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Precautionary SAGE on UK Preparedness for a Potential Foot-and-Mouth (FMD) Disease Outbreak.

Held on 01/05/2025 via Microsoft Teams

Situation update:

1. A brief update was given on the latest foot-and-mouth disease (FMD) situation in Europe:
 - a. There have been two incursions in Europe this year. There was a single outbreak in January in Germany. An unrelated incursion was reported in March in Hungary, and then in Slovakia. There have now been five outbreaks in Hungary and six in Slovakia. The most recent outbreak was confirmed on 17/04/25 in Hungary.
 - b. The origins of these incursions have not yet been confirmed.
 - c. The risk of FMD entering the UK is currently assessed as medium by the Animal and Plant Health Agency (APHA). The last FMD outbreak in the UK was in 2007.

Reporting in the Event of an Outbreak:

2. Government Chief Scientific Adviser (GCSA) requested:
 - a. *An overview of government's plan for data flows, modelling, analysis and reporting during a UK FMD outbreak.*
3. In the event of an outbreak or suspected outbreak:
 - a. When a suspected case is reported a temporary control zone might be implemented whilst sampling and testing of clinical cases is conducted. The Chief Veterinary Officer (CVO) would give confirmation of any verified FMD outbreak. Confirmation would lead to the immediate implementation of 3km protection zone and 10km surveillance zone.
 - b. APHA will work with The Pirbright Institute to identify where the disease originated and where it may have spread to.
 - c. This starts with investigation and analysis on the infected farm including lesion aging in infected animals to understand how long the outbreak has been ongoing and identifying animal movements to other farms to understand potential spread.



- d. APHA will undertake tracings of all potential contacts during the high-risk window as determined from initial investigations on the farm. Nearby (within 3km) premises will also be investigated, prioritised by proximity to the infected premises.
 - e. Data gathered from the investigations will feed directly into analyses and models.
 - f. Tracking FMD spread is challenging because livestock movements are not reported in real time. Farms have up to three days to report movements, movement records are often filed on paper requiring digitalisation, and reporting is not required for movements within farm businesses that occupy multiple locations. Given the data limitations, APHA staff also visit farms to support data reporting systems, looking at records and speaking to farmers to supplement their understanding.
 - g. Pirbright would analyse the genetic data and carry out serology and strain identification to provide information on transmission chains.
4. Precautionary SAGE agreed that a further discussion needed to take place between GCSA, CVO and Defra to determine:
- a. What data are available to be shared now with internal and external modellers to support model development.
 - b. The status of relevant data-sharing agreements to enable data sharing within and outside of government.
 - c. How government ensures data, analysis and advice are aligned between departments and disseminated to ministers through agreed routes.
 - d. If a separate modelling group, equivalent to SPI-M, would be needed.

ACTION 1: GCSA to chair a meeting with CVO and Defra CSA to agree next steps in data and information sharing, internally and externally of HMG, and decide whether a SPI-M equivalent modelling group is required to support preparedness.

Vaccination:

- 5. GCSA posed the question:
 - a. *Based on the scientific evidence, what is our recommendation on the use of vaccination in response to an FMD outbreak in the UK?*
- 6. GCSA invited discussion, reminding participants that any advice needed to be framed within the context of the country regaining “disease free” status as soon as possible.
- 7. Precautionary SAGE participants made the following points:



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- a. Pirbright will match the outbreak strain to a vaccine. Defra have a time-limited contract for the purchase, storage and emergency production of vaccine with a commercial provider. The provider holds the strains most likely to cause a UK outbreak as advised by Pirbright but does not hold all strains.
- b. There is no pre-existing FMD vaccination strategy within government.
- c. Use of vaccination alone, instead of culling, would not be advised by Precautionary SAGE. It is possible to achieve the status of “disease free with vaccination,” however, the trade benefits of this status are reduced compared to “disease free without vaccination”, as is our current status.
- d. Suppressive vaccination could be used as part of the culling strategy to prevent or to reduce spread whilst animals await culling. Vaccines have been used to reduce viral shedding prior to culling in recent outbreaks in Slovakia and Hungary. Some animals can be vaccinated faster than they can be culled.
- e. There are many factors that need to be considered in a vaccination strategy. The response to vaccination between different animals is unclear. Within a single epidemic, any immune escape would be limited, meaning vaccines should have a long lifespan and remain effective for the duration of the epidemic (high confidence). It is uncertain how much viral shedding would be seen in vaccinated animals that could result in continued transmission. However, viral shedding would likely be less in vaccinated animals than in unvaccinated animals (high confidence). Any vaccination regime would need to consider capacity and cost, which could be significant, versus benefit.
- f. Government’s current FMD model can be used to model vaccination scenarios for the FMD O strain and inform the strategy. There is a long-term need to develop a new model which builds in changes since the 2001 outbreak, for example, different FMD strains, changes to farmland use and modern methods of recording animal movement. Model development takes 3-5 years.
- g. Scenarios could be used to inform vaccination strategy before an outbreak occurs, and to inform decision making in that event.

