British Equestrian

Equine Infectious Disease Advisory Group

Advice Notes for Member Bodies and Organisers of Equine Gatherings

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Equine Infectious Disease Advisory Group (EIDAG)

Advice notes for BEF Member bodies and organisers of horse gatherings

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The EIDAG produced these notes for British Equestrian and its member bodies to help reduce risk of infectious disease spread when horses gather. We encourage sharing and will be delighted if other organisations would like to adapt them for their own purposes. Please contact office@bef.co.uk to request a copy in a format suitable for further publication. The advice notes will be reviewed and wherenecessary updated by EIDAG on an annual basis.

Disclaimer

The information, including but not limited to, text, graphics, images and other material contained in this handbook are for information purposes only. The content of the handbook is not intended to be a substitute for professional veterinarian advice, diagnosis, or treatment, nor should veterinary surgeons rely on it as a substitute for their own knowledge and expertise in dealing with the facts and circumstances of individual cases.

***Horse owners** should always seek the advice of their vet or other qualified animal health care provider regarding a medical condition or treatment and before undertaking a new health care regime for their horse and should never disregard professional veterinary advice or delay in seeking it because of something contained in this handbook.*

*EIDAG advise **veterinary surgeons** that consent should be obtained from horse owners/ agents prior to use of a vaccination regime that is not consistent with data sheet recommendations and would therefore be considered "off licence". Similarly, consent from horse owners/agents should be obtained prior to administration or prescription of medications not licensed for use in the horse.*

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Infectious Disease Management

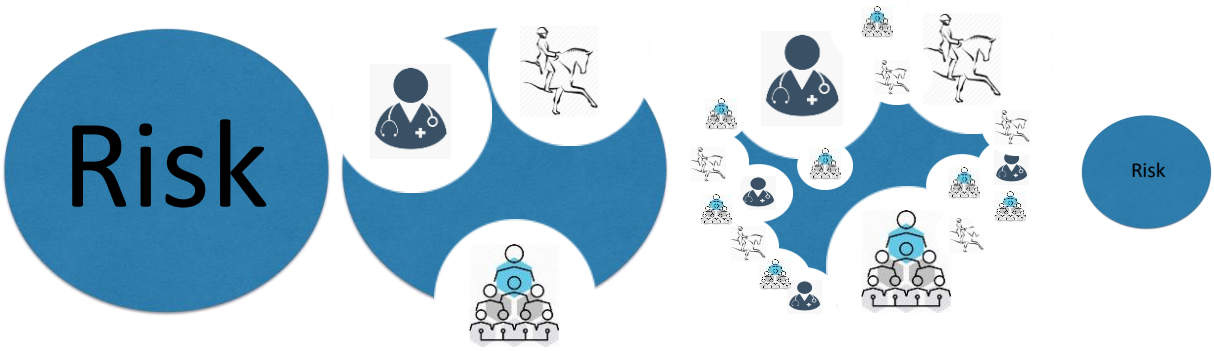
Why is it critical to reduce the risk of equine infectious diseases?

Infectious disease represents a major threat to equine welfare, and can lead to cancellation and curtailment of competitions at local or national levels. Mixing of horses at competitions can enable infectious diseases to spread, and it is clearly the responsibility of BEF member bodies (BEF-MB) to mitigate against this risk, and to minimise the risk of disease spread.

These advice notes have been prepared by a group of volunteers with expertise in equine medicine and infectious diseases. They are based on the current best evidence and will be regularly reviewed and up-dated as necessary in the future.

The specific aim of these Advice Notes is to provide practical guidance to help individuals or groups who are organising BEF affiliated and national competitions as well as other gatherings of horses such as training camps, rallies etc. Each advice note has some brief general background information about the specific diseases, however horse owners and riders who are seeking to educate themselves about equine disease in general, are likely to find resources contained in BEF's 'Diseases to know about' section more useful (https://www.britishequestrian.org.uk/equine/health-biosecurity/diseases-to-know-about).

A team effort for risk reduction



Each stakeholder group contributes to risk reduction
& together multiple individual interventions and strategies reduce the total risk

Infectious disease risk can be managed and reduced, however it is not realistic to expect that it can be removed completely. It is critical that this challenge is approached as a partnership between horse owners, riders and other participants, the BEF-MB and the veterinary surgeons who are providing primary care to BEF-MB members and those advising BEF-MB.

There is no single strategy which can reduce risk of every infectious disease and some interventions are more effective in one disease than others. By combining multiple

interventions and strategies, the overall risk of infectious disease can be reduced. Below, the pillars of infectious disease management are summarised, and in each of the disease specific advice notes, the most important disease-specific control measures, are highlighted. Common themes in all advice notes are measures to reduce the likelihood that a horse which is actively infectious will attend a gathering, information sharing when disease occurs, vigilance and early diagnosis.

Which diseases should BEF member bodies focus on?

Clearly any equine disease is regrettable. However, from the perspective of organisers of gatherings at which horses mix, it is important that efforts are focussed on those diseases where horse mixing is an important contributor to disease transmission.

Infectious diseases are caused by microscopic 'germs' (such as bacteria or viruses) that get into the body and cause disease. Infectious diseases can be spread between horses either directly (for example from one horse coughing near another), or indirectly via the transfer of live infectious material on someone's hands, bedding or a piece of equipment.

Some diseases are spread indirectly via insect vectors that transfer the infection between the animals on which they feed. These include Piroplasmosis (spread by ticks) and several exotic diseases such as Equine Infectious Anaemia (biting flies), West Nile Fever (mosquitoes) and African Horse Sickness (midges).

There are a variety of diseases that are caused by micro-organisms that do not spread from horse to horse and are therefore not covered in the BEF Advice Notes. Tetanus is an example where the horse picks up the infectious organism, *Clostridium tetani,* via a penetrating wound and this infection produces toxins locally, which cause the disease. There is no risk of an infected horse coming to a competition, or horse gathering, infecting other horses with tetanus.

Infectious diseases are broadly classified as endemic or exotic in the UK. **Endemic diseases** are defined as conditions which regularly occur at some level. Equine influenza, Equine herpes virus (EHV-1 and -4) and strangles are examples of infectious diseases which are endemic in the UK. These examples are all respiratory diseases and can cause outbreaks involving variable numbers of animals. Influenza, in particular, can quickly spread over fairly large distances, certainly encompassing the typical area of a competition, whereas EHV and strangles generally require fairly close contact to spread. Other endemic diseases covered by these advice notes include enteric (gastrointestinal) infections, such as Salmonella and coronavirus, and the skin condition ringworm, the spread of which also requires close contact between horses or with infected material. Most adult horses have a degree of immunity to ringworm; however, it is important because it can infect humans, particularly children and young people, and it can stop individual horses being able to wear tack, thus preventing them from competing.

Exotic diseases are those which do not generally occur in a given region but which may be introduced by infected animals or infected insect vectors and create disease outbreaks amongst the native population. Because UK horses will be most unlikely to have ever encountered specific exotic diseases, they have no immunity and are very vulnerable to

severe illness if it does occur. Some equine exotic diseases can involve other species, including humans, and all have the potential to endanger the national herd; consequently, there are UK Government regulations on how to manage suspected cases. Diseases which must be reported to government are known as "**notifiable**". There is also more information about these diseases and the regulations associated with them in our disease-specific advice notes.

Strictly, the term **syndrome** refers to a group of clinical signs; however, it is also often applied to a collection of diseases and disorders with different causes which may present in the same way, sharing certain key clinical signs. These advice notes include information on two syndromes relevant to infectious disease management: neurological diseases and enteric diseases.

Pillars of equine infectious disease management

1. **Responsibility:** EIDAG recommends that BEF-MB should appoint a named veterinary adviser at national committee level with specific responsibility for EID strategy. This individual will act as the point of contact between the BEF's Emergency Response Group (ERG) and the BEF-MB's officers and administrators.
    a. The EID veterinarian will have a key role in risk assessment when infectious disease threaten MB's activities locally or nationally and in formulating appropriate responses when the MB receives reports that infectious disease may have occurred at horse gatherings
    b. The EID veterinarian should also be available to support local organising committees to enhance biosecurity in cases of locally increased risk.
    c. To ensure rapid and seamless communication between ERG and the EID veterinarians, contact details should be registered with BEF and any changes in personnel should be reported promptly.
2. **Risk communication and responsiveness**: The BEF's ERG monitors and assesses the international and national risk level. BEF-MB should have clear channels of communication and protocols for promptly acting on the ERG's advice.
    a. This should include pre-defined effective structures and steps for cancelling gatherings in the face of nationally increased risk.
    b. BEF-MB should liaise with BEF's ERG to promote unified messaging around infectious disease.
    c. Cancellation of a horse gathering is disappointing; however, in the face of infectious disease threats this course of action may be highly responsible, as it reduces the potential for onward spread of disease that would put additional animals at risk of suffering clinical infectious disease.
3. **Education and Rising standards:** BEF-MB should review BEF's equine infectious disease advice notes at national committee level and proactively decide the minimum standards to be followed by organisers of gatherings and encourage local organisers to raise standards.
    a. Standards should be set out in terms of agreement between BEF-MB and venues hosting affiliated competitions, training camps and other horse gatherings.
    b. BEF-MB should promote education of riders and horse owners on equine infectious disease.

i. BEF's website is an excellent disease information resource: https://www.britishequestrian.org.uk/equine/health-biosecurity/diseases-to-know-about.
ii. Additional mechanisms might include the provision of biosecurity information in member joining packs, the promotion of educational material at gatherings and the inclusion of biosecurity and infectious disease information with general information on specific competitions.
iii. Participants and owners should be made aware that even if their own horse appears well, there is the potential for it to have subclinical infection from other infected horses on their yard which it might spread to others if it is brought to a gathering. Therefore, participants and owners should be encouraged to understand the possible detrimental consequences of travelling an apparently healthy horse to an event from premises at which horses havea potentially infectious disease, either with or without a specific diagnosis.

4. **Vaccination:** Ensure that horses coming to gatherings have immunity by using vaccines against, as a minimum, equine influenza.
5. **Vigilance and risk reduction:** inspect and certify that horses entering the gathering are not harbouring infectious disease.
    a. This can primarily be implemented via declarations of "*health and freedom from disease and contact*" and use of such declarations should be considered in periods where nationally, regionally or within a specific group of horses participating within a discipline(s), disease risk is recognised as being high.
    b. There are now numerous readily available online "event check-in" tools which have become popular due to COVID-19. BEF will help BEF-MB select tools suitable for their needs.
    c. Additional precautions may range from veterinary inspections leading to quarantining of animals if necessary to, at the most basic level, spot checks by officials at the gathering.
    d. Organisers should raise awareness of infectious disease risk immediately before any gathering by direct contact with participants, for example via text, facebook messaging etc. Recommended key messages are listed in the Appendices
    e. Each advice note outlines are series of recommendations for how horses which have suffered from, or been in contact with, specific infectious diseases can subsequently be defined as "free" of that disease.
    f. BEF-MB should be prepared to consider, on a case-by-case basis, appeals for exemptions to these recommendations provided such appeals are based on robust veterinary evidence.
    g. Recommendations for contents of self-declaration forms are provided in the Appendices.
6. **Biosecurity practice: participants:**
    a. BEF-MB should inform participants how to avoid cross contamination between participants and their horses and how to reduce risk to other horses when the return from gatherings
        i. For an example of a guide to participant good practice see Appendices

b. There should be a commitment enshrined in all BEF-MB's codes of conduct that participants and horse caretakers are obiliged to inform the local organisers at any gathering if they have any reason to believe that any horse is ill while at a gathering.

7. **Biosecurity practice: stabling:**
   a. Where venue organisers provide stabling to allow horses to staying onsite there should be adequate good quality stabling for all competitors and compulsory cleaning between occupants.
   b. Records of which stables were assigned to which participant should be kept.
8. **Early disease recognition:** Highlight the potential that horses returning home from gatherings may be incubating infectious disease and can infect others
   a. This information might be, for example, included in self-certifying templates, signage at gatherings, and/or provided with general information on specific competitions.
9. **Transparent information sharing:** A Tell, Trace, Temp & Test Strategy to allow reporting of disease incidents to enable tracing of potential contacts, triggering enhanced monitoring and potential testing for disease should be adopted. Participants and owners should be obliged, expected or encouraged to report to the BEF-MB when horses are diagnosed with an endemic infectious disease by a veterinary surgeon after attending gatherings, thus enabling potential contacts to be traced if they are considered at risk of disease.
   a. BEF-MB have a duty of care and obligation to distribute information on potentials contact with infectious disease in the interests of equine welfare and to achieve this each BEF-MB must encourage a culture of transparent information sharing between the association and its members.
   b. Placing a requirement on horse owners and participants to report episodes of infectious disease in horses, both at and following recent attendance at gatherings, should be included in regulations for membership of every BEF-MB with the potential for sanctions against individuals who do not comply (for recommendations on wording relating to infectious disease in membership codes of conduct see Appendices).
   c. Recommendations for contents for infectious disease reports are given in Appendices.
   d. Reports from horse owners/participants should be directed to the BEF-MB's EID veterinarian who, in turn, should assess risk of spread amongst others, taking account details of the reported case; disease incubation and shedding features; and the nature of the specific gathering.
   e. Any advice issued to other participants who attended the same gathering regarding potential contact with infectious disease must include clear guidance on how this potential contact will affect the horse's *Freedom from disease and contact* status for upcoming gatherings.
   b. Each BEF-MB should decide whether reporting requirements are applied to all endemic diseases included in these advice notes, or whether there are any exceptions. The EIDAG encourage reporting of all endemic diseases; however, a staged introduction may have merit and recognise that the importance of ringworm varies depending on the the participants, being

arguably most important where children and young people are frequent participants.

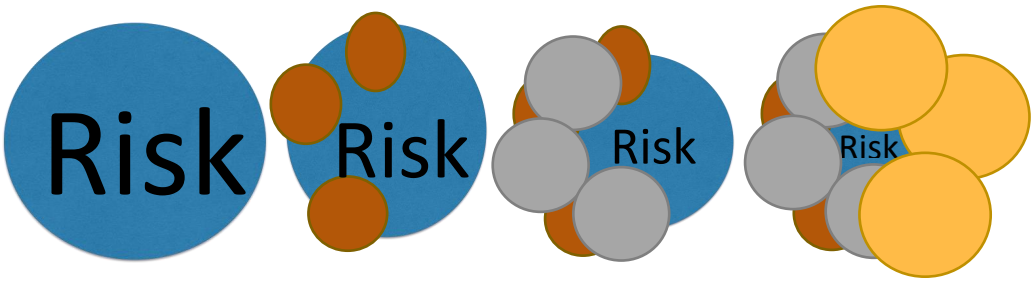
c. EIDAG recommend the reporting phase is time-limited and propose a 14-day window based on observation of first signs of potential infectious disease after a gathering, mindful that laboratory results confirming diagnosis may not be available for several days.
d. False diagnoses can cause considerable concern and excessive reliance on owner-diagnosed disease reports may create confusion. EIDAG encourage reporting only where the disease has been confirmed by a veterinary surgeon and with appropriate laboratory test results. The BEF-MB's EID veterinarian should work as closely as possible with the veterinary surgeons attending the index case (i.e. the case which has prompted the infectious disease report) to ensure the diagnosis of infectious disease is rigorous before sharing any information on potential contact with an infectious disease. It is essential that attending veterinary surgeons have client consent before they interact directly with BEF-MB.
e. BEF-MB should ensure that they have the rights to seek more information directly from the attending veterinary surgeon(s) engaged by the owner or participant of a suspect case(s) (see Appendices).
f. BEF-MB should ensure that the rights to trace horses that have potentially been in contact with infectious disease and contact their owners is defined in their agreement(s) with the owner of premises where affiliated gatherings are held (see Appendices).
g. There is a need to deal with infectious disease reports sensitively. When infectious disease is linked to a specific gathering EIDAG recommends that the venue owner(s) are contacted first and encouraged to join the BEF-MB in their efforts to trace and inform participants.
h. Reasonable efforts should be made to contact participants directly before releasing general information about potential infectious disease contacts via the press and/or social media.
i. Any press releases made by the BEF-MB or their officers must be mindful of the need for confidentiality when discussing veterinary information. BEF press officers are available to provide support.

10. **Support National Infectious Disease Management:** There is limited public or government support for endemic equine disease surveillance, prevention and management in the UK. Every BEF-MB should develop plans to finance:
    a. Maintenance of their disease incident report and trace programmes.
    b. Contributions to national programmes.

