

VRA 4 - What are the risks of causing a new outbreak of foot and mouth disease (FMD) by allowing susceptible livestock that are caught in transit at markets to return home or to move to their new owner's premises, as an exemption from the immediate national livestock movement ban in the 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 the RZ movements of animals are permitted, but only under the authority of a licence granted by an inspector (FMD Order (Scotland) 2006, schedule 6, paragraph 1). Therefore, movements of animals caught at market could be permitted under licence.

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.

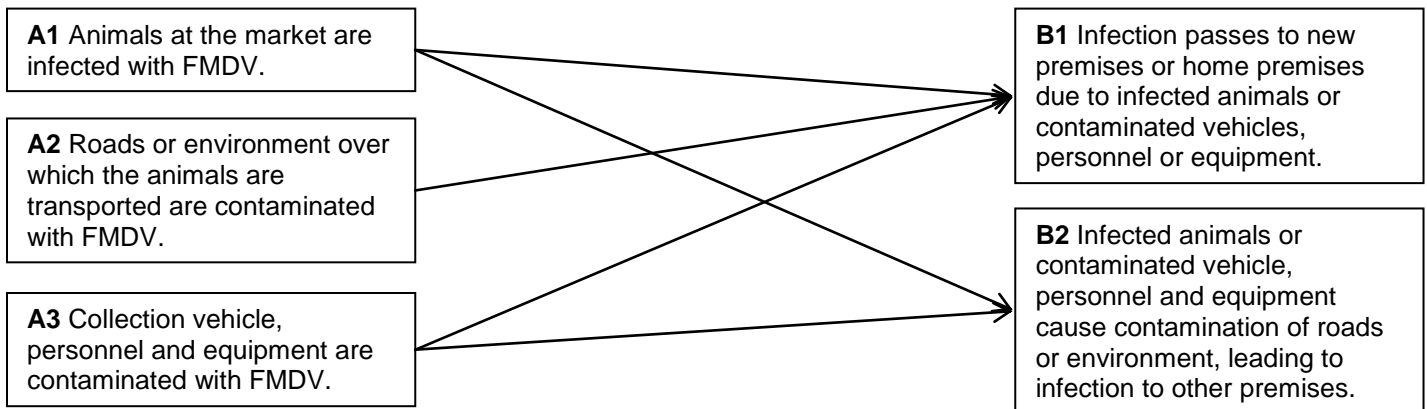
3. HAZARD IDENTIFICATION

(a) Hazard: FMD virus (FMDV)

(b) Specific risk

Any movement of animals during an FMD outbreak increases the risk of further disease transmission. If any animals present at the market are infected with FMDV, the virus could be spread to uninfected premises. However, the welfare and logistics of livestock caught in transit at livestock marts must be balanced against disease control considerations when assessing the risk of causing new FMD outbreaks by allowing them to return home or proceed to their new owner's premises.

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>
<p>Infection source: A1 Animals at the market are infected</p> <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"> Since movements of animals stuck at markets are most likely to be necessary in the early stages of an outbreak, undetected or incubating infection is a significant risk. Animals infected whilst at the market are unlikely to exhibit clinical signs since they will still be within the incubation period. 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 (Alexanderson <i>et al.</i> 2003, 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.
<p>Risk that animals at the market are infected depends on:</p> <ul style="list-style-type: none"> • Origin of animals– infection status of origin premises and proximity to premises with FMD 	<ul style="list-style-type: none"> • The highest risk is presented by the presence of animals at the market that have come from premises where FMD is present but has not been detected, The risk of this happening is most likely for animals which have originated from the PZ or SZ. The risk of undetected premises with FMD in the RZ is low.
<ul style="list-style-type: none"> • Movements of animals prior to arrival at market 	<ul style="list-style-type: none"> • Animals which have moved recently prior to coming to the market, particularly from another market, present a high risk of having been exposed to FMDV. Statutory standstills should ensure that animals have not been moved within the previous 13 days in Scotland (20 days for pigs), which reduces this risk to very low assuming full compliance. Animals could also have moved from England, where the statutory standstills are 6 days for cattle, sheep and goats.
<ul style="list-style-type: none"> • Number and species of animals at market 	<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, meaning that the disease can often spread more widely before detection.
<ul style="list-style-type: none"> • Proximity of market to infected premises 	<ul style="list-style-type: none"> • Close proximity of the market to infected premises increases the risk that animals may have originated from premises where FMD is present but has not been detected. In addition, there is increased risk of indirect transmission via roads, vehicles, personnel, equipment or air borne infection.
<ul style="list-style-type: none"> • Likelihood of detection and transmission is influenced by FMDV 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"> • Degree of mixing between groups of animals at market 	<ul style="list-style-type: none"> • More mixing means more animals may be exposed. Mixing for prolonged periods of time increases chance of transmission occurring. The degree of mixing is difficult to quantify and in most situations the market would be likely to function as one epidemiological unit, in the same way that one premises would do.
<ul style="list-style-type: none"> • Inspection of animals for clinical signs 	<ul style="list-style-type: none"> • Regular inspections will increase the speed at which disease is detected, reducing the potential for spread.
Infection source: A2 Roads or environment over which the animals are transported are contaminated with FMDV	
<ul style="list-style-type: none"> • Proximity to premises with FMD, stage of outbreak, strain differences 	<ul style="list-style-type: none"> • See A1.
<ul style="list-style-type: none"> • Biosecurity of local premises, cleansing and 	<ul style="list-style-type: none"> • FMDV is very sensitive to approved disinfectants and