ACTION 2: Defra to convene a subgroup to explore how scenario planning could inform vaccination strategy.

ACTION 3: Defra to progress development of an updated FMD model.



Culling:

8. GCSA posed the question:
 - a. *Based on the scientific evidence, is advice still (as in 2001) that animals at all infected premises should be culled within 24 hours of confirmation, and all dangerous contacts within 48 hours (24/48 policy)?*
9. Precautionary SAGE participants made the following points:
 - a. Based on the available scientific evidence and learning from previous outbreaks (including 2001), Precautionary SAGE's advice is that the 24/48 culling policy, combined with disinfection of premises, is the most effective response to an outbreak to stop spread and return to disease free status if it can be properly resourced (high confidence). Animal welfare should be a key consideration in implementing this policy.
 - b. Modelling suggests that had the 24/48 policy been used from the start of the 2001 crisis the total number of infected premises would have reduced to 57% of what was seen in 2001, and total culls would have reduced to 54%.¹
 - c. The 24/48 culling policy should not be conflated with contiguous culling where animals are culled from farms that are located near or adjacent to farms with confirmed cases.
 - d. Implementing the 24/48 policy requires significant resources. Relevant policy leads should review resource capacity, including appropriate vets, vehicles and drivers. This includes reviewing relevant contract arrangements to surge resources.
 - e. Precautionary SAGE highlighted that it would be useful for policy makers to work with scientists and economists to consider different outbreak scenarios, response plans and risk appetite for extending the time to disease-free status to determine if there are any scenarios where the 24/48 policy isn't considered the primary response. This could include consideration of any future vaccination strategy. The relevant economic expertise is not present in SAGE.

1

Keeling, M et al. (2001). Dynamics of the 2001 UK Foot and Mouth Epidemic: Stochastic Dispersal in a Heterogeneous Landscape. *Science*, 813-817.



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10. GCSA then posed the question:

- a. *Should dangerous contacts be tested before culling to better inform epidemiology of the outbreak?*

11. Precautionary SAGE participants made the following points:

- a. Pre-culling testing of dangerous contacts could be useful to inform epidemiology in the early stages of an outbreak (medium confidence). However, the frequency of testing required to reduce the risk of false negatives may be disproportionate to the benefits.

ACTION 4: Defra to consider convening policy, science and economic experts to explore whether there are scenarios where the 24/48 policy would not be advised.

ACTION 5: Defra/APHA to investigate availability and capacity of vehicles and drivers needed for a possible FMD response, working with DfT where required.

ACTION 6: DEFRA to review contracting arrangements for surging resources to deliver the 24/48 policy.

Social and Behavioural Science Questions:

12. GCSA posed the question:

- a. *What outstanding questions could require urgent consideration by a separate SBS-focused commission or meeting?*

13. During discussions, SAGE participants highlighted the following points:

- a. It is imperative that the key social and economic drivers of FMD transmission inform epidemiological modelling of an outbreak.
- b. There will need to be good communication with farmers on why culling is required despite the existence of a vaccine. There is an extensive evidence base on factors influencing farmers' decisions to vaccinate that should be considered. See, for example, [Morgenstern et al \(2024\)](#)² and [Hill et al \(2022\)](#)³.

14. Following discussion, the key social and behavioural science questions to take forward were:

² Morgenstern, M et al. (2024). Would you bet on the vet? Influences on dairy farmers' vaccination choices, with a spotlight on the Veterinarian impact. *Preventive Veterinary Medicine*.

³ Hill, E et al. (2022). Modelling livestock infectious disease control policy under differing social perspectives on vaccination behaviour. *Public Library of Science*.