Translating infectious disease management pillars into achievable and specific actions

Risk reduction is a cumulative process – collectively multiple small actions can have a big impact. The EIDAG recommend that BEF-MB implement these pillars as soon as possible but recognise that individual BEF-MB may have different priorities and may not necessarily want to introduce multiple changes simultaneously. Below we have subdivided some areas for action into gold, silver and bronze levels, anticipating that bronze will be easy to achieve but will have less impact on reducing infectious disease risk than more challenging gold measures. This three-tier approach also allows BEF-MB to envisage how they might seek to raise standards over time. We urge BEF-MB to develop their own roadmap to ultimately implementall pillars at the highest standard, but we also suggest that BEF-MB begin to introduce the more achievable measures very quickly. EIDAG envisage that BEF-MB will set standards and local organisers will work at the defined standards. BEF-MB may choose to mix gold, silver and bronze standards – for example, a BEF-MB might decide gold standard should be applied for pillar 5, with silver or bronze standard acceptable for pillars 6 and 10 or Bronze level for pillar 6 might be combined with gold or silver level for other pillars.

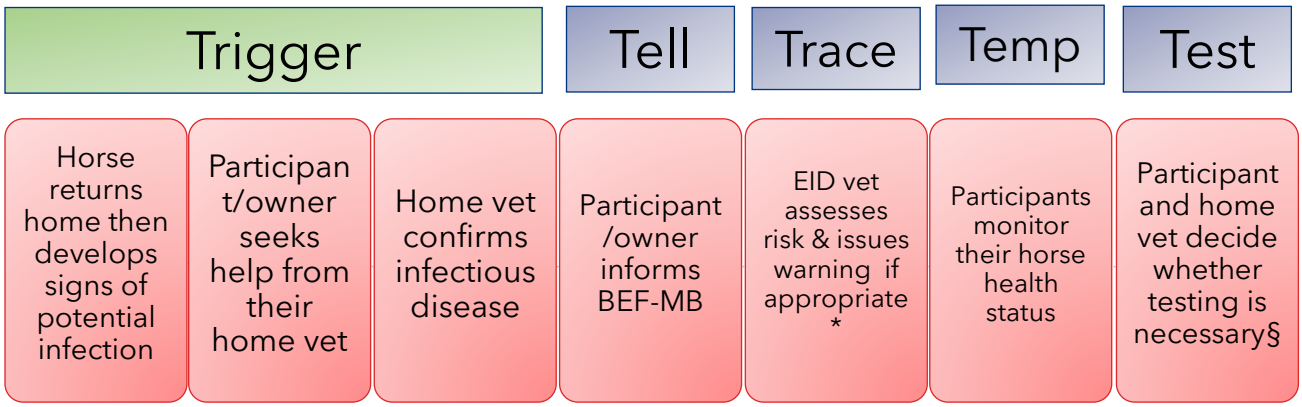
A gold-silver-bronze approach



Biosecurity measures additively reduce risk and this cumulative effect is highest at gold level; however, bronze measures are a good way to begin this process

	Pillar	Gold standard	Silver Gilt standard	Silver standard	Bronze Standard
1	**Responsibility:**	appoint an EID veterinarian at national committee level			
2	**Risk Communication and Responsiveness:**	define communication channels and steps required to act on ERG's risk assessments and unify messaging			
3	**Rising Standards and Education**:	define and encourage improving biosecurity standards at horse gatherings & promote education of riders and horse owners on equine infectious disease			
4	**Vaccination:** Ensure that horses coming to gatherings are vaccinated as a minimum, against influenza with a primary course (V1-V2: 21-60 days apart), a first 6 month booster (V2-V3: 120-180 days apart) then subsequent boosters:	**Gold standard** Within 6 months, and at least 7 days previously, **every** passport checked on entry or digitally in advance	**Silver Gilt standard** Within 6 months, and at least 7 days previously, self-certified with random passport spot checks	**Silver standard** Within 12 months, and at least 7 days previously, **every** passport checked on entry or digitally in advance	**Bronze r standard** Within 12 months, and at least 7 days previously, self-certified with random passport spot checks
5	**Vigilance and risk reduction:** inspect and certify that horses entering the gathering are heathy and not harbouring infection disease	Self-certification of *Health and freedom from disease and contact* submitted not greater than 24hs before the animal arrives at gathering. Veterinary inspection at gate of entry, inspectors empowered to deny entry to stables and facilities available to isolate individual horses if necessary. Organisers **obliged** to send a "disease risk" memo to participants within 24hrs of gathering.		Self-certification of *Health and freedom from disease and contact* submitted not greater than 24hs before the animal arrives at gathering plus spot checks by competition judges/officials empowered to request veterinary advice or examination. Organisers **expected** to send a "disease risk" memo to participants within 24hrs of gathering.	Self-certification of *Health and freedom from disease and contact* at the time entry/attendance is registered with commitment not to attend if status changes. Spot checks by competition judges/officials empowered to request veterinary advice or examination. Organisers **encouraged** to send a "disease risk" memo to participants within 24hrs of gathering.
6	**Biosecurity practice: participants** biosecurity practices at gatherings should be promoted and enabled	Information resources provided before and at gatherings to encourage good biosecurity practices and limit contact between participants and their horses, including provision of hand sanitizing stations. It should be enshringed in the BEF-MB codes of conduct that horse caretakers are committed to informing the local organisers if they have any reason to believe that horses under their care are ill while at a gathering.			
7	**Biosecurity practice: stabling:** biosecurity practices at gatherings should be promoted and enabled	If stabling is provided by a venue, there should always be sufficient time to permit compulsory cleaning between occupants. As a minimum, this means the stable is completely mucked out and fresh bedding provided for each horse. Additional measures such as use of disinfectant on floors and walls are desirable. Records must be kept of which stables are assigned to each participant and should be made available to the MB if requested.			
8	**Early disease recognition:**	make horse owners aware of the potential that horses returning home from gatherings may infect others with information resources provided before and at gatherings			
9	**Transparent information sharing:** require participants to report infectious disease occurrence to reduce risk to others	Tell, Trace, Temp & Test Strategy **obligatory,** with potential sanctions determined by BEF-MB, all endemic diseases (ringworm optional), 14-day window		Tell, Trace, Temp & Test Strategy **expected**, all endemic diseases (ringworm optional), 14-day window	Tell, Trace, Temp & Test Strategy **encouraged**, all endemic diseases (ringworm optional),, 14-day window
10	**Support National Infectious Disease Management:**	every BEF-MB should put in place financial structures to enable them to maintain their disease incident report programmes and contribute to national equine infectious disease surveillance, prevention and management programmes			

Tell, Trace, Temp & Test Strategy



*- this must include clear guidance on how this *potential* contact will affect the horse's "*Freedom from disease and contact*" status for upcoming gatherings.

§- testing strategy will also be informed by advice from BEF-MB with respect to the horse's"*Freedom from disease and contact*" status for upcoming gatherings.

Practical biosecurity and risk reduction

Biosecurity involves a set of measures aimed at preventing the introduction and/or spread of harmful organisms, in order to minimise the risk of transmission of infectious diseases. Below we have summarised information which we urge BEF-MB to pass on to venues and local event organisers.

Actions recommended for organisers and officers at horse gatherings if horses are ill

Participants should be obliged to alert organisers if a horse at a gathering displays signs consistent with potential infectious disease:

- In most situations, rapid and accurate diagnostic assays will not be practically available during the event to confirm or negate specific infectious diagnoses.
- As an immediate step, the suspect horse should be moved away from other horses and people, or if this is not feasible, others nearby should be warned to keep their horses away from both the suspect horse and other horses.
- The next priority is to arrange for the suspect horse to have prompt veterinary attention.
- Decisions on case management and the need for isolation in individual cases of potential infectious disease will be dictated by the most likely cause and severity of clinical signs and should be determined by the attending veterinary surgeon.
- Ideally, and only if deemed fit to travel by the attending veterinary surgeon, the suspect horse should be transported off the premises where the horse gathering is taking place.
    - The suspect horse may be able to return home.

        - In this scenario, the horse's caretakers must be strongly advised to arrange for prompt veterinary advice at their home premises as soon as they return home on ongoing care and further investigations.
    - Consideration should be given to arranging for the suspect case to be moved to a facility where it can have any veterinary care it requires and can be isolated until infectious disease is ruled out.
    - It may be helpful for the veterinary surgeon present at the gathering to provide the horse's caretaker with brief notes on any clinical observations, medications given and their contact details to pass on to the veterinary surgeon(s) who will be taking the horse after it leaves the gathering.
- If the horse is to stay at the gathering and its clinical needs can be adequately met there, it should be isolated from other horses.
    - This may be by returning it to its transport or housing within isolation facilities at the gathering.
    - In this scenario, strict biosecurity measures should be adopted (wearing of gloves, hand washing, changing of clothes, disinfection of feed and water buckets/utensils etc.).
- It may be possible to continue the gathering after the suspect horse(s) have been removed:
    - Any horses that have been in direct contact with the suspect horse, for example due to the sharing of transport, facilities, personnel or equipment etc., should normally be required to leave.
    - There may be circumstances in which the attending vets and organisers are confident that these in contact horses can remain at the gathering without any close contact with other horses.
        - every effort should be made to prevent cross contamination between horses remaining at the gathering (i.e. no sharing of equipment, separate personnel etc.) and strict biosecurity measures should be adopted at all times (hand washing, changing of clothes, disinfection of feed and water buckets/utensils etc.) when separately handling the in-contacts and other horses at the gathering.

- Regardless of whether the gathering is immediately terminated or continues with enhanced biosecurity, if the attending veterinary surgeon considers that others at the gathering have potentially been exposed to infectious disease, other participants should be alerted promptly that they should monitor their own horses closely, keep them separate from others and seek veterinary advice if they see any signs of disease.
    - For this purpose, it is critical that event organisers and venues ensure that at every gathering they have a list of contacts for all participants to allow rapid sharing of information about any infectious disease concerns that arise during the gathering. For this purpose, apps allowing group chat, such as WhatsApp, are ideal.
        - The alert should include:

        - potential in-contacts that have left the venue before the case was identified.
        - the name of the disease that is suspected and give details of a contact person
    - Alerts should not include any confidential details of the suspect horse such as its identity.
  - The venue should be closed with no horses arriving or leaving until the situation can be assessed.
- It will be helpful if Event organisers inform BEF-MB about the incident.

Advice for BEF member bodies to share with participants at horse gatherings

To reduce risk of infectious disease at horse gatherings, BEF-MB event organisers should make strenuous efforts to ensure that participants in horse gatherings know that they should:

- Bring all necessary equipment with them, including feed, water, feed and water buckets.
- Avoid communal troughs
- Not share any equipment, particularly tack.
- Prevent direct and indirect contact between horses.
- Minimise use of communal grazing areas.
- Avoid horse-to-horse contact.
- Discourage other people touching their horse and avoid touching horses belonging to others.
- Frequently sanitize their hands, particularly before and after touching horses.
- When stabling away, ensure that stables have been cleaned, including feed mangers and water drinkers before being used.
- Bring disinfectants (such as household disinfectant wipes or sprays) to reduce contamination in areas where their horse is stabled.
- When there is a high risk of diseases directly linked to ectoparasites, take proportionate measures to reduce flies and other insects around horses and their stables. Horse owners should also be mindful that products with activity against ectoparasites have a negative environmental impact. Judicious use of ectoparasiticides will help limit the ecotoxic effects of these drugs and reduce the selection pressure for resistance.

Advice for BEF member bodies to share with participants returning home after horse gatherings

To reduce risk of infectious disease after returning home after horse gatherings, event organisers should make strenuous efforts to ensure that participants in horse gatherings know that they should:

- Minimise contact between the returning horse(s) and others on the property.
    - The ability to isolate horses on equine premises is critical and is not complex to establish
    - If not already established, everyone should have a plan for how they will do this.

- Horse caretakes should be encouraged to minimise the risk that the returning horse(s) spread infectious disease to on the property: for example, by creating:
    - Space: creating distance between individuals reduces the risk of disease spread. A few metres is helpful and with increasing distance, risk reduces. For examples:
        - Turn returning horses and others out in separate paddocks
        - Assign stabling so that frequent travellers are housed as far as possible from others that do not routinely attend gatherings.
        - Leave empty boxes between horses.
    - Bubbles: creating sub-groups based on age and sports discipline helps to protect those with less robust immunity and reduce challenges from pathogens that individuals are not encountering regularly:
        - Avoiding mixing adults travelling for competition with foals and youngstock is particularly important.
        - Unvaccinated horses should not be permitted on premises used by horses which attend BEF-MB's gatherings.
        - Manage horses competing in unrelated disciplines separately (for example sports horses should not be housed in close proximity to racehoses; show jumpers should be kept as far as possible from those competing in driving or polocrosse etc).

- Disinfect equipment and boots that were taken to the horse gathering; suitable products include Equizar™, Steri-7 Xtra™, Trigene™, Virkon S™ and Equine BIO fluid™.
- Disinfect their lorry or trailer, suitable products include Equizar™, Steri-7 Xtra™, Trigene™, Virkon S™ and Equine BIO fluid™ and others approved by DEFRA are listed at http://disinfectants.defra.gov.uk/DisinfectantsExternal/Default.aspx?Module=ApprovalsList_SI.
- It is very important to bear in mind no disinfectant is effective in dirty or wet areas: clean thoroughly before using disinfectant and make sure the area can drain and is not left wet.
- Closely monitor horses after attending any gathering, including daily temperature monitoring and recording, ideally for at least two weeks.
    - Fever is defined as a rectal temperature greater than 38.5°C.
    - Many horse owners are not confident about taking their horses temperature, BEF-MB should provide links to resources that support participants in being able to effectively take their horse's temperature such as BEVA's owner guide.

- Contact a veterinary surgeon at the earliest opportunity if the horse shows any signs of illness to arrange clinical assessment, and laboratory tests and for advice on case management.
    - If infectious disease is diagnosed, in addition to reporting to the BEF-MB, participants should also inform transporters and owners/managers of their horse's home premises.

Endemic Diseases

Equine influenza

also known as 'Equine flu'; 'Horse Flu'

Goals of disease-specific control measures

- Equine influenza can rapidly spread into and between groups of horses through airborne spread in groups of horses both at gatherings and following return to their home premises.
- Vaccination provides protection against the virus, it limits the severity of signs and reduces the amount of virus that an infected individual sheds thereby reducing the likelihood that it will infect others.
- The goals of control measures are to
    - improve immunity both at the level of the individual horse and at the herd level by effective vaccination.
    - limit direct or indirect spread of the virus amongst groups of horses through good biosecurity practices.
    - reduce the likelihood that an infected horse will attend a gathering.
    - promote information sharing, enhanced monitoring and early diagnosis via a reporting strategy.

The aetiological agent: H3N8 equine influenza (type A) virus

- Equine Influenza is present in the UK, in most years the prevalence is relatively low and mainly confined to unvaccinated animals.
- Periodically, there is an increase in prevalence, which was most recently seen in Europe in 2019.
- Influenza viruses evolve due to naturally occurring genetic mutations and equine influenza viruses are divided into families, or clades, based on these genetic differences. Each clade contains several virus strains.
- Evolution of the viruses leads to reduced vaccine efficacy therefore it is important that vaccines are regularly updated with the most important virus strains.
- Vaccines used to protect against current Equine Influenza virus will be unlikely to protect against newly evolved influenza virus types which may emerge in future.
- There is extensive evidence that sub-optimal vaccination increases risk of disease and extending the intervals between vaccines creates immunity gaps.

Clinical Signs

- Equine Influenza is noted as characteristically more rapidly spreading in groups of horses than other infectious respiratory diseases, especially where all the group are not vaccinated.
- Equine Influenza in non-immune horses is most characterised by a hacking, largely dry, non-productive cough.

- Frequently, there is frequently a raised rectal temperature ('fever') that may be associated with a loss of appetite, dull demeanour and some weight loss.
- Usually, there is a notable nasal discharge; this is initially clear ('serous') but becomes stickier ('mucoid') and possibly pus-like ('purulent') as the disease progresses over a matter of a several days to weeks.
- Clinical signs are generally milder and may be absent in horses with immunity from either prior infection or vaccination.