disinfection procedures in place	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"> FMDV 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).
Infection source: A3 Collection vehicle, personnel and equipment are contaminated with FMDV (for example if a new owner sends transport or if a contractor is used for transporting animals)	
<ul style="list-style-type: none"> Presence of infected livestock at premises of despatch of transport, if not farmer's own transport 	<ul style="list-style-type: none"> Presence of livestock introduces risk of vehicle, personnel or equipment being contaminated on leaving the premises if undetected infection present. Livestock are not commonly present on premises used for processing or disposal of animal by-products so this risk is very low.
<ul style="list-style-type: none"> Movement history of vehicle 	<ul style="list-style-type: none"> Any previous movements close to infected areas increase risk. Movements to multiple slaughterhouses or premises increase risk.
<ul style="list-style-type: none"> Failure to appropriately cleanse and disinfect vehicle, personnel and equipment prior to leaving each premises visited, including disposal premises 	<ul style="list-style-type: none"> FMDV is very sensitive to suitable disinfectants and good biosecurity will reduce risk of virus transfer to roads via fomites such as personnel, vehicles and equipment.
Risk of transmission: B1 Infection passes to new premises or home premises due to infected animals or contaminated vehicles, personnel or equipment	
<ul style="list-style-type: none"> Number of animals moving 	<ul style="list-style-type: none"> Larger number of animals moving increases risk of transmission.
<ul style="list-style-type: none"> Number and species of other susceptible animals on the premises and ability to keep stray animals separate from other susceptible livestock 	<ul style="list-style-type: none"> Whilst these factors do not affect the risk of the premises becoming infected, smaller numbers of animals or effective separation of animals may reduce the risk of onward transmission to other premises by decreasing the total number of animals that become infected at the premises and hence total viral load. Movement standstills will reduce risk of onward transmission to other premises through further animal movements.
<ul style="list-style-type: none"> Cleansing and disinfection of vehicle, personnel and equipment 	<ul style="list-style-type: none"> Appropriate cleansing and disinfection will reduce risk of virus transfer to premises via fomites such as personnel, vehicles and equipment.
<ul style="list-style-type: none"> Length and duration of journey, number of stops 	<ul style="list-style-type: none"> Increasing length, duration and number of stops increases risk of contamination.
Risk of transmission: B2 Infected animals or contaminated vehicle, personnel and equipment cause contamination of roads or environment, leading to infection to other premises	
<ul style="list-style-type: none"> Length and duration of journey, number of stops, proximity of route to susceptible animals 	<ul style="list-style-type: none"> Longer journeys, multiple stops and proximity to high densities of susceptible animals increases risk.
<ul style="list-style-type: none"> Suitable vehicle and cleansing and disinfection of vehicle, personnel and equipment 	<ul style="list-style-type: none"> Suitable vehicles and appropriate cleansing and disinfection will reduce risk of virus transfer to roads via fomites such as personnel, vehicles and equipment.

6. CONSEQUENCE ASSESSMENT

Spread of FMD to uninfected premises. Movement from markets have the potential to disseminate infection over large geographical areas, if animals with undisclosed infection are moved to a number of premises.

7. RISK MANAGEMENT OPTIONS

There is a risk that permitting susceptible livestock in caught in transit at markets to proceed to their destinations, as an exemption from Restricted Zone measures leads to spread of FMD to uninfected premises. The greatest risks are associated with animals with undetected infection, either because they are still in the incubation period, or because there

are few clinical signs, as is often seen with sheep. By necessity, movements of livestock from markets to home or other premises occurs before full information is available regarding movement history and before a full incubation period has passed, meaning that undisclosed infection may be present.

Potential risk management options are:

- (i) Do not allow animals to return home or move to new owner's premises. Animals must be humanely destroyed or moved direct to a slaughterhouse.
- (ii) Allow animals to return home or move to new owner's premises under certain conditions regarding biosecurity, and with restriction on subsequent movements of animals from that premises. The choice of destination should be dependent on considerations of whether the home or intended destination premises appear to be at greater risk in relation to known sites of infection.

Option (i) represents the lowest risk but is unlikely to be necessary in the RZ, unless the origins of animals at the market make it highly likely that FMDV is present in animals that are or were recently there. In a RZ, where none of the animals have originated from a SZ or PZ, option 2 is appropriate and reduces the risk to low.

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

Subject to the following conditions, movement of animals caught at market to their home premises or to their new owner's premises represents a low risk, provided the following risk mitigation strategies are in place.

A. Before movement

- (i) Livestock should be subject to veterinary inspection to ensure that no animals at the market show clinical signs of FMD.
- (ii) Cleansing and disinfection facilities must be available at the market. Vehicle, personnel and equipment should undergo cleansing and disinfection when leaving their own premises, at the market, and when arriving at the premises of destination. Approved disinfectants must be used at the correct concentration.
- (iii) Collection vehicles and personnel should minimise contact with susceptible livestock at the market other than those they are collecting.

B. During movement

- (i) Animals should be moved directly to their destination, with only one premises visited per journey i.e. no multiple drop offs or pick ups.
- (ii) A contingency plan should be kept in case of accident or breakdown *en route*, to minimise any increases likelihood of spread of disease if it was present

C. After movement

- (i) Records must be kept of each consignment to include origin and ownership, place of departure, date and time of departure, place of destination and duration of the journey (as per movement legislation).
- (ii) Animals arriving at their destination premises should be kept securely and separate from other susceptible livestock as far as possible for at least 21 days and should not be allowed to join common grazing during this period. None of the animals at the premises should be permitted to move off the premises within this time.

Movements to destinations in England would be dependent upon reciprocal licensing arrangements under the Foot and Mouth Disease (England) Order 2006.

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 based on VRA 2007 #14 held by the Scottish Government "What is the risk of causing new outbreaks of FMD by allowing susceptible livestock, that are caught in transit at markets, to return home or to move to their new owners premises, as an immediate exemption from the immediate national livestock movement ban?".

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12. NOTES

None