and disinfected with an approved disinfectant before leaving the premises. Sufficient supplies of water and approved disinfectant should be carried on the vehicle for this purpose.

It is assumed that all relevant legislation normally applicable is followed, for example regarding livestock identification and recording of movements.

9. SOURCES OF EXPERT ADVICE

This VRA is predominantly based on:

SG VRA 2007 #13 "What are the current risks of causing new outbreaks of FMD by allowing itinerant embryo transfer and artificial insemination teams to operate between livestock premises in mainland Scotland?"

and also took information from:

SG VRA2007 #15 "What is the risk of causing new outbreaks of FMD by allowing (1) the movement of susceptible livestock between premises in Scotland and (2) the resumption of itinerant livestock services?"

AHVLA VRA 18 "What is the risk of causing new outbreaks of FMD through collection and transport of bull semen and artificial insemination of cows?"

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12. NOTES

None