Current gold standard for diagnosis

- Detection of the presence of segments of Equine Influenza viral RNA in samples taken from the respiratory tract of infected horses using a sensitive method known as quantitative polymerase chain reaction (qPCR).
- Positive diagnoses may also be made through confirmation of a significant immune response by the infected horse; this is referred to as a 'seroconversion'. Seroconversions can be shown by comparing antibody levels in blood samples taken in the early stages of disease (low or absent) with those taken during recovery and clearance of the virus (markedly increased). However, vaccines also stimulate immunity and may be responsible for seroconversions, which may not be readily differentiated from Equine Influenza infection.

How does the disease spread in general?

- Equine influenza is spread by transfer of viable virus present in respiratory secretions between infectious and susceptible horses.
- Spread can occur directly, between animals in close contact with each other.
- Spread can also occur over longer distances between animals that are physically separated (potentially distances of approximately 2 km are possible under optimal conditions).
- Indirect spread via infected environments, personnel or equipment such as shared tack, mucking out tools and water and feed buckets is also possible.
- Transmission is more likely amongst unvaccinated horses and where biosecurity measures, such as adoption of quarantine (of new/returning animals that might introduce infection), isolation (of animals showing signs of disease) and strict cleaning and disinfection practices, are not effectively or routinely employed.

What is the specific role of horse gatherings in disease spread?

- Horse gatherings can be highly significant for spread of Equine Influenza as they provide effective means of bringing infectious individuals together with large numbers of other, potentially susceptible, animals.
- Following exposure to Equine Influenza virus at events horses, the vehicles in which they are transported and any associated equipment, returning to home premises may act as sources of infection for other horses; newly infected horses may subsequently carry infection to other gatherings, thereby propagating and expanding outbreaks .

- Horse gatherings that have no, or sub-optimal, requirements for entrants to be vaccinated against Equine Influenza are especially likely to contribute to spread of infection.

Disease specific criteria for gathering cancellation

- BEF-ERG is responsible for assessing risk based on national and international equine influenza surveillance reports.
- Confirmed and reliable reports of propagating disease locally should also lead to a prompt review of the justification for cancellation or introduction of a local requirement for enhanced vaccination.

Safe admission criteria

EIDAG recommends that BEF-MB put in place regulations, potentially with sanctions, to:

- prevent horses being presented for admission to a gathering in the following circumstances:
    - Any horse with recent cough or nasal discharge of unknown cause, enlarged lymph nodes or fever.
    - Any horse which is known or under investigation for equine influenza.
    - Any horse which has been in contact with, or lives on the same premises as a horse known or under investigation for equine influenza.
    - Where a horse has been excluded due to influenza or equine influenza-contact, future admission should require that:
        - EITHER all horses on the property have close clinical monitoring with twice daily temperature recording and the excluded status should apply until all horses on the premises have been free of clinical signs for at least 14 days.
        - OR a detailed veterinary report should be presented to the BEF-MB EID veterinarian including robust laboratory evidence to show that the horse intended for admission to a gathering has not been infected with equine influenza.
        - EIDAG suggests this is implemented via a "*health and freedom from disease & contact*" declaration (see Appendices).
    - The BEF-MB's EID veterinarian should be available to support attending veterinary surgeons if required.
- require all horses attending events to be vaccinated against equine influenza using the following protocol:
- Any horse receiving a new primary course as of 1 January 2024 must be vaccinated as follows: V1 (initial vaccination); V2 (second vaccination) must be administered 21-60 days after V1; and V3 (first booster) must be administered 120-180 days after V2. This protocol is in line with the manufacturers' recommendations and both FEI and BHA requirements.
    - Thereafter, a **minimally appropriate** subsequent booster schedule can be considered:
        - Booster vaccinations must be administered at a maximum of 12 months intervals,
    - EIDAG strongly endorses an **optimal schedule** achieved by

        - increasing the frequency of boosters, such that horses competing in BEF MB events must have received a booster within 6 months +21 days (and not within 7 days) before arrival at the event or gathering. This protocol is in line with FEI requirements. It will also be acceptable for horses visiting a racecourse (any location) outside of a raceday or the preceding 8 days.
        - BHA require vaccine boosters every 6 months and require all horses attending racecourses (any location) on raceday or during the preceding 8 days to adhere to their regulations.
- Horses should not attend gatherings within 7 days of receiving any vaccination to have some benefit from that last vaccine, to avoid compromising the immunological response to the vaccine.
- Any horse which is found to have breached the recommendations above V1 (initial vaccination); V2 (second vaccination) and V3 (first booster), or exceeded 12 months between subsequent boosters, should be required to restart and receive a minimum of V1 & V2 and had a 7 day post-vaccine stand-down before being allowed entry to gatherings.
- Exceptions required to solve potential problems for older horses now and in future
    - Horses that received the primary course prior to *1 January 2024** should be permitted to have an interval of up to 92 days between the first (V1) and second (V2) vaccination of the primary course and for the first booster (V3) an interval of up to 7 months following the date of the administration of the second vaccination of the primary course.

      * Member bodies should adjust this date to correspond with the timing of their introduction of their new policy. EIDAG strongly encourage all member bodies to adopt the above protocol on or before 1 January 2024 thereby harmonising their regulations with those of the FEI.
    - Horses that received the primary course prior to 1 January 2005 should not be required to fulfil the requirement for the first booster (V3), providing there has not been an interval of more than 12 months between each of their subsequent boosters.

- In deciding whether to follow the "minimally appropriate" or "optimal" vaccine schedules outlined above, EIDAG urge member bodies to consider the following points:
    - The primary aim of flu vaccination policies is to protect individual horses from clinical illness should they encounter equine influenza virus.
    - There is considerable scientific evidence to support the assertion that horses which are vaccinated at six monthly intervals are protected more effectively from clinical signs of flu than those vaccinated at 12 monthly intervals and are less likely to transmit infection.

    - Additional benefit can be gained by administering boosters strategically, i.e. at the times of year corresponding with periods of increased horse gathering.
        - Furthermore, MB governing sports which are concentrated into a specific season rather than having year-round activities, should note that the optimal schedule can be achieved with one vaccine per year provided that the annual vaccination is given in the month which will allow "within 6 months & 21 days (and not within 7 days) before the arrival at the gathering"
    - Influenza virus spreads via the airborne route and has the ability to spread rapidly over distances in excess of that of a typical equestrian premises, whether indoor or outdoor.
- EIDAG recommend that the **optimal vaccination schedule** should be adopted for disciplines where horses gather frequently, attend gatherings where horses have travelled considerable distances and/or are in shared stabling.
- With some reservations, EIDAG recognise that the **minimally appropriate schedule** may be considered adequate for horses that attend local events once or twice a year and which do not stay at such gatherings for more than a few hours in a single day.

- Although not a requirement for event entry, tetanus vaccines are available alone or combined with Equine Influenza and so vaccination records should also accommodate tetanus vaccination in accordance with manufacturers recommendations.
- Measures should be in place for checking passport vaccine entries on admission to gathering or digitally in advance.
- In addition to vaccine record checking, EIDAG recommends that horse owners should be required to declare influenza vaccine schedule compliance via a "*health and freedom from disease & contact*" declaration (see Appendices), particularly in times of high risk.

Influenza vaccines: veterinary Advice & "off label" use of vaccines

Individual horse owners are advised to follow their vets' advice on the intervals recommended by the manufacturer for the specific product used (typically 4 or 4-6 weeks between the 1st and 2nd vaccine and 5 months between the 2nd and 3rd vaccine).

EIDAG recognise that our optimal influenza vaccine protocol involves "off label" use of veterinary products. However, there is a considerable body of research evidence to support this recommendation and it is line with British Equine Veterinary Association's position on equine vaccine: https://www.beva.org.uk/Home/Guidance-and-Resources/Infectious-Diseases/Advice-to-BEVA-Members-on-Equine-Vaccination
We also refer vets and horse owners to guidance on medication use within the front pages of this document.

Influenza vaccines: visiting racecourses after 1 October 2023

The British Horseracing Authority (BHA) is committed to ensuring optimal welfare and biosecurity for racehorses and for all equines in UK. BHA's vaccination policy is evidence-based and aims to achieve maximum possible protection from equine influenza. BHA also seeks to support racecourses and allow the horse-owning public to enjoy access the excellent equestrian facilities available on racecourses at times when racehorses are not present and therefore the risk of spread of infectious disease between the racing population and other equines is minimised.

Where there is an intention that equines may attend gatherings hosted on British racecourses, the BHA's regulations on the first 3 vaccines for Equine Influenza must be followed: V1-V2 interval 21-60 days; V2-V3 interval 120-180 days. Equines attending racecourses (any location) on raceday or within the preceding eight days must have subsequent booster intervals of **every** six months (i.e. must adhere to BHA rules on vaccination). Where equines are attending racecourses (any location) at times outside on raceday and within the preceding eight days, subsequent six monthly boosters are desirable but subsequent booster intervals can be reduced to **within** six months and 21 days (i.e. following FEI guidelines).

Disease specific advice for participants at gatherings

Event organisers should provide facilities to allow participants to follow our general advice on reducing risk of infectious disease at horse gatherings (see General advice section).

Disease specific advice for participants after gatherings

Event organisers should encourage participants to follow our general advice on reducing risk of infectious disease on returning home from horse gatherings (see General advice section).

- Additionally, in periods of increased Equine Influenza risk, all returning animals should be placed in quarantine, for example turned out away from others or housed elsewhere rather than on the home premises.

Report triggers & responses

- If there is a report of confirmed equine influenza in a horse which has been at a gathering within the last 14 day, the BEF-MB's EID vet should assess the risk of spread amongst others, taking account details of the reported case; disease incubation and shedding features; and the nature of the specific gathering.
- Options for BEF-MB actions might, for example, include:
    - Contacting participants to advise them to immediately isolate horses that have attended the same gathering, apply strict biosecurity measures and contact their own veterinary surgeon to arrange clinical assessment and laboratory testing and obtain advice on case management.
        - with equine influenza identified any time in the 14-day window a gathering, this action is highly likely.
    - Informing participants that the risk of disease spread is sufficient high that this potential disease contact impacts on other horses' "freedom

from disease and contact" status until the safe admission conditions described above are met on their own premises.
        - with equine influenza identified any time in the 14-day window a gathering, this action is highly likely.
    - Issuing a warning to the general public that this disease has been diagnosed locally.
        - with equine influenza identified any time in the 14-day window after a gathering, this action is highly likely.

Existing regulations

- There are no legal obligations for reporting equine influenza in the UK.
- The Thoroughbred industry, via the HBLB, supports influenza surveillance in the UK.
- Various equestrian disciplines have their own regulations on Equine Influenza including International Equestrian Federation (FEI) https://inside.fei.org/fei/your-role/veterinarians/biosecurity-movements/vaccinations and Horserace Betting Levy Board Codes of Practice Guidelines on Equine Influenza https://codes.hblb.org.uk/index.php/page/164.
- The British Horse Racing Authority requires licensed trainers to notify them if a horse under their care is infected or likely to be infected with communicable disease, including equine influenza: http://rules.britishhorseracing.com/#!/book/34/chapter/s3142-horse-welfare-and-management/content?section=s3143-horse-welfare

Useful resources

Equibiosafe App (https://itunes.apple.com/gb/app/equibiosafe/id1131137694) or (https://play.google.com/store/apps/details?id=com.veterinaryadvances.android.equibiosafe&gl=GB), a free resource provided by the Horserace Betting Levy Board and the National Trainers Federation.

https://www.magonlinelibrary.com/doi/full/10.12968/ukve.2019.3.S3.1

https://veterinaryrecord.bmj.com/content/185/7/198.long

https://app.jshiny.com/jdata/equiflunet/equiflunet/

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Equine Herpes Virus 1 & 4

Also known as EHV-1, EHV-4, neurological herpes, paralytic herpes, Equine Herpes Myeloencephalopathy (EHM)

Goals of disease-specific control measures

- Equine Herpes viruses are widespread within the global horse population.
- Herpes viruses have the ability to become latent, which means they are dormant within the tissues from where they can be reactivated periodically. Human cold sores are an example of this phenomenon.
- Clinical disease can occur when there is re-activation of these latent viruses. The reactivated virus might cause the horse to become ill itself and shed virus, or the horse might remain healthy but start shedding the infection which in turn infects others.
- The horse in which the latent virus has been reactivated does not necessarily show signs of disease and therefore the virus can spread silently.
- Trigger factors which reactivate latent viruses include a range of stressors, including travel and mixing with other horses, both of which are inherent to attending horse gatherings.
    - Event organisers can contribute to equine stress reduction by ensuring their gatherings are well organised, controlling horse flow and minimizing mixing, appropriate class sizes, and providing adequate space for parking, stabling and warming up.
- The goals of control measures are to:
    - reduce the likelihood reactivation of latent virus by minimization of triggers.
    - limit direct or indirect spread amongst gatherings of horses through good biosecurity practices.
    - reduce the likelihood that an infected horse will attend a gathering.
    - promote information sharing, enhanced monitoring and early diagnosis via a reporting strategy.
- Vaccination decreases nasal shedding of virus and therefore decreases the total amount of virus in the environment.
- Vaccination of animals known or suspected to have recently been in contact with EHV-1 is not recommended.

The aetiological agent: Equine Herpes Virus 1 and Equine Herpes Virus 4

- There are nine different equine herpesviruses (EHVs). Five types (EHV-1 to EHV-5) infect the domestic horse and EHV-6 to EHV-9 are associated with infections in wild equids including asses and zebra.
- The alpha herpesviruses EHV-1 and EHV-4 are respiratory pathogens.
- EHV-1 is also responsible for neurological disease and abortion, still birth and neonatal illness (the latter group is not discussed further here, for information see HBLB codes of practice https://codes.hblb.org.uk/index.php/page/32.
- EHV-4 occasionally causes neurological disease.

- EHV-3 is a venereal pathogen. The gamma herpesviruses EHV-2 and EHV-5 may be clinically important in certain situations causing ocular and respiratory disease, usually in individuals rather than groups.
- Herpes viruses can survive in the environment and have been shown to remain potentially infective for at least 48 hours on various surfaces and for three weeks in water.

Clinical Signs

Respiratory signs

- Inapparent or mild acute disease in older primed animals.
- More severe disease of longer duration in young, immunologically naive animals.
- There may be fever, enlarged lymph nodes and/or lower limb swelling.
- Cough is occasional and moist.
- Serous nasal discharge or mucopurulent discharge if secondary bacterial infection.
- Other respiratory diseases which can look similar include Equine Influenza, Equine Viral Arteritis, Equine Rhinitis Virus, bacterial infections and Inflammatory airway disease.

Neurological signs

- Range from mild hindlimb ataxia to paralysis of all four limbs (quadriplegia).
- Paralysis or weakness of the bladder can lead to urine dribbling.
- Fever and respiratory signs are not often found in the case, but contact horses may show respiratory signs (see above).
- Other neurological diseases which can look similar include Cervical Vertebral Malformation and spinal trauma. Diseases such as atypical myopathy and botulism can present with inability to rise.
- Horses with neurological disease are frequently distressed, the signs they exhibit are distressing to onlookers and people work with them may be in danger.

Current gold standard for diagnosis

- When horses suffering from severe neurological disease have to be euthanased, it is extremely important that attempts are made to reach a definitive diagnosis; this will generally necessitate a post-mortem examination. Moving the animal's body to a specialised facility for examination can be logistically challenging; however, it may be extremely important for the welfare of in contact horses. Consequently, event organisers should make a concerted effort to help facilitate this if horses become recumbent at horse gatherings without any clear alternative reasons (for example trauma).
- Testing nasopharyngeal swabs from the affected case, and animals in close contact, with qPCR allows viral DNA to be identified rapidly and virus isolation is usually performed, but this is more time consuming. A positive qPCR result indicates that the virus is likely still being shed. By the time signs

occur, this may no longer be happening in the affected case however horses in close contact may be positive, thus providing information that herpes virus is circulating in the group.
- White blood cells (retrieved from a heparinised blood sample, minimum 35 mls) can also be tested with qPCR and virus isolation.
- qPRC and virus isolation are used for both the respiratory and neurological forms.
- Serological (antibody tests) are helpful in both respiratory and neurological forms but require two samples collected at least 10 days and ideally 14 days apart. These can be used to establish the case's status and test contact animals.

How does the disease spread in general?

- The virus is spread directly by respiratory secretions between horses in fairly close contact with each other.
- Indirect spread via infected environments, personnel or equipment such as shared tack, mucking out tools and water and feed buckets is also possible.