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- a. How should communications about potential FMD precautions and restrictions be framed in the context of social media and local (rural) media, particularly in a context where vaccines are available?
- b. How might farmers and different social and economic groups perceive and respond to the use of an FMD vaccine? And what factors are likely to influence farmers' decisions to vaccinate?
- c. What do we know about the capacity and motivation/resilience of vets and other frontline responders in the event of a FMD outbreak?
- d. How can the mental health of frontline workers and other affected groups be protected during an FMD response and the subsequent recovery phase?
- e. How might experiences of previous disease outbreaks (2001 FMD, bovine tuberculosis, highly pathogenic avian influenza and Covid) inform the responses of farmers, agricultural workers, rural communities and rural businesses to a new FMD outbreak?
- f. How might experiences of the 2001 FMD outbreak and Covid inform wider public debate and responses to a new FMD outbreak?
- g. Beyond the agricultural workforce, how might different sociodemographic groups be impacted by a FMD outbreak? What are the wider determinants of vulnerability in a FMD outbreak?
- h. Given changes in the organisation/structure of UK farming (and related infrastructure, e.g. abattoirs) since the last FMD outbreak in the UK, what lessons from the 2001 FMD response remain relevant?

Additional Science Questions

15. GCSA posed the question:
16. In the event of an FMD case in the UK, what questions will the first SAGE be asked, beyond vaccinations and culling?
17. Following discussion, the key themes and questions were:
 - a. What is the origin of the outbreak?
 - b. How big is the outbreak? Where has it spread to? How big will the outbreak be?
 - c. Should live animal movements be banned?
 - d. Should countryside recreational activity be restricted?
 - e. Does the UK have sufficient field and laboratory capacity to respond?
 - f. What will the impact be to and from wildlife (including deer)?
 - g. Can novel technologies support the response?



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h. Are rapid tests available?

18. This is a list of questions that were not addressed within this Precautionary SAGE but could be asked at a future SAGE in the event of a UK FMD outbreak, produced during the meeting by attendees. The inclusion of a question in this list does not indicate the answer is currently unknown, merely that it has not been addressed in this meeting.

ACTION 7: GO-Science to explore next steps with Defra on addressing the questions and themes identified in the ‘Social Behavioural Science Questions’ and ‘Additional Science Questions’ sections.

Actions:

Action	Owner
ACTION 1: GCSA to chair a meeting with CVO and Defra CSA to agree next steps in data and information sharing, internally and externally of HMG, and decide whether a SPI-M equivalent modelling group is required to support preparedness.	GO-Science
ACTION 2: Defra to convene a subgroup to explore how scenario planning could inform vaccination strategy	Defra
ACTION 3: Defra to progress development of an updated FMD model.	Defra
ACTION 4: Defra to consider convening policy, science and economic experts to explore whether there are scenarios where the 24/48 policy would not be advised.	Defra
ACTION 5: Defra/APHA to investigate availability and capacity of vehicles and drivers needed for a possible FMD response, working with DfT where required.	Defra/APHA
ACTION 6: DEFRA to review contracting arrangements for surging resources to deliver the 24/48 policy.	GO-Science/Defra



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ACTION 7: GO-Science to explore next steps with Defra on addressing the questions and themes identified in the ‘Social Behavioural Science Questions’ and ‘Additional Science Questions’ sections.

GO-Science

Attendees:

Scientific experts (20)

- Angela McLean (chair)
- Maggie Mort (Lancaster University)
- Steve Hinchliffe (University of Exeter)
- Simon Gubbins (The Pirbright Institute)
- Mike Tildesley (University of Warwick)
- Steven McCulloch (University of Winchester)
- Rowland Kao (University of Edinburgh)
- Piran White (University of York)
- Robin May (CSA FSA)
- Chris Lewis (dCSA FCDO)
- Gideon Henderson (CSA Defra)
- Christine Middlemiss (CVO)
- Helen Roberts (Defra)
- Clare Wild (APHA)
- Nigel Gibbens (Former CVO)
- Dan Horton (APHA)
- Charlotte Cook (APHA)
- Anna Ludi (The Pirbright Institute)
- Charlotte Paterson (SitCen)
- Valerie Mioulet (The Pirbright Institute)

Observers and officials (10)

- Julie Fitzpatrick (CSA Scotland)
- Jas Pal Badyal (CSA Wales)
- Sarah Sharples (CSA DfT)
- Richard Prager (CSA MHCLG)
- David Johnson (dCSA HSE)
- Nicholas Moiseiwitsch (dCSA HO)

4 observers redacted.



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Secretariat (15)

- Ted Hayden
- Jane Williams

13 secretariat redacted.

Annex A: Definition of Confidence Statements

In this document, confidence is defined as follows.

- High confidence: High degree of certainty in the answer. Well-understood science with strong and robust evidence base.
- Medium confidence: Reasonable degree of certainty. There is evidence to support but there are some important gaps.
- Low confidence: High degree of uncertainty. Major evidence gaps. Advice is very generalised or theoretical but not yet supported with strong data, or completely unknown.