What is the specific role of horse gatherings in disease spread?

- Transport, intense exercise and mixing with other horses can be triggers for reactivation of latent virus causing virus shedding in an outwardly healthy horse.
- Horse gatherings provide both direct and indirect routes to spread the virus.

Disease specific criteria for gathering cancellation

It is unlikely that EHV will lead to national cancellations, but events should not be hosted in venues where there have been cases positive for EHV-1 until clinical and laboratory investigations have shown that the virus is no longer circulating amongst the resident population.

Safe admission criteria

EIDAG recommends that BEF-MB put in place regulations, potentially with sanctions, to:

- prevent horses being presented for admission to a gathering in the following circumstances:
    - Any horse with recent cough or nasal discharge of unknown cause, enlarged lymph nodes or fever.
    - Any horse which is known or under investigation for EHV infection (whether associated with respiratory or neurological signs).
    - Any horse which has been in contact with, or lives on the same premises as, a horse known or under investigation for EHV associated with neurological signs.
    - Where a horse has been excluded due to neurological EHV or neurological EHV-contact, future admission should require that:
        - EITHER all horses on the property have close clinical monitoring with twice daily temperature recording and the excluded status

should apply until all horses on the premises have been free of clinical signs for at least 28 days.
        - OR a detailed veterinary report should be presented to the BEF-MB EID veterinarian including robust laboratory evidence to show that the horse intended for admission to a gathering has not been infected with neurological EHV
        - EIDAG suggests this is implemented via a "*health and freedom from disease & contact*" declaration (see Appendices).
    - The BEF-MB's EID veterinarian should be available to support attending veterinary surgeons if required.

Disease specific advice for participants at gatherings

Event organisers should provide facilities to allow participants to follow our general advice on reducing risk of infectious disease at horse gatherings (see general advice section).

EIDAG recommends that the following groups of horses are vaccinated with a primary course and then re-vaccinated against EHV-1 at 6-month intervals.

- Horses less than 5 years of age (but > 6months).
- Horses that may come into contact with pregnant mares.
- Horses housed at facilities with frequent movement of horses on and off the premises.
- Horses which frequently attend gatherings where horses mingle in close proximity.

Vaccines for EHV 1 and 4 can be given at the same time as those for equine influenza and tetanus. There is no clear evidence of harm or benefit associated with combining vaccines. Presently available vaccines do not protect against neurological herpes.

Disease specific advice for participants after gatherings

Event organisers should encourage participants to follow our general advice on reducing risk of infectious disease on returning home from horse gatherings (see general advice section).

Report triggers and responses

- Respiratory infection due to confirmed EHV infection is common and does not require a report to the BEF-MB.
- If there is a report of confirmed neurological herpes in a horse which has been at a gathering within the last 14 days, the BEF-MB's EID vet should assess the risk of spread amongst others, taking account details of the reported case; disease incubation and shedding features; and the nature of the specific gathering.
- Options for BEF-MB actions might, for example, include:
    - Contacting participants to advise them to immediately isolate horses that have attended the same gathering, apply strict biosecurity measures and contact their own veterinary surgeon to arrange

clinical assessment and laboratory testing and obtain advice on case management.
        - with neurological herpes identified any time in the 14-day window a gathering, this action is highly likely.
    - Informing participants that the risk of disease spread is sufficient high that this potential disease contact impacts on other horses' "freedom from disease and contact" status until the safe admission conditions described above are met on their own premises.
        - with neurological herpes identified any time in the 14-day window a gathering, this restriction may not be necessary however the risk would be assessed taking account factors such as the numbers of horses involved, the format of the gathering (stabling or not), location of case relative to others.
    - Issuing a warning to the general public that this disease has been diagnosed locally is unlikely to be constructive.

Existing regulations

- There are no legal obligations for reporting disease associated with EHV-1 or EHV-4 in the UK.
- The British Horse Racing Authority requires licensed trainers to notify them if a horse under their care is infected or likely to be infected with communicable disease, including "paralytic herpes" (i.e. neurological herpes). http://rules.britishhorseracing.com/#!/book/34/chapter/s3142-horse-welfare-and-management/content?section=s3143-horse-welfare

Knowledge gaps

- The pathogenesis of neurological herpes is poorly characterised.

Additional comments

- There are medications which may potentially limit clinical signs after EVH-1 infection.
- Heparin has been proposed as a potential treatment to limits EHV1's ability to penetrate the nervous tissue and minimise clinical signs in in-contact animals.

Useful resources

Equibiosafe App (https://itunes.apple.com/gb/app/equibiosafe/id1131137694) or (https://play.google.com/store/apps/details?id=com.veterinaryadvances.android.equibiosafe&gl=GB), a free resource provided by the Horserace Betting Levy Board and the National Trainers Federation.

https://aaep.org/guidelines/infectious-disease-control/equine-herpesvirus-resources

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Strangles

Also known as *Streptococcus equi* subspecies *equi* infection

Goals of disease-specific control measures

- Strangles can spread directly through nose-to-nose contact with an infected horse or indirectly via contaminated personnel and sharing of stables or equipment. Infected horses do not necessarily show external signs ("silent carriers").
- The goals of control measures are to:
    - limit direct or indirect spread amongst gatherings of horses through good biosecurity practices.
    - reduce the likelihood that an infected horse will attend a gathering.
    - promote information sharing, enhanced monitoring and early diagnosis via a reporting strategy.

The aetiological agent: *Streptococcus equi* subspecies *equi* aka *S. equi*

- *S. equi* is a bacterium closely related to, and believed to have evolved from, *Streptococcus equi* subspecies *zooepidemicus* (*S. zooepidemicus*), which can be found in the upper respiratory tract of healthy horses.
- *S. equi*–induced disease (Strangles) is highly infectious.
- *S equi* has the ability to survive in the environment for prolonged periods (weeks or possibly even months) particularly in colder months, and in wet locations and in water troughs.

Clinical signs

- The severity of clinical signs can vary markedly, with some cases having a comparatively mild clinical presentation.
- Although all ages are susceptible, disease severity is generally greater in younger horses.
- Typically, horses will initially develop an increased temperature which develops three to 14 days following bacterial exposure. Unless rectal temperatures are routinely checked, this may only be evident by an altered demeanour (lethargy, dull demeanour) or reduced appetite.
- Other early signs of disease include the following:
    - Pharyngeal inflammation, which may result in difficulty eating (dysphagia) and coughing (especially associated with attempts to eat).
    - Bilateral (both nostrils) mucopurulent (yellowish in colour) nasal discharge.
- As the disease progresses, the lymph nodes around the head region become enlarged and painful. Abscesses rapidly develop within the lymph nodes, resulting in their further enlargement, occasionally resulting in partial obstruction of the upper respiratory tract; this may cause breathing difficulties.
- Generally, lymph node abscesses rupture between 7 days and 4 weeks following infection, resulting in the drainage of thick pus, either externally

through the skin or internally into the airway, below the skin (cellulitis) or into the guttural pouch(es).

- Accumulation of pus in the guttural pouches is termed guttural pouch empyema, and leads to an intermittent purulent (yellowish in colour) nasal discharge, most evident when the head is lowered (for example during feeding/grazing).
- Horses carrying the bacteria in their guttural pouches represent an important, and potentially long term, source of infection to other horses via the intermittent shedding of bacteria.

Although most cases develop the typical clinical signs described above, a minority may have a slightly different clinical presentation; for example:

- Bastard Strangles, whereby abscesses develop at multiple anatomical sites; the clinical presentation of such cases is largely determined by the location of the abscesses
- Catarrhal Strangles, whereby the clinical signs are subtler (for example less purulent nasal discharge, failure to develop lymph node abscesses); despite the relatively low level of disease severity, such cases will shed virulent *S. equi* and represent a significant source of infection in more susceptible horses.

Current gold standard for diagnosis

Acute infection

- Diagnostic confirmation relies on positive identification of *S. equi* within samples submitted from the respiratory tract (for example nasopharyngeal swabs, guttural pouch lavage fluid) or draining abscesses (swabs).
- In the acute stage of disease, bacterial shedding generally commences one to two days after the case develops a fever and generally persists for tow to three weeks in most animals (longer in some). The initial delay in bacterial shedding should be considered when choosing an appropriate time for sample collection and submission
- Presence of *S. equi* within samples can be confirmed by bacterial culture or via detection of bacterial DNA with qPCR. Although qPCR is more sensitive (i.e. more likely to detect S. equi if present) than bacterial culture and the results are more rapidly available, neither method is 100% sensitive, consequently sample submission for both qPCR and culture is advisable. Repeated sample submissions can also increase diagnostic sensitivity, particularly when relying solely on bacterial culture.
- Serology, measurement of serum antibody levels, has the major disadvantage during the acute disease that it does not permit the rapid identification of cases which is necessary to allow both the initiation of appropriate therapy *and* the implementation of measures to minimise rapid spread of disease.
- Demonstration of rising serum antibody levels (two weeks apart) against *S. equi* is consistent with recent infection, therefore serology can be helpful when seeking to demonstrate that *S equi* infection is spreading within a group of horses.

- Serology can also be used to screen for recent infection before introducing new horses provided they are quarantined from others during the 2 weeks.

S. equi carriers

- Carriage of *S. equi* is generally attributable to persistence of infective material within the guttural pouch(es), even following resolution of acute disease; this may persist for years in some horses.
- Similar to acute cases, the definitive identification of "carriers" relies on the positive identification of *S.equi*, adopting the same diagnostic tools (culture and qPCR). In light of the location of the bacteria in such cases, submission of samples obtained directly from the guttural pouch is essential. The presence of *S. equi* within the nasopharynx likely results from *intermittent* bacterial shedding from the guttural pouch; consequently, when relying on nasopharyngeal swabbing, it may be necessary to submit several sequential swabs in order to identify a carrier. For example, based on qPCR analysis, the single submission of a pooled guttural pouch wash (i.e. left and right combined) and a single nasopharyngeal swab taken at the same time will detect more than 90% of carriers A slightly less expensive, but more time-consuming alternative is to submit three swabs taken one week apart.
- Serology may identify some carriers but both false negative and false positive results are problems. This means that some horses are labelled as carriers wrongly, while others go undetected.

How does the disease spread in general?

- Strangles is transmitted between horses via both direct and indirect contact.
- Nasal discharges and pus draining from ruptured abscesses both contain large numbers of *S.equi* bacteria and represent the principal sources of infection.
- Direct horse-to-horse contact, particularly nose-to-nose contact, is the most likely means of disease transmission in non-isolated horses. Unlike certain respiratory viral infections, airborne transmission of *S. equi* from horse to horse is considerably less likely.
- Indirect contact is also a common route of disease transmission. Examples include the following: hands, clothing and equipment of staff, farriers or veterinary surgeons; shared water troughs, feed buckets, grooming utensils etc.
- Due to *S. equi*'s ability to survive in the environment, particularly in wet locations and in water troughs, for prolonged periods (weeks or possibly even months), good hygiene is therefore essential in disease containment within premises.
- Following recovery from disease, a proportion of horses will harbour *S. equi* within the guttural pouch(es), thus becoming asymptomatic ("silent") carriers. Such carriers may shed bacteria for prolonged periods (months to years) and are considered the most important factor in the persistence of infection on

premises and the spread of infection between premises following apparent resolution of outbreaks.

What is the specific role of horse gatherings in disease spread?

- Horse gatherings represent a significant opportunity for the spread of Strangles, largely due to the close proximity of horses and the potential for horse-to-horse contact and/or sharing of feeding utensils etc. and/or indirect contact via personnel.
- The risk of disease introduction is most likely attributable to asymptomatic carriers attending the gathering; however, cases with the acute form of the disease prior to the development of clinical signs and cases with a subtle form of the disease (Catarrhal Strangles) also represent important sources of disease transmission.
- Depending on the duration of the event, it is likely that the development of clinical signs in horses infected whilst present at the gathering may not be evident until they return to their own premises; by this time, it is possible that bacterial shedding may have occurred without detection.

Disease specific criteria for gathering cancellation

- Strangles outbreaks are usually "local" occurrences, largely associated with particular premises, rather than a particular geographical region.
- If the gathering is scheduled to be held at venue at which horses normally reside, confirmation (or even strong suspicion) of the presence of Strangles on this premises should prompt cancellation of the gathering.
- Cancellation of the gathering should also be strongly considered if Strangles is confirmed in other premises (for example neighbouring premises) whereby there is a risk of transmission of disease to the premises in which the gathering is planned in the days immediately preceding the scheduled gathering (i.e. within the window of time prior to the development of clinical signs in infected horses).

Safe admission criteria

EIDAG recommends that BEF-MB put in place regulations, potentially with sanctions, to:

- prevent horses being presented for admission to a gathering in the following circumstances:
    - Any horse with recent cough or nasal discharge of unknown cause, enlarged lymph nodes or fever.
    - Any horse which is known or under investigation for Strangles.
    - Where a horse has been excluded due to Strangles -diagnosis, future admission should require that the horse has been shown to be negative on PCR or culture of a nasopharyngeal swab plus pooled guttural pouch lavages after its clinical signs have completely resolved.
    - Any horse which has been in contact with, or lives on the same premises as a horse known or under investigation for Strangles.

- Where a horse has been excluded due to Strangles-contact, future admission should require that that:
  - EITHER all horses on the premises have close clinical monitoring with twice daily temperature recording and have been free of clinical signs for at least 28 days **plus** the attending veterinarian is willing to support movement of horses on and off the premises.
  - OR a detailed veterinary report should be presented to the BEF-MB EID veterinarian including robust laboratory evidence to show that the horse intended for admission to a gathering has not been infected with *Strep equi equi*.
  - EIDAG suggests this is implemented via a "health *freedom from disease & contact*" declaration (see Appendices).
- The BEF-MB's EID veterinarian should be available to support attending veterinary surgeons if required.

Disease specific advice for participants at gatherings

Event organisers should provide facilities to allow participants to follow our general advice on reducing risk of infectious disease at horse gatherings (see general advice section).

Disease specific advice for participants after gatherings

Event organisers should encourage participants to follow our general advice on reducing risk of infectious disease on returning home from horse gatherings (see general advice section).

Report triggers and responses

- If there is a report of confirmed Strangles in a horse which has been at a gathering within the last 14 days, the BEF-MB's EID vet should assess the risk of spread amongst others, taking account details of the reported case; disease incubation and shedding features; and the nature of the specific gathering.
- Options for BEF-MB actions might, for example, include:
  - Contacting participants to advise them to immediately isolate horses that have attended the same gathering, apply strict biosecurity measures and contact their own veterinary surgeon to arrange clinical assessment and laboratory testing and obtain advice on case management.
    - with Strangles identified towards the beginning of the reporting window, this action is highly likely.
    - with Strangles identified towards the end of the reporting window, imposing restrictions which impact on horses' "*freedom from disease and contact*" may not be necessary but other participants might be alerted as potentially, their horses might be silent carriers (i.e. the source of infection).
  - Informing participants that the risk of disease spread is sufficient high that this potential disease contact impacts on other horses' "*freedom*

from disease and contact" status until the conditions described above are met on their own premises.
        - with Strangles identified any time in the 14-day window after a gathering, this restriction is fairly unlikely however, the risk would be assessed taking account factors such as the numbers of horses involved, the format of the gathering (stabling or not), location of case relative to others.
    - Issuing a warning to the general public that this disease has been diagnosed locally is unlikely to be constructive.

Existing regulations

- There are no legal obligations for reporting Strangles in the UK.
- Various initiatives have been established with the broad aims of increasing Strangles awareness, encouraging transparency with regard to active cases/outbreaks, preventing disease spread (both locally and nationally) and providing control guidelines focussed on eliminating and preventing infection on yards. Examples include the Premium Assured Strangles Scheme in Scotland, initiated by SRUC (in collaboration with BHS, Redwings and the AHT https://www.sruc.ac.uk/info/120473/premium_assured_Strangles_scheme) and the Stamp out Strangles initiative (Redwings https://www.redwings.org.uk/news-and-views/strangles-pledge); membership of, and/or engagement with, such schemes is designed to enhance yard health status for Strangles.

Knowledge gaps

- There is an ongoing body of work aimed at further optimising the accuracy of diagnostic tests.
- Vaccination against has been shown to confer a level of protection; although, the duration of immunity can be relatively short-lived (approx. 3 months).
- A live attenuated vaccine was available but was difficult to use and not widely accepted. A novel soluble recombinant protein-based vaccine (based on *S. equi* genome sequencing) may be available soon.

Useful resources

HBLB International Code of Practice (Strangles):
https://codes.hblb.org.uk/index.php/page/99

Equibiosafe App (https://itunes.apple.com/gb/app/equibiosafe/id1131137694) or (https://play.google.com/store/apps/details?id=com.veterinaryadvances.android.equibiosafe&gl=GB), a free resource provided by the Horserace Betting Levy Board and the National Trainers Federation.

Evidence Sources

Durham, AE, Hall, YS, Kulp. L, Underwood, C. A study of the environmental survival of Streptococcus equi subspecies equi. Equine Vet Journal, 2018, 50, 861-864. https://beva.onlinelibrary.wiley.com/doi/abs/10.1111/evj.12840

Ringworm

Also known as Dermatophytosis

Goals of disease-specific control measures

- To prevent transmission of skin infection between horses and to people through good biosecurity practices.

The aetiological agent: Fungi of the *Trichophyton* or *Microsporum* genus

- *Trichophyton* or *Microsporum* are highly infectious fungal organisms that invade the skin and hair shafts.
- Ringworm is a zoonotic disease i.e. it can spread from horses to people.
    - Children and young people are more likely to be affected: adults who have been around horses for some time are likely to have developed immunity.

Clinical Signs

- Circular areas of hair loss and crusting skin may appear anywhere on the body.
- Lesions are occasionally itchy but are very rarely painful.
- If infection occurs in areas that are in contact with tack, performance might be affected.

Current gold standard for diagnosis

- Lesions have a characteristic appearance but can be confused with bacterial infection or sarcoids. Laboratory testing is required to confirm ringworm.
- Fungal organisms can be seen in hairs examined under a microscope; however, this method is unreliable as fungi are easily missed. The presence of fungal spores does not indicate infection.
- Fungal culture takes up to 2 weeks but is the only means of confirming whether infection is active or historical.
- qPCR testing can be used to identify the genetic material (DNA) from ringworm and gives results within a day. It does not differentiate live fungal organisms that could spread infection from dead organisms that have been treated effectively.

How does the disease spread in general?

- Infection spreads easily via fungal spores either directly from horse to horse or carried on objects, people or stables themselves.
- Infection can spread to and from other animals and people and may also be present in soil.
- Younger horses are more commonly infected as immunity develops with age.

What is the specific role of horse gatherings in disease spread?

- Gathering allow large numbers of horses to come into close or direct contact and there is potential for the transmission of infection via people or objects such as grooming equipment, tack and feed buckets.

Disease specific criteria for gathering cancellation

- Ringworm does not present a significant threat to equine welfare and therefore gathering cancellation is not warranted but BEF-MB are likely to want to prevent its spread.

Safe admission criteria

EIDAG recommends that BEF-MB consider putting in place regulations, potentially with sanctions, to:

- require participants/owner to provide a declaration of "*health and freedom from disease and contact*" including "skin lesions typical of ringworm" (see Appendices)
- facilitate an option to provide a veterinary certificate to confirm that where there are skin lesions typical of ringworm that appropriate treatment has been prescribed with self-certified confirmation that this has been completed according to veterinary recommendations (see Appendices)

Disease specific advice for participants at gatherings

Event organisers should provide facilities to allow participants to follow our general advice on reducing risk of infectious disease at horse gatherings (see general advice section).

Disease specific advice for participants after gatherings

Event organisers should encourage participants to follow our general advice on reducing risk of infectious disease on returning home from horse gatherings (see general advice section).

Report triggers and responses

- A BEF-MB reporting requirement for ringworm could be considered but is not necessarily warranted on horse welfare grounds.

Existing regulations

- Ringworm is not a notifiable disease.
- The British Horse Racing Authority (Rules of Racing - Manual (C) Part 3) will not allow horses with active Ringworm lesions to enter racecourse premises. http://rules.britishhorseracing.com/#!/book/34/chapter/s3142-horse-welfare-and-management/content?section=s3143-horse-welfare.

Additional comments

- Stables or equipment used by horses with suspected ringworm should not be used until they have been thoroughly disinfected with bleach or a fungicidal/sporocidal disinfectant, for example Equizar™, Steri-7 Xtra™, Trigene™, Virkon S™ and Equine BIO fluid™.
- It is very important to bear in mind no disinfectant is effective in dirty or wet areas: clean thoroughly before using disinfectant and make sure the area can drain and is not left wet.

- Anyone handling horses suspected to be infected should take appropriate precautions by wearing gloves, using hand sanitizers and washing all exposed areas of skin.

Useful resources
https://www.racehorsetrainers.org › publications › pdfs › cop

Infectious Syndromes

Neurological signs

Goals of syndrome-specific control measures

- Neurological signs have many causes, some of which are infectious and some exotic to UK but should be considered in horses which have travelled internationally and some of which could spread from horse to humans.
- The goals of control measures are to:
    - encourage prompt and reliable diagnosis which in turn will inform management of any risk to others.
    - promote information sharing, enhanced monitoring and early diagnosis via a reporting strategy.

The Aetiological Agents

The pathogens which can be involved in neurological signs vary with respect to geographic region as well as the particular part of the central nervous system affected i.e. brain, spinal cord, peripheral nerves. Many viruses which cause neurological signs are exotic to the UK and some are notifiable. Further details on management of neurological herpes specifically are provided in a separate advice note.

For up-to-date information on global distribution of various pathogens which can be involved in neurological signs go to the International Collating Centre for equine disease

Clinical Signs

Horses with neurological disease may present with a range of signs depending on whether the brain, spinal cord or peripheral nerves are affected. Infectious disease is rare but can occur; it is therefore important that these cases are identified and isolated promptly to prevent spread or dissemination of disease.

Horses with neurological disease are frequently distressed, the signs they exhibit are distressing to onlookers and people working with them may be in danger.

Disease or damage to the brain may result in:

- Changes in behaviour
- Changes in level of arousal and response to surroundings
- Incoordination
- Collapse
- Altered reflexes around the face
- Altered head position

Disease or damage to the spinal cord may result in:

- Incoordination of the limbs
- Altered neck and head position
- Recumbency

Damage to peripheral nerves may result in:

- Disruption of the function of the area supplied by that nerve for example paralysis of a single limb and/or loss of sensation in a specific area.
- Atrophy (wasting) of individual muscles supplied by the nerve may occur with time.

Current gold standard for diagnosis

To determine an appropriate diagnostic plan, it is essential that historical information is obtained; important considerations include whether there has been:

- Overseas travel within the last few months.
- Travel to the Americas at any time.
- Recent history of a trauma or a fall, particularly a rotational fall.
- Recent signs of illness or high temperature.

The most likely causes of neurological disease in competition horses are:

- Cervical vertebral malformation (CVM), colloquially referred to as "wobbler syndrome".
- Trauma to the spine of the neck or back.

Other less common causes might include:

- Head trauma.
- Trauma or degenerative disease of the vestibular apparatus.
- Equine herpes virus.
- Bacterial meningitis.
- Lyme neuroborreliosis.

A history of travel to Europe raises the possibility of some infectious diseases that are not present in the UK:

- Borna disease.
- West Nile virus.
- Rhabdovirus (Rabies).

A history of travel to the Americas raises the possibility of some infectious diseases that are not present in the UK:

- Equine Protozoal Myeloencephalopathy (EPM).
- Eastern/Western/Venezuelan equine encephalomyelitis virus.
- West Nile virus.
- Powassan virus.
- Rhabdovirus (Rabies).
- Orthobunyavirus.
- Bunyamweravirus.

A history of travel to Australasia and Asia raises the possibility of some disease that are not present in the UK:

- Japanese encephalitis virus.
- Murray Valley encephalitis.
- Kunjin virus.
- Nipah virus.

Diagnostic Approach

- Examination by a veterinary surgeon may enable the likely site of neurological damage to be established. The specific tests used will be determined by the most likely causes.
- Rectal temperature should be taken to assess the risk of an infectious cause.
- Blood samples can be taken to identify inflammation and to look for antibodies to viruses that can cause neurological disease, however this takes time and decisions will have to be made without the benefit of blood test results. Swabs can be taken via the nose to test for the presence of some viruses, including equine herpes virus. Testing for exotic diseases may be performed in consultation with the Animal and Plant Health Agency.
- Radiography may be required to identify developmental or traumatic disease of the spinal cord or skull. Advanced imaging such as CT or MRI can be more useful for identifying disease of the brain/head.
- Horses that are lame or have severe dehydration or electrolyte deficiencies may have signs that make them appear to have neurological dysfunction.
- When horses suffering from severe neurological disease have to be euthanased, it is extremely important that attempts are made to reach a definitive diagnosis; this will generally necessitate a post-mortem examination. Moving the animal's body to a specialised facility for examination can be logistically challenging; however, it may be extremely important for the welfare of in contact horses. Consequently, event organisers should make a concerted effort to help facilitate this if horses become recumbent at horse gatherings without any clear alternative reasons (for example trauma).

How do these diseases spread in general?

- Infectious causes of neurological disease may spread via horse to horse transmission, via insect vectors or indirect spread via infected environments, personnel or equipment such as shared tack, mucking out tools and water and feed buckets .

What is the specific role of horse gatherings in disease spread?

- Horses attending gatherings may be stressed and if they are infected, they are more likely to spread disease.

Disease specific criteria for gathering cancellation

- If a notifiable disease is confirmed, then the outbreak must be managed by government appointed personnel in line with the contingency plan for exotic notifiable diseases.

Safe admission criteria

EIDAG recommends that BEF-MB put in place regulations, potentially with sanctions, to:

- prevent horses being presented for admission to a gathering in the following circumstances:

- Any horse which has recent onset neurological signs of unknown cause (*see separate advice note for specific advice on neurological EHV*).
- Any horse which has been in contact with, or lives on the same premises as a horse known or under investigation for infectious neurological disease (*see separate advice note for specific advice on neurological EHV*).
- If a notifiable disease is confirmed, then the outbreak must be managed by government appointed personnel in line with the contingency plan for exotic notifiable diseases.
    - EIDAG suggests this is implemented via a "*health and freedom from disease & contact*" declaration (see Appendices).

Disease specific advice for participants at gatherings

Event organisers should provide facilities to allow participants to follow our general advice on reducing risk of infectious disease at horse gatherings (see general advice section).

Disease specific advice for participants after gatherings

Event organisers should encourage participants to follow our general advice on reducing risk of infectious disease on returning home from horse gatherings (see general advice section).

Report triggers and responses

- The EIDAG's advice on an appropriate response to a report of neurological herpes is outlined in a separate advice note.
- If a notifiable disease is confirmed, then the outbreak must be managed by government appointed personnel in line with the contingency plan for exotic notifiable diseases.
- If there is a report of any other confirmed infectious cause of neurological signs in a horse which has been at a gathering within the last 14 days, actions must be determined by the specific infectious agent. Many of the infections listed above do not spread directly from horse to horse and require specific vectors, absent from the UK, for indirect spread. As these are uncommon conditions, the BEF-MB's EID veterinarian may wish to seek advice from international specialists in equine infectious disease before informing horse owners and participants of potential contact.

Existing regulations

Rabies, West Nile and Encephalitis viruses are notifiable.

Useful resources

BEVA equine exotic disease information - https://www.beva.org.uk/BEVA-Trust/Health-Medicines/Equine-Exotic-Disease-information

Animal and Plant Health Agency advice on notifiable diseases - https://www.gov.uk/government/collections/notifiable-diseases-in-animals

Evidence sources

Sellon, D.C. and Long, M.T. (2014) Equine Infectious Diseases 2nd edition.

Enteric signs

Goals of syndrome-specific control measures

- Enteric signs have many causes, some of which are spread amongst horses and some of which could spread from horse to humans.
- The goals of control measures are to:
    - encourage prompt and reliable diagnosis which in turn will inform management of any risk to others.
    - promote information sharing, enhanced monitoring and early diagnosis via a reporting strategy.

The Aetiological Agents

- Certain infectious organisms may affect the intestinal tract, resulting in inflammation of the lining of the intestine and a loss of the barrier between the intestinal tract contents (including resident bacteria and bacterial-derived toxins) and the bloodstream.
- In adult horses, the majority of these organisms primarily affect the large intestine, an important function of which is to absorb water from the intestinal lumen into the bloodstream. Inflammation of the large intestine is termed "colitis".
- The most common causes include the following:
    - *Salmonella*
    - *Clostridium difficile*
    - *Equine coronavirus (ECoV)*
        - Note ECoV is a species-specific member of the coronavirus family. There is no risk of cross-infection between humans and horses.
- Parasites (worms) can also cause enteric disease but do not spread directly from horse to horse, although communal grazing areas might contain worm eggs.
- It is important to bear in mind that enteric signs can relate to infection with more than one agent and in adult horses this often involves parasites plus one or more of the organisms listed above.
- There are non-infectious diseases such as infiltrative bowel disease (IBD).

Clinical Signs

- Horses with infectious enteric disease will generally present with diarrhoea; however, diarrhoea is often preceded by the development of a dull demeanour and a reduction in appetite.
- Some cases with colitis may not develop diarrhoea, despite significant inflammation of, and fluid accumulation within, the large colon.
- Most cases of colitis will develop a fever and some may also develop signs of mild to moderate abdominal pain (colic).
- Examination by a veterinary surgeon may reveal additional findings which are consistent with (yet not confirmatory of) an infectious cause of the diarrhoea and/or clinical illness.

- Clinical examination may reveal a fever, an increased heart rate, reddening of the mucous membranes (for example gums), a weak pulse and evidence of dehydration (prolonged skin tenting).
- Blood analyses may reveal electrolyte derangements, a reduced white blood cell count, evidence of fluid loss and/or a reduced protein concentration.
- Abdominal ultrasonography may reveal thickening of the wall of the large intestine and/or a fluid-filled colon. From a biosecurity perspective, the detection of a fluid filled colon in horses without diarrhoea at the time of the examinations has significant benefits as it permits isolation of the case prior to the development of diarrhoea, thus minimising contamination of communal areas with potentially infectious organisms.

Current gold standard for diagnosis

- Although there are various non-infectious causes of diarrhoea (for example change in feeding, stress-induced changes in faecal transit etc.), *consideration* should be given to a potential diagnosis of infectious colitis in any horse at a gathering presenting with diarrhoea, especially if associated with concurrent dullness, fever and/or a low white blood cell count. In such cases, diagnostic confirmation of the aetiological agent necessitates submission of a faecal sample for bacterial, viral and/or toxin analysis.
- *Salmonella* bacteria may be detected by culture or PCR and positive detection may require the submission of several sequential samples, either separately or pooled. A small proportion of horses will act as asymptomatic *Salmonella* carriers and intermittently shed bacteria in the faeces; such cases may require the submission of considerably more sequential samples in order to detect the pathogen.
- In the case of *Clostridium difficile*, detection of the bacteria is less diagnostically informative, compared with the detection of bacterial toxins (for example *Clostridium difficile* toxins A and B). It is not uncommon to culture non-toxin producing strains of *Clostridium perfringens* from healthy horses.
- Equine coronavirus is confirmed via the detection of ECoV by PCR in faecal samples; however, not all horses from which ECoV is detected in the faeces will have associated clinical signs and many horses with ECoV do not have diarrhoea but have the less GI-specific signs of fever and low white blood cell count.
- In acute diarrhoeic cases with associated clinical illness (for example poor appetite, dull), isolation of the horse and the implementation of strict biosecurity measures should NOT be delayed until the results of the diagnostic tests are available; indeed, in many cases of suspected infectious colitis, the causal agent remains unconfirmed.

How does the disease spread in general?

- The route of transmission of infectious colitis is "faecal-oral"; namely, pathogens in faeces of a clinically affected (or more rarely asymptomatic carrier horses; for example, *Salmonella*) pass to the mouth of susceptible horses; for example, via faecal contamination of feed, water, shared feed

utensils, bedding, stable walls or floors, hands of handlers or veterinary equipment (for example stomach tubes).

- If the clinical case has developed diarrhoea, it is quite likely that the liquid faeces contain high concentrations of the infectious organism. Furthermore, passage of diarrhoea will inevitably result in wider dissemination of faeces (and therefore pathogens) compared with the passage of faeces of normal consistency.
- Contamination of bedding, feed etc. with liquid faeces may not be as visibly apparent, compared with faeces of normal consistency.
- Some horses are asymptomatic carriers of *Salmonella*; such cases may become symptomatic under certain conditions (for example stress).

What is the specific role of horse gatherings in disease spread?

- Horses attending gatherings are in close contact facilitating disease spread.
- Horses travelling to and attending gatherings may be stressed, potentially leading to either an increased likelihood of carrier horses developing clinical disease (for example *Salmonella*) or increased susceptibility of non-carrier horses to pathogens shed by clinical cases or carriers.

Disease specific criteria for gathering cancellation

- Cancellation of multiple gatherings due to enteric disease is unlikely.
- At a local level, if a venue planning a gathering has an outbreak of enteric disease amongst resident horses, cancellation of gatherings at that venue may be necessary.

Safe admission criteria

EIDAG recommends that BEF-MB put in place regulations, potentially with sanctions, to:

- prevent horses being presented for admission to a gathering in the following circumstances:
    - Any horse which has diarrhoea or fever.
    - Any horse under investigation for or known to be shedding *Salmonella* spp., *Clostridium difficile* and ECoV.
    - Note: Occasionally horses (e.g. when anxious or stressed) will pass normal formed faeces along (or interspersed) with the passage of very watery material. This recognised, yet poorly understood, presentation in an otherwise healthy horse is not consistent with a diagnosis of colitis.
        - EIDAG suggests this is implemented via a "*health and freedom from disease & contact*" declaration (see Appendices).

Disease specific advice for participants at gatherings

Event organisers should provide facilities to allow participants to follow our general advice on reducing risk of infectious disease at horse gatherings (see general advice section).

Disease specific advice for participants after gatherings

Event organisers should encourage participants to follow our general advice on reducing risk of infectious disease on returning home from horse gatherings (see general advice section).

Report triggers and responses

- Parasite infection does not require a report to the BEF-MB.
- If there is a report of confirmed Salmonella, Clostridium difficile, ECoV or any other enteric infectious organism in a horse which has been at a gathering within the last 14 days, the BEF-MB's EID vet should assess the risk of spread amongst others, taking account details of the reported case; disease incubation and shedding features; and the nature of the specific gathering.
- Options for BEF-MB actions might, for example, include:
    - contacting all participants may not be necessary or constructive with these enteric diseases.
    - a focussed contact strategy aiming at participants whose horses were stabled near the reported case might be helpful to advise them to immediately isolate horses that have attended the same gathering, apply strict biosecurity measures and contact their own veterinary surgeon to arrange clinical assessment and laboratory testing and obtain advice on case management.
    - advice on how this potential disease contact impacts on other horses' "freedom from disease and contact" status should also be based on a case-by-case risk assessment.
    - Issuing a warning to the general public any of these diseases has been diagnosed locally is unlikely to be constructive.

Existing regulations

- *Salmonella* is reportable in the UK; all isolations of *Salmonella* from horses are reportable to the Animal and Plant Health Agency. However, under the Zoonoses Order 1989, responsibility for reporting the isolation of *Salmonella* lies with the laboratory carrying out the examination and not the individual horse caretaker.

Exotic Diseases

Equine Piroplasmosis

Also known as Equine malaria, equine biliary fever, horse-tick fever

Goals of disease-specific control measures

- OIE data for 2019 states that the official Equine Piroplasmosis status of the UK is 'infection/infestation in domestic animals and disease absent in wild animals'. This reflects the fact that while imported domestic horses present in the country have tested seropositive for Equine Piroplasmosis, there have been no reported cases of disease transmission within the UK.
- The UK has historically been considered free of Equine Piroplasmosis because of the reported lack of competent vectors, although this assumption has been questioned recently.
- The current national aim of disease control is to avoid the introduction of carrier equidae and infected tick vectors into the UK, where they could subsequently infect either equidae or indigenous ticks, leading to spread of disease.
- The goal of control at the level of individual gatherings is to educate participants on risk in locations with high tick populations.

The aetiological agents: *Babesia caballi (B. caballi)* and *Theileria equi (T. equi)*

- Equine piroplasmosis is not spread directly between horses and it is a vector-borne disease caused by the intracellular protozoan parasites *B. caballi* and *T equi*.
- Ticks are the primary vectors and are required for disease spread.
- Tick vectors are active all year in the UK, with peaks in late spring, early summer and the Autumn.
- Ticks climb vegetation and attach to mammalian hosts when they brush the vegetation. Woodland, meadow and hedgerows are highest risk, but they can still be found on longer pasture.
- Equid infection occurs during biting by infected ticks and infected horses act as a source of infection to ticks. The life cycle of the parasites involves several stages in both the horse and the tick.
- Infection can also occur during needle sharing or use of contaminated blood products.
- For up-to-date information on global distribution of these pathogens go to the International Collating Centre for equine disease

Clinical Signs

- Acute Equine Piroplasmosis infection: fever and signs associated with red blood cell rupture and subsequent anaemia - lethargy, reduced appetite, swelling of lower limbs and under the abdomen, pale/yellow/congested/red-spotted gums, dark red urine, high heart rate and high breathing rate.

- Chronic Equine Piroplasmosis infection: signs are less marked - weight loss, poor performance, lethargy and reduced appetite.

Current gold standard for diagnosis

- Serology is the basis of international disease control. Several are available, with pros and cons for each. Both cELISA and IFAT are currently OIE recognised for international trade.

How does the disease spread in general?

- During blood-feeding (biting) by ticks.

What is the specific role of horse gatherings in disease spread?

- Horse gatherings are generally considered of low significance in disease spread.

Disease specific criteria for gathering cancellation

- Cancellation of gatherings is unlikely. But careful consideration should be given to the risks and benefits of organising gatherings in areas with high tick numbers particularly at times of year when tick numbers are highest or where the horses are likely to be in contact with long grass and vegetation in which ticks are found.

Safe admission criteria

EIDAG recommends that BEF-MB put in place regulations, potentially with sanctions, to:

- prevent horses being presented for admission to a gathering in the following circumstances:
    - Any horse which has fever.
        - EIDAG suggests this is implemented via a "*health and freedom from disease & contact*" declaration (see Appendices)

Disease specific advice for participants at gatherings

Event organisers should provide facilities to allow participants to follow our general advice on reducing risk of infectious disease at horse gatherings (see general advice section).

- If the risk of horses encountering ticks is high, participants should be advised to check horses for ticks frequently.

Disease specific advice for participants after gatherings

Event organisers should encourage participants to follow our general advice on reducing risk of infectious disease on returning home from horse gatherings (see general advice section).

- Participants should be advised to check horses for ticks after attending any gathering where horses may contact ticks.

Report triggers and responses

EIDAG is not recommending introduction of a reporting requirement for this disease at this time.

Existing regulations

There is no longer any compulsory screening of equidae entering the UK or anti-tick treatment of any animals traveling from endemic regions into the UK.

Knowledge gaps

- There are no accurate data describing the distribution of Equine Piroplasmosis vectors within the UK. A recent study based on serology and molecular testing of blood samples from UK horses suggests that there is a population of Equine Piroplasmosis carrier horses living within the UK and further investigation is required to determines if any pockets of infection exist.

Additional comments

- If a clinical case is diagnosed in the UK then attempts should be made to medically resolve the infection in that animal. During this time the infected animal can infect vector ticks, but cannot directly infect other horses. Infected horses should be treated with acaricide and separated from potential tick vectors during this time to prevent spread of the disease. Participants should contact their veterinary surgeon for advice on specific treatment regimens.

Useful resources

- https://www.oie.int/wahis_2/public/wahid.php/Countryinformation/Countrytimelines#
- Public Health England's tick surveillance scheme (TSS) - Any ticks found on horses can be sent here for identification. Further information, along with general information on avoiding ticks in the UK, can be found at www.gov.uk/guidance/tick-surveillance-scheme.

Evidence sources

Coultous, RM, Phipps, P, Dalley, C, Lewis, J, Hammond, TA, Shiels, BR, Weir, W, Sutton, DGM. 2019. Equine piroplasmosis status in the UK: An assessment of laboratory diagnostic submissions and techniques. Veterinary Record, 184, 95.

Equine viral arteritis (EVA)

Also known as Infectious or epizootic cellulitis, 'pink eye'

Goals of disease-specific control measures

- The mainstays of ongoing control to prevent EVA outbreaks are vaccination of stallions to prevent the carrier state and semen shedding, regular testing of at-risk horses and quarantine of horses travelling to the UK from countries where EVA is endemic.
- EVA is a notifiable disease in the UK under the EVA Order 1995 and suspicion of infection must be reported to the government.
- If EVA is confirmed, then the outbreak must be managed by government appointed personnel in line with the contingency plan for exotic notifiable diseases.
- Stallions known to be carriers of EVA are likely to be permanently banned from breeding activities; these horses, and all horses from the same premises, should also be excluded from attending BEF-MB's horse gatherings.

The Aetiological Agent: Equine arteritis virus

- The equine arteritis virus is found worldwide and occasionally causes outbreaks of severe illness. The disease is notifiable in the UK and the last outbreak here was in 2019 (with the previous one in 2012).
- Conventionally EVA is of major concern to horse breeding and as such is included in the Horserace Betting Levy Board (HBLB) Codes of Practice (https://codes.hblb.org.uk/index.php/page/30
- However, the outbreak in the UK in 2019 demonstrated the infection may also be of concern to other equestrian gatherings (for example stallion shows), particularly where these involve horses from endemic countries.
- Some stallions (but as far as is known never mares or geldings) become persistently infected carriers of equine arteritis virus that do not show any outward signs of disease but shed the virus in their semen.
- Mares that catch equine arteritis virus from infected semen can then pass on the virus to other horses via the respiratory route, can abort infectious material or give birth to very sick, infected foals that are also infectious.
- EVA is endemic in several countries in Europe, therefore horses that are competing internationally are at risk and should be closely monitored. For up-to-date information on global distribution of EVA go to the International Collating Centre for equine disease
- The equine arteritis virus does not cause disease in humans.

Clinical Signs

- In countries where EVA is endemic, most infections are subclinical.
- In countries where EVA is not endemic , more severe disease occurs and the clinical signs vary greatly between horses and between outbreaks.

- EVA causes Flu-like respiratory (for example, raised rectal temperature, dullness, loss of appetite, cough, nasal discharge); in addition, cases can develop swollen and watery eyes and red spots on the gums.
- There may also be swelling of the lower limbs, underside of the belly, sheath and udder and urticaria (widespread skin lumps).
- Mares may abort and affected foals have severe, potentially fatal, pneumonia.
- Persistently infected stallions usually show no signs of disease or illness or may have temporarily reduced fertility. Use of these stallions for breeding without testing is very high risk.

Current gold standard for diagnosis

- With qPCR on samples from respiratory and/or reproductive tracts.
- Virus isolation may also be attempted but compared to rapid PCR methods, results may take days to weeks to be reported.
- Serology tests (called ELISA and virus neutralisation or VN tests) to confirm exposure by measurement of antibodies against EAV; however, antibodies produced after infection cannot be differentiated from those produced by vaccination. Consequently, specific pre-vaccination testing protocols are required when vaccination is used. Vaccination is generally restricted to stallions, such that antibodies found in mares is likely to reflect prior infection.

How does the disease spread in general?

- During breeding (virus transmitted in semen) – including teasing, natural service and artificial insemination using fresh, chilled or frozen semen. Freezing does not inactivate the virus.
- Contact with aborted material.
- Respiratory spread – via droplets shed by infected animals during coughing and snorting.
- Indirect spread via infected equipment, including artificial vaginas and tack) and personnel contaminated by infected semen or droplets.
- Non-venereal transmission between horses in environments contaminated by semen from masturbating stallions has been described.

What is the specific role of horse gatherings in disease spread?

- Where infected adult horses with any of the clinical syndromes described above attend a gathering of horses and where conditions permit the spread of the virus to other horses.

Disease specific criteria for gathering cancellation

- If EVA is suspected or confirmed amongst horses resident an equestrian venue at which a gathering is planned, then the outbreak must be managed by government appointed personnel. Horses will not be allowed to enter the venue.

Safe admission criteria

EIDAG recommends that BEF-MB put in place regulations, potentially with sanctions, to:

- prevent horses being presented for admission to a gathering in the following circumstances:
    - Any horse which has recent cough or nasal discharge of unknown cause, enlarged lymph nodes or fever.
        - EIDAG suggests this is implemented via a "*health and freedom from disease & contact*" declaration (see Appendices).
- EVA outbreaks must be managed by government appointed personnel and movement restrictions may be applied.
- Horses which have been identified as EVA carriers should be prevented from attending gatherings, and until contact with the EVA carrier ceases, horses from the same premises should also be excluded.
- Note, for international travel, regulations relating to testing and quarantine apply.

Disease specific advice for participants at gatherings

Event organisers should provide facilities to allow participants to follow our general advice on reducing risk of infectious disease at horse gatherings (see general advice section).

Disease specific advice for participants after gatherings

Event organisers should encourage participants to follow our general advice on reducing risk of infectious disease on returning home from horse gatherings (see general advice section).

Report triggers and responses

If a notifiable disease is confirmed, then the outbreak must be managed by government appointed personnel in line with the contingency plan for exotic notifiable diseases.

Existing regulations

- Equine Viral Arteritis Order 1995

Useful resources

HBLB codes of practice on EVA: https://codes.hblb.org.uk/index.php/page/30

Contingency plan for exotic notifiable diseases
https://www.gov.uk/government/publications/contingency-plan-for-exotic-notifiable-diseases-of-animals-in-england

Equine viral arteritis order 1995:
http://www.legislation.gov.uk/uksi/1995/1755/contents/made

Government poster for horse owners:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/801094/equine-viral-arteritis-spot-signs-poster.pdf

Crabtree, JR, Newton, JR, Equine viral arteritis (EVA): a potential trapdoor for the practising veterinary surgeon in the United Kingdom
https://beva.onlinelibrary.wiley.com/doi/abs/10.1111/eve.12974

Equine Infectious Anaemia (EIA)

Also known as Swamp fever

Goal of disease-specific control measures

- EIA is not present in the UK and is notifiable. If EIA is confirmed, the outbreak will be controlled in line with the government contingency plan for exotic notifiable diseases. and specifically, the EIA control strategy for Great Britain.
- Currently, disease monitoring and control is achieved by adhering to the HBLB guidelines https://codes.hblb.org.uk/index.php/page/33.
- This is based around serological testing (at least once a year) to identify infected breeding animals, good biosecurity (particularly avoiding areas where disease is endemic or an outbreak is occurring if travelling abroad), vector control to prevent transmission via biting flies and rapid identification and destruction of infected animals.

The Aetiological Agent: Equine Infectious Anaemia Virus

- EIA is caused by a virus which can be transmitted via blood, semen or via the placenta. The most important route of transmission in blood is via the mouth parts of large horse flies.
- Transmission can also occur during injection of contaminated blood and blood products or during use of blood contaminated equipment, particularly veterinary and dental products. Other equipment such as tack or feed bowls etc represent very low transmission risks.
- EIA poses no risk to human health.
- The last UK outbreak was in 2012. For up-to-date information on global distribution of EIA go to the International Collating Centre for equine disease

Clinical Signs

- EIA may take an acute, chronic or sub-clinical form. Clinical signs are therefore extremely variable.
- Acute: fever, dull demeanour, increased heart and breathing rate, abnormal bleeding, bloody diarrhoea, loss of co-ordination, poor performance, wobbliness, weight loss, swelling of lower limbs and abdomen and jaundice.
- Chronic: recurring bouts of fever, dull demeanour, anaemia, weakness or weight loss. Horses can be completely normal for periods of time in-between recurring bouts and the chronic form may last for years.

Current gold standard for diagnosis

- Serology – the Coggins test/Agar gel immunodiffusion test is currently the internationally recognised test.

How does the disease spread in general?

- Large horseflies are the main natural vector. The flies are mostly active from May to September, with a peak in July and August.

- The horseflies only travel short distances to feed, but the disease can be carried over long distances by infected horses or contaminated blood products.

What is the specific role of horse gatherings in disease spread?

- An infected horse could infect several other horses at an event - this would depend on the amount of horse flies present.

Disease specific criteria for gathering cancellation

- If EIA is confirmed in the UK, the outbreak will be controlled in line with the government contingency plan for exotic notifiable diseases. and specifically, by the animal disease control strategy for EIA.
- An EIA outbreak in an area is likely to prompt cancellation of gatherings as infection may be spread by vectors.

Safe admission criteria

EIDAG recommends that BEF-MB put in place regulations, potentially with sanctions, to:

- prevent horses being presented for admission to a gathering in the following circumstances:
    - Any horse which has fever.
        - EIDAG suggests this is implemented via a "*health and freedom from disease & contact*" declaration (see Appendices).

Disease specific advice for participants at gatherings

Event organisers should provide facilities to allow participants to follow our general advice on reducing risk of infectious disease at horse gatherings (see general advice section).

Disease specific advice for participants after gatherings

Event organisers should encourage participants to follow our general advice on reducing risk of infectious disease on returning home from horse gatherings (see general advice section).

Report triggers and responses

If a notifiable disease is confirmed, then the outbreak must be managed by government appointed personnel in line with the contingency plan for exotic notifiable diseases..

Existing regulations

- The Infectious Diseases of Horses Order 1987
- The Specified Diseases (Notification and Slaughter) Order 2006
- The Equine Infectious Anaemia (Compensation) (England) Order 2006.

Useful resources

EIA control strategy for Great Britain - https://www.gov.uk/government/publications/animal-disease-control-strategy-equine-infectious-anaemia

Government information on EIA
https://www.gov.uk/guidance/equine-infectious-anaemia-swamp-fever

Government information on notifiable diseases
https://www.gov.uk/government/collections/notifiable-diseases-in-animals
Government contingency plan for exotic notifiable diseases
https://www.gov.uk/government/publications/contingency-plan-for-exotic-notifiable-diseases-of-animals-in-england

Government information for vets - http://apha.defra.gov.uk/vet-gateway/tte/wnv.htm

HBLB Codes of Practice - https://codes.hblb.org.uk/index.php/page/33

West Nile Fever (WNF)

Also known as West Nile Disease, West Nile Encephalitis, West Nile Virus Infection

Goals of disease-specific control measures

- WNF is notifiable.
- In the event of WNF diagnosis, overall control at the national level will be undertaken by a joint Defra / Dept of Health team.
- The UK's current ongoing goal is to monitor closely for clinical cases and report immediately. Vaccination is currently permissible and a licensed product is available.
- The immediate goal in the event of a case in the UK will be to prevent spread of the virus into the indigenous vector population.
- In the event of an outbreak, government strategy will be rapid containment and resolution of the outbreak using a combination of quarantine, movement controls and vaccination.
- A vaccine is available in the UK: if West Nile Fever were shown to have been transmitted to a horse within the UK, then vaccination of other horses would be recommended to minimise the severity of disease in vaccinated animals. Importantly though, this would have no effect on the rate of disease spread as horses cannot spread West Nile virus. If the vaccine were in short supply, then available stocks should logically be targeted toward horses in the same region as affected cases, as the virus is more likely to be circulating within birds and mosquitoes in that area.

The Aetiological Agent: West Nile virus

- WNF is notifiable in the UK and is an OIE-listed disease. The virus is not present in the UK.
- West Nile Virus is present in many European horses where British horses may frequently travel to, such as Spain, France and Germany. For up-to-date information on global distribution go to the International Collating Centre for equine disease
- WNV causes disease in humans (zoonotic), horses, and several species of birds.
- Mosquito species act as vectors and are required for spread of the virus.
- The virus is maintained in nature by cycling between birds and mosquitos.
- Infection of other species, including humans and horses, occurs during feeding by infected mosquito vectors.
- The virus cannot be spread from infected horses or humans on to other mosquitos or animals.
- This means that an infected horse or human does not represent a serious disease risk to other horses or humans and both horses and humans are known as dead end hosts.
- An outbreak can only occur when the virus enters a region that simultaneously has a high enough density of birds and a suitably abundant and competent vector population.

- In the UK mosquitos have three seasonal peaks of activity in the months of May, late June–early July and September. These would be the times of greatest risk for disease outbreak.

Clinical Signs

- WNV targets the nervous system and neurological signs predominate.
- Changes in behaviour, (head pressing, walking in circles), personality (aggression) and mentation (dull demeanour, excitement), reduced appetite, tongue weakness and swallowing problems, muscle twitching (especially affecting the head), head tilt, wobbliness (this can be asymmetric and mimic lameness early on), stumbling, paresis (weakness), collapse and death. Fever may occur.
- Mortality rates (death or euthanasia) of 35-45% are reported.

Current gold standard for diagnosis

- Serology (blood test) - cELISA and IgM ELISA.
- Despite it being a notifiable disease, veterinary surgeons are able to test for WNV without initiating an official government investigation where it is low on the list of differential diagnoses, see http://apha.defra.gov.uk/vet-gateway/tte/wnv.htm for more details.

How does the disease spread in general?

- The disease spreads to horses when they are bitten by infected mosquitos.
- The virus spreads to a new area via infected birds or mosquitos.

What is the specific role of horse gatherings in disease spread?

- Government advice must be followed in the case of outbreak.
- If an infected horse went to a gathering, then there would be no risk of onward direct spread of infection to other horses.
- If a gathering were held in an area with a high rate of high mosquito infection then large numbers of horses could become infected at once, even if no infected horses actually travelled to the gathering.

Disease specific criteria for gathering cancellation

In the event of an outbreak, overall control at the national level will be undertaken by a joint Defra / Dept of Health team.

Safe admission criteria

EIDAG recommends that BEF-MB put in place regulations, potentially with sanctions, to:

- prevent horses being presented for admission to a gathering in the following circumstances:
    - Any horse which has fever or recent onset neurological signs of unknown cause.
        - EIDAG suggests this is implemented via a "*health and freedom from disease & contact*" declaration (see Appendices).

- WNF outbreaks must be managed by government appointed personnel and movement restrictions will be applied.
- Note, for international travel, regulations relating to testing and quarantine apply.

Disease specific advice for participants at gatherings

Event organisers should provide facilities to allow participants to follow our general advice on reducing risk of infectious disease at horse gatherings (see general advice section).

Disease specific advice for participants after gatherings

Event organisers should encourage participants to follow our general advice on reducing risk of infectious disease on returning home from horse gatherings (see general advice section).

Report triggers and responses

If a notifiable disease is confirmed, then the outbreak must be managed by government appointed personnel in line with the contingency plan for exotic notifiable diseases.

Existing regulations

- Infectious Diseases of Horses Order 1987

Knowledge gaps

- Overall monitoring for presence of WNV in the UK birds and mammalian hosts is minimal; consequently, an outbreak could occur without warning.

Additional comments

- Historically disease-free status in the UK is mostly assumed to be based on lack of competent vectors and geographical separation from regions where virus is endemic.
- Bridge vectors of WNV (feed on both birds and mammals including horses) are now known to be present in the UK and WNV now exists across many parts of Europe, including some northern countries.
- Vaccination is currently permissible and a licensed product is available. EIDAG recommend that horses travelling to areas where there is a risk of WNF (for example during the mosquito season in a country where the virus is endemic) should first be vaccinated.

Useful resources

Government information on WNV - https://www.gov.uk/guidance/west-nile-fever

Government information on notifiable diseases - https://www.gov.uk/government/collections/notifiable-diseases-in-animals

Government contingency plan for exotic notifiable diseases - https://www.gov.uk/government/publications/contingency-plan-for-exotic-notifiable-diseases-of-animals-in-england

Government information for vets - http://apha.defra.gov.uk/vet-gateway/tte/wnv.htm

African horse sickness (AHS)

Also known as 'Dunkop' (peracute respiratory form of disease) and 'Dikkop' (cardiac form of disease)

Goals of disease-specific control measures

- AHS has never been reported in the UK and is a notifiable disease.
- If African horse sickness is confirmed in the UK, the outbreak will be controlled in line with the contingency plan for exotic notifiable diseases and specifically by the animal disease control strategy for AHS.
- The UK's current ongoing goal is to maintain official OIE disease-free status by preventing infected equidae or Culicoides vectors from entering the UK.
- Vaccination is not permissible in disease free countries because it is not possible to distinguish between animals that are vaccinated and those that are infected. Vaccines currently in use in Africa are not suitable for the use in the UK.
- The immediate goal in the event of a single AHS case in the UK will be to prevent spread of the virus into the indigenous Culicoides vector population (outbreak).
- Goals in the event of an outbreak in the UK will be rapid containment and resolution of outbreak using a combination of quarantine, movement controls, prevention of biting by vectors and vaccination and to regain official OIE disease-free status as soon as possible.

The Aetiological Agent: African Horse Sickness Virus

- African Horse Sickness virus is spread between horses by insects (vectors), but cannot pass directly from horse to horse.
- Culicoides (commonly known as midges) are the primary vectors.
- The midge season in the UK is usually April to November. A large-scale outbreak would be almost impossible outside of this time.
- Peaks in midge numbers are also seen following warm and wet weather and these are peak disease times where AHS is endemic. Local geographical features, in particular water for breeding sites, also has a significant effect on local midge numbers and species. June, July and September have been identified as times when the risk of an outbreak in the UK is highest.
    - Wind speed and direction affects how quickly, and how far, midges can spread the disease.
- AHS is almost exclusively a disease of Equidae. It can occur in dogs, which are considered dead-end hosts i.e. dogs do not spread the infection.
- AHS does not typically infect humans and it not considered zoonotic under normal circumstances (disease has been reported in man following nasal exposure to virus from broken vaccine vials).
- For up-to-date information on global distribution of AHS go to the International Collating Centre for equine disease

Clinical Signs

- Traditionally four clinical syndromes of AHS (pulmonary, cardiac, mixed and reservoir species) are described but the usefulness of the classification system has been questioned and most cases are mixed.
- Pulmonary: rapidly progressive respiratory failure, with up to 95% mortality. Clinical signs include marked fever (up to 41°C), respiratory distress, profuse sweating, coughing and death.
- Cardiac: characterised by oedema (swelling), which is usually preceded by 3–4 days of less severe fever. Swelling starts above the eyes, before extending around the eyes and then the remainder of the head and neck. Breathing difficulties, pale gums, colic and heart failure are all reported. The cardiac form is less clinically severe and more protracted than the pulmonary form.
- The mixed form presents as varying combinations of the two, with mortality around 60 – 80%.
- Disease in reservoir species (zebra and donkeys) is usually inapparent. These are known as reservoir species as they act as a source of the virus to maintain it within a region. They are also most likely to introduce the virus to a new area as they do not show signs of disease and may therefore be transported.

Current gold standard for diagnosis

- Virus isolation from blood or tissue remains the gold standard; however, the OIE will now accept PCR.

How does the disease spread in general?

- An outbreak can only occur when the virus enters a region that simultaneously has a high enough density of equidae and a suitably abundant and competent vector population.
- The virus spreads to a new area via either through either movement of infected vectors or movement of infected equidae (reservoir species).
- Spread to individual animals occurs during blood-feeding by the infected vector Culicoides.

What is the specific role of horse gatherings in disease spread?

- Essentially all horse gatherings allow horse-vector interaction and therefore represent a risk. Government advice must be followed in case of an outbreak and movement of horses and horse gatherings would be severely restricted.
- The main risk results from an infected horse travelling to an event and infecting local vectors. Infected insects could then spread the virus to other horses at the gathering and/or to other horses within the local area.
- Equally, if an event were held in an area of high vector infection, then large numbers of horses coming into the area could become infected at once.

Disease specific criteria for gathering cancellation

- In the event of an outbreak, the government AHS control strategy will impose strict mandatory movement restrictions across the UK.

- All gatherings within a 150km radius of infected premises (the 'restricted zone') would be prohibited, with horse movement only occurring under licence.
- Gatherings could potentially take place elsewhere in UK, however advice will be given at the time by government veterinary advisers and is likely to vary as the outbreak progressed. Any gathering should certainly be avoided in areas where Cullicoides density is high.

Safe admission criteria

EIDAG recommends that BEF-MB put in place regulations, potentially with sanctions, to:

- prevent horses being presented for admission to a gathering in the following circumstances:
    - Any horse which has fever
        - EIDAG suggests this is implemented via a "*health and freedom from disease & contact*" declaration (see Appendices)
- AHS outbreaks must be managed by government appointed personnel. Wide ranging movement restrictions are likely.
- Note, for international travel, regulations relating to testing and quarantine apply.

Disease specific advice for participants at gatherings

Event organisers should provide facilities to allow participants to follow our general advice on reducing risk of infectious disease at horse gatherings (see general advice section).

Disease specific advice for participants after gatherings

Event organisers should encourage participants to follow our general advice on reducing risk of infectious disease on returning home from horse gatherings (see general advice section).

Report triggers and responses

If a notifiable disease is confirmed, then the outbreak must be managed by government appointed personnel in line with the contingency plan for exotic notifiable diseases.

Existing regulations

- African Horse Sickness (England) Regulations 2012
- Infectious Diseases of Horses Order 1987

Knowledge gaps

- The classical species of midge that transmit the AHS virus are not present in the UK currently; however, there is some evidence that certain the UK species would be able to transmit the virus and these species have been found near horses. More data on the distribution of these midge species, the ability of

these species to spread the virus and the exact location of horses around the UK are required.

Additional comments

- Historically disease-free status in the UK is mostly assumed to be based on lack of competent vectors and geographical separation from regions where the virus is endemic.
- The traditional vector species of Culicoides are not present in the UK. It is suspected that indigenous Culicoides may be able to act as vectors in the UK based on their ability to transmit Bluetongue Virus (very similar to AHSV) in 2006-7.
- Globalisation and international travel are thought to increase the risk of viral entry to the UK, although the risk is currently considered to be very low.
- Research is underway to develop an AHS vaccine which can be used in the UK and other regions outside Africa. Challenges include creating a vaccine which is effective against all 9 strains of the virus and which will not impact on surveillance programmes.

Useful resources

Information on notifiable diseases - https://www.gov.uk/government/collections/notifiable-diseases-in-animals

AHS control strategy 2012 - https://www.gov.uk/government/publications/african-horse-sickness-control-strategy

DEFRA advice - https://www.gov.uk/guidance/african-horse-sickness

Evidence sources.

Long, M.T., Guthrie, A.J., 2014. African Horse Sickness, In: Equine infectious diseases, 2nd ed. Elsevier Health Sciences, pp. 181-188.

Robin, M., Page, P., Archer, D., Baylis, M., 2016. African horse sickness: The potential for an outbreak in disease-free regions and current disease control and elimination techniques. Equine Vet. J. 48, 659-669.

Sabirovic, M., López, M., Patel, K., Kingston, A., Hall, S., 2008. African Horse Sickness: Potential risk factors and the likelihood for the introduction of the disease to the United Kingdom., London, p. 3.

Glanders & Farcy

Goals of disease-specific control measures

- Glanders and Farcy are not present in the UK and are notifiable (last confirmed case in 1928).
- The disease is controlled by pre-international movement testing. Statutory notification of suspected disease in horses is followed by investigation by a Veterinary Officer of the State Veterinary Service.
- If Glanders or Farcy is confirmed, the outbreak will be controlled in line with the government contingency plan for exotic notifiable diseases. Disease must also be reported to the OIE.

The Aetiological Agent: *Burkholderia mallei*.

- *Burkholderia mallei* is a bacterium which is geographically restricted to Eastern Europe, Asia, North Africa, South America and the Middle East. Historically the bacterium was eradicated from many parts of the world, including the UK, by a policy of blood testing and culling all animals which tested positive.
- For up-to-date information on global distribution of *Burkholderia mallei* go to the International Collating Centre for equine disease
- Most cases of disease affect horses, donkeys and mules, however clinical disease can occur in cats, dogs, camels, sheep and goats and humans.
- Disease in humans is rare but potentially fatal. Suspect cases should be isolated away from people. Persons handling suspect or infected animals should wear protective clothing including gloves, a face mask, and goggles or an eye shield.
- No vaccine is available.

Clinical Signs

- Hallmark pathology is nodular lesions in different locations depending on the form of the disease.
- Glanders: The respiratory form of the disease - nodules in the nostrils, nasal passages and lungs (and sometimes other organs including testicles). Ulceration of nodules results in thick, yellow nasal discharge. The acute form of glanders is associated with high fever and pneumonia that progresses to severe breathing difficulties and death.
- Farcy: The cutaneous form of the disease - nodules mainly within the skin. Nodules often ulcerate and discharge yellow pus. Lymphatics become swollen and appear like ropes under the skin.
- Some horses develop chronic disease associated with varying degrees of fever, dull demeanour, reduced appetite, weight loss and breathing problems.
- Chronically infected horses often have no signs of disease and act as a source of infection to other horses.

Current gold standard for diagnosis

- Isolation of *B. mallei* – difficult to grow and also impractical due to biosecurity requirements for handling of the bacterium.
- Serology test - Demonstration of antibodies to *B. mallei* by CFT in horses with clinical signs of disease is currently the OIE approved test in non-endemic countries.

How does the disease spread in general?

- All infected horses act as sources of the bacterium.
- Infection mostly occurs through ingesting feed or water that is contaminated with nasal secretions containing bacterium from infected horses.
- Spread also occurs via equipment and directly between horses.
- Transmission is increased with overcrowding and poor stable hygiene.

What is the specific role of horse gatherings in disease spread?

- An infected horse (especially one without clinical signs) could infect many other horses at a gathering particularly via shared water troughs or feed buckets or contaminated communal grazing areas.

Disease specific criteria for gathering cancellation

- If a notifiable disease is confirmed, then the outbreak must be managed by government appointed personnel in line with the contingency plan for exotic notifiable diseases.

Safe admission criteria

EIDAG recommends that BEF-MB put in place regulations, potentially with sanctions, to:

- prevent horses being presented for admission to a gathering in the following circumstances:
    - Any horse which has fever, recent cough or nasal discharge of unknown cause, enlarged lymph nodes.
        - EIDAG suggests this is implemented via a "*health and freedom from disease & contact*" declaration (see Appendices).
- Glanders and Farcy outbreaks must be managed by government appointed personnel and movement restrictions will be applied.
- Note, for international travel, regulations relating to testing and quarantine apply.

Disease specific advice for participants at gatherings

Event organisers should provide facilities to allow participants to follow our general advice on reducing risk of infectious disease at horse gatherings (see page general advice section).

Disease specific advice for participants after gatherings

Event organisers should encourage participants to follow our general advice on reducing risk of infectious disease on returning home from horse gatherings (see general advice section).

Report triggers and responses

If a notifiable disease is confirmed, then the outbreak must be managed by government appointed personnel in line with the contingency plan for exotic notifiable diseases.

Existing regulations

- Infectious Diseases of Horses Order 1987

Useful resources

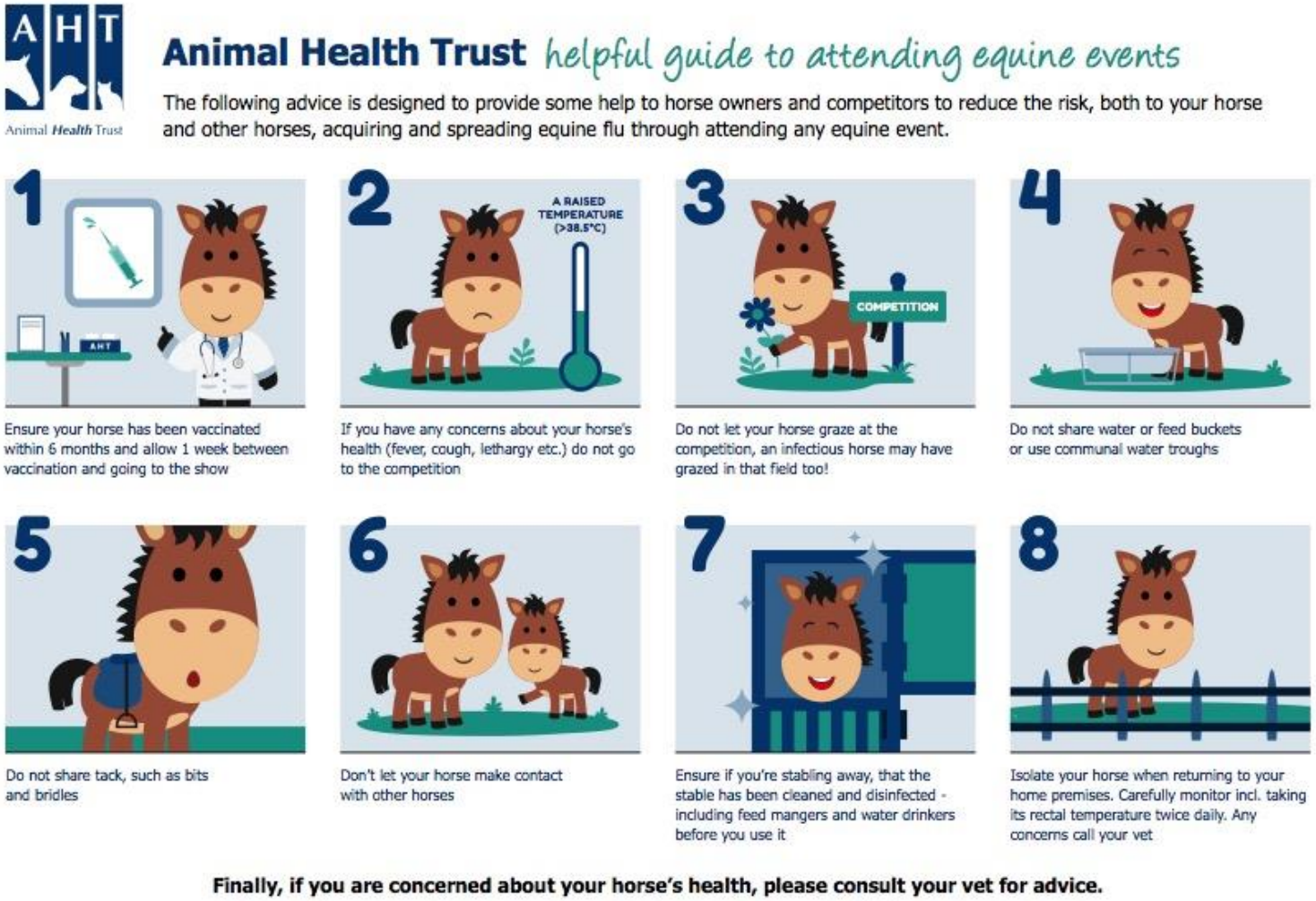
Government information on Glanders/Farcy - https://www.gov.uk/guidance/glanders-and-farcy

Government information on notifiable diseases - https://www.gov.uk/government/collections/notifiable-diseases-in-animals

Government contingency plan for exotic notifiable diseases - https://www.gov.uk/government/publications/contingency-plan-for-exotic-notifiable-diseases-of-animals-in-england

Appendices

Example of a guide to reducing risk of infectious disease at equine events.



Recommended Wording on infectious disease for BEF-MB's Privacy Policy

Under review by BEF's Legal Team
Wording in the BEF's Privacy Policy should clarify:

- how BEF-MB will use information provided by venues, owners and participants in declarations of health and reports of infectious disease and that this will include using the information, in the interests of equine welfare, to trace horses that have potentially been in-contact with infectious disease and inform their owners that this has potentially occurred.
- give BEF-MB the right to
    - store and share anonymised health, medical and infectious disease data with surveillance programmes and researchers working to combat equine infectious disease.
    - contact vets attending individual horses at gatherings, resident on venues at which gatherings have taken place or those horses which have become ill following attendance at a gathering.
    - contact other participants at gathering which the case may have attended while infectious, or at which the case may have contracted the infection.

Recommended Wording on infectious disease for affiliation agreements between BEF-MB and venues

Under review by BEF's legal team
Wording should give BEF-MB the right to insist that venues:

- are responsible about cancelling gatherings if there is infectious disease amongst horses resident on the premises.
- collaborate with BEF-MB in the process of informing participants that their horses may have been in contact with infectious disease where there is a report of infectious disease after a gathering.
- will support the use of information provided by owners and participants in declarations of health and reports of infectious disease without revealing the identity of the affected horse or its owner, rider or caretakers.
- give BEF-MB the right to contact the vets who regularly attend horses resident at the venue.
- give BEF-MB the right to share data on disease in horses who have been at the venue with surveillance programmes and researchers working to combat equine infectious disease.

Recommended Wording on infectious disease for membership terms/code of conduct

Under review by BEF's Legal team
Wording should give BEF-MB the right to insist that horse owners and gathering participants:

- Comply with individual gathering's requirement for vaccination
- Accurately complete declarations of "*health and freedom from disease and contact*".
- Comply with requirements to report confirmed infectious disease to the BEF-MB after attending a gathering.
- Provide permission for the BEF-MB officers to contact vets attending the horse at and after gatherings.
- Support BEF-MB in their efforts to trace in-contacts on the understanding that their own and their horse's identity will not be revealed.
- Comittment to inform local organisers if there is any reason to believe that horses under their care are ill while at a gathering.

Include a Statement that anonymised data will be shared with surveillance programmes and researchers working to combat equine infectious disease.

Advise BEF-MB to seek their own legal advice if they choose to impose sanctions relating to vaccination information and health and freedom from disease declarations.

Recommended Key Messages to deliver to participants before a gathering

1. Infectious disease can spread when horses gather: horses that are carrying infectious disease may not necessarily show external signs.
2. Check that your horse is healthy before leaving home, do not travel if you have any concerns
3. Submit, or bring, the BEF-MB's self-certificate of health required for this gathering
4. Inform the gathering organisers immediately if your horse shows any signs of illness at the gathering.
5. Bring everything you will need to minise contact between your horse and others at the gathering
6. Inform the gathering organisers immediately if your horse shows any signs of illness at the gathering.
7. Minimise contact between your horse and others when you return home

Recommended Contents for *Health and Freedom from Disease and Contact* Statements

Versions of the form should clearly state whether it is intended for the purpose of making a self-certified statement of each horse's health status at the time of admission to the gathering (gold and silver levels) or whether it is being used at the time of entry registration with an undertaking not to attend if the horse's health status changes (bronze level).

8. BEF-MB identity.
9. Instruction of how/where to submit declaration (for example digitally in advance, on arrival at gathering etc).
10. Rider/participant name.
11. Horse identity and microchip number.
12. Specific event/competition/gathering.
13. Date of horse gathering.
14. Horse's temperature prior to travel (with instruction that the horse should not travel if it has a temperature of >38.5°C).
15. Declaration that the horse has none of the following clinical signs:
    a. recent cough of unknown cause
    b. recent nasal discharge of unknown cause
    c. enlarged lymph nodes
    d. fever (≥38.5°C)
    e. recent onset neurological signs of unknown cause
    f. diarrhoea
    g. optional: skin lesions typical of ringworm
    h. optional: veterinary certificate on ringworm stating that appropriate treatment has been prescribed for the horse (include signature, name

and RCVS membership number from attending vet) with self-certification that the treatment has been administed according to veterinary recommendations.

16. Declarations of absence of specific diseases based on "safe admission criteria" as follows:
    a. Any horse which is known or under investigation for equine influenza
    b. Any horse which has been in contact with, or lives on the same premises as, a horse known or under investigation for equine influenza until
        i. EITHER all horses on the property have close clinical monitoring with twice daily temperature recording and the excluded status should apply until all horses on the premises have been free of clinical signs for at least 14 days.
        ii. OR a detailed veterinary report is presented to the BEF-MB EID veterinarian including robust laboratory evidence to show that the horse intended for admission to a gathering has not been infected with equine influenza.
    c. Any horse which is known or under investigation for EHV infection (whether associated with respiratory or neurological signs).
    d. Any horse which has been in contact with, or lives on the same premises as, a horse known or under investigation for EHV associated with neurological signs until.?
        i. EITHER all horses on the property have close clinical monitoring with twice daily temperature recording and the excluded status should apply until all horses on the premises have been free of clinical signs for at least 28 days.
        ii. OR a detailed veterinary report is presented to the BEF-MB EID veterinarian including robust laboratory evidence to show that the horse intended for admission to a gathering has not been infected with neurological EHV
    e. Any horse which is known or under investigation for Strangles.
        i. Where a horse has been excluded due to Strangles diagnosis, future admission should require that the horse has been shown to be negative on PCR or culture of a nasopharyngeal swab plus pooled guttural pouch lavages after its clinical signs have completely resolved.
    f. Any horse which has been in contact with, or lives on the same premises as a horse known to be infected with or under investigation for Strangles until:
        i. EITHER all horses on the premises have close clinical monitoring with twice daily temperature recording and have been free of clinical signs for at least 28 days **plus** the attending veterinarian is willing to support movement of horses on and off the premises.
        ii. OR a detailed veterinary report is presented to the BEF-MB EID veterinarian including robust laboratory evidence to show that

the horse intended for admission to a gathering is not currently infected with *Strep equi equi*.

g. Any horse under investigation for or known to be shedding *Salmonella* spp., *Clostridium difficile* and ECoV.
h. Any horse which is known to have, or be a carrier of, equine viral arteritis (EVA)
i. Any horse which has been in contact with, or lives on the same premises as, a horse known to have, or be a carrier of equine viral arteritis (EVA)

17. Declaration that the horse has received a primary vaccine course (2 doses) for equine influenza and has received its last booster within 6 or 12 months (delete as appropriate for gold and silver/bronze standards) of entering the gathering premises but not within the last 7 days.
18. Name of signatory.
19. Confirmation that the signatory is at least 18 years-old.
20. Reference to BEF-MB's privacy policy covering data use, storage and sharing.

Note: above, for the convenience of form designers, we have provided our detailed recommendations for removing "excluded due to disease contact" status, anticipating that in an online form, these detailed descriptions could be replaced with links to a resource on the BEF-MB's website or, for print, could be provided as footnotes.

Recommended Contents for Infectious Disease Report Forms

1. BEF-MB identity.
2. Instruction of how to submit report (for example digitally to BEF-MB via specific email address, website upload facility etc).
3. Reminder that disease reporting is only required when the infection has been confirmed by a veterinary surgeon using appropriate laboratory tests.
4. Statement of disease reporting window: 14 days is recommended by EIDAG qualified by requirement to report as soon as information is available (i.e. results of a test submitted on day 14 will not necessarily be available within the 14-day window).
5. Rider/participant name.
6. Horse identity.
7. Specific event/competition/gathering.
8. Date of gathering.
9. Attending Vet name and contact details (telephone and email) with statement that BEF-MB's officers may contact this person.
10. Home Vet or the vet/practice under which the horse is cared for contact details so that they can be advised of the situation.
11. Instructions of specific endemic diseases which should be reported to the BEF-MB if the first clinical signs are observed within 14 days of attending a horse gathering
    a. Equine Influenza
    b. Neurological herpes
    c. Strangles
    d. *Salmonella*
    e. *Clostridium Difficile*
    f. Equine Corona Virus
    g. Ringworm (optional but should be considered by BEF-MB)
12. EIDGA advise use of a table (see overleaf) giving explicit details of the evidence of positive diagnosis.
13. Name of signatory.
14. Confirmation that the signatory is at least 18 years-old.
15. Statement that this information will be used to trigger tracing of all potential in-contacts and share information that horses may have been in contact with a horse with infectious disease. This information will be shared anonymously (i.e. without revealing the identity of the horse, its rider, driver and/or its owner).
16. Reference to BEF-MB's privacy policy covering data use, storage and sharing.

Laboratory tests table recommended to trigger an infectious disease report

Infectious Disease	Laboratory confirmation	Tick all that apply
Equine Influenza	Positive PCR from a Nasopharyngeal swab from the horse that attended gathering	
	Positive PCR a Nasopharyngeal swab taken from another horse on the same premises	
Neurological Herpes	Diagnosis based on post-mortem examination	
	Positive PCR from a Nasopharyngeal swab from the horse that attended gathering	
	Positive PCR from a Nasopharyngeal swab from another horse on the same premises	
	Rising titre on paired serology where the first sample has been taken within the reporting window 14 days from the horse that attended gathering	
Strangles	Positive PCR or bacterial culture from a Nasoppharngeal swab, a pooled guttural pouch lavage or from a swab from another site (e.g. discharging lymph node or other abscess). Note ELISA serology results alone are not sufficient grounds for reporting but should prompt further investigations.	
Salmonella	Positive PCR or bacterial culture from an intestinal or faecal sample from the horse that attended the gathering.	
Clostridium difficile	Positive clostridial toxins found in an intestinal or a faecal sample from a horse that attended the gathering. Note results of PCR alone are not sufficient grounds for reporting but should prompt further investigations.	
Equine Corona Virus	Positive PCR from in an intestinal or a faecal sample from the horse that attended the gathering.	
Ringworm	Positive fungal culture or PCR from a hair pluck sample taken from the horse that attended the gathering.	

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