International Codes of Practice

2022

Contagious equine metritis (CEM)
Klebsiella pneumoniae
Pseudomonas aeruginosa

Equine viral arteritis (EVA)

Equine herpesvirus (EHV)

Equine coital exanthema (ECE)

Equine infectious anaemia (EIA)

Dourine

Guidelines on equine influenza (EI)

Guidelines on piroplasmosis

Guidelines on strangles

Guidelines on West Nile fever (WNF)

Guidelines on artificial insemination (AI)

ADVANCING VETERINARY SCIENCE AND EDUCATION

HORSERACE BETTING HBLB LEVY BOARD

Key Changes to the Codes for 2022

* New guidelines on piroplasmosis
* Revised guidelines for Strangles
* Clarification regarding the control of CEM infection
* Clarification regarding the diagnosis of WNF
* Updated vaccination information

ADVANCING VETERINARY SCIENCE AND EDUCATION

codes.hblb.org.uk

Codes of practice

racehorsehealth.hblb.org.uk

Research projects

www.hblb.org.uk

Infectious disease and equine influenza programmes

Research and clinical scholarships

Codes of Practice on

- Contagious equine metritis (CEM)
  Klebsiella pneumoniae
  Pseudomonas aeruginosa
- Equine viral arteritis (EVA)
- Equine herpesvirus (EHV)
- Equine coital exanthema (ECE)
- Equine infectious anaemia (EIA)
- Dourine
- Guidelines on equine influenza (EI)
- Guidelines on piroplasmosis
- Guidelines on strangles
- Guidelines on West Nile fever (WNF)
- Guidelines on artificial insemination (AI)

These Codes of Practice are published by:

Horserace Betting Levy Board
3rd Floor
21 - 27 Lamb's Conduit Street
London WC1N 3NL
Tel: 020 7333 0043
e-mail: equine.grants@hblb.org.uk

The full Codes of Practice are available online at http://codes.hblb.org.uk/.

IMPORTANT

Responsibility for the Laboratory Registration Scheme has passed to the British Equine Veterinary Association (BEVA) (www.beva.org.uk)

Contents

- Introduction 3
- Code of Practice for contagious equine metritis (CEM), *Klebsiella pneumoniae* and *Pseudomonas aeruginosa* 5
- Code of Practice for equine viral arteritis (EVA) 19
- Code of Practice for equine herpesvirus (EHV) 31
- Code of Practice for equine coital exanthema (ECE) 45
- Code of Practice for equine infectious anaemia (EIA) 51
- Code of Practice for dourine 59
- Guidelines on equine influenza (EI) 65
- Guidelines on piroplasmosis 71
- Guidelines on strangles 75
- Guidelines on West Nile fever (WNF) 81
- Guidelines on artificial insemination (AI) 87
- Appendix 1 - Animal & Plant Health Agency (APHA) Contacts 93
- Appendix 2 - Definition of 'high risk' and 'low risk' mares and stallions 95
- Appendix 3 - Example of 2022 Mare Certificate 96
- Appendix 4 - Example of 2022 Laboratory Certificate 97
- Appendix 5 - EAV – Identification of Shedding Stallions 98
- Appendix 6 - Guidance on Isolation 99
- Appendix 7 - Transport 101
- Appendix 8 - Vaccines available in the UK 102
- Appendix 9 - Further reading 103
- Appendix 10 - Glossary of terms 104
- Appendix 11 - Industry protocol for the control of contagious equine metritis in Great Britain 105

Introduction

This booklet sets out voluntary recommendations to help breeders, in conjunction with their veterinary surgeons, prevent and control specific diseases in all breeds of horse and pony. It comprises six Codes of Practice and guidelines on equine influenza, *Streptococcus equi* (strangles), piroplasmosis, West Nile fever and on artificial insemination (AI).

The recommendations within the Codes of Practice are common to France, Germany, Ireland, Italy and the United Kingdom.

In addition, numerous countries have used the Codes, in translated form, as the basis for their own, national guidelines. The Codes have thus become truly international in application. This is especially evident since the release of the EquiBioSafe app.

Any of the above diseases can have devastating consequences. They compromise horse and pony welfare, disrupt breeding activity, cause economic loss to both mare and stallion owners and are costly to deal with.

The diseases are highly contagious. Uncontrolled infection in just one horse or pony can transmit easily to others, potentially escalating to local and national outbreaks. With any disease that can spread via the respiratory route, non-breeding stock can become infected, leading to adverse cost and welfare consequences for owners and horses and, potentially, disruption of equestrian activities locally and nationally. In the UK, CEM, EVA, EIA and dourine are notifiable by law and, ultimately, outbreaks on any scale can lead to Britain losing its horse export status.

To avoid these consequences, breeders should aim to prevent disease, and control its spread if a case is suspected or occurs, by implementing the recommendations in these Codes of Practice.

If a case occurs, it is important to inform owners of other horses that are at risk of infection through contact with the affected horse/premises so that they can treat their horse and implement measures to stop any further spread of disease to other horses.

The Codes of Practice set out minimum recommendations for disease prevention and control. Breeders should implement additional precautions whenever appropriate to their circumstances. **Mare owners are strongly advised to check whether the stallion stud and/or boarding stud to which their mare is to be sent, or any local breeders' association for that area such as the Newmarket Stud Farmers Association (NSFA), has any requirements additional to those included in these Codes.**

Throughout the Codes, the term:

- 'Horse' includes mares and stallions of any breed of horse or pony.
- 'Stallion' includes stallions of any breed to be used for natural mating, teasing or semen collection for AI.
- 'Breeding activity' includes natural mating; teasing, collection, processing and insemination of semen; preparation and handling of mares for mating or insemination.

The introduction of these Codes of Practice has resulted in a significant decrease in the incidence of infectious disease outbreaks. It is vital that owners/managers of breeding stock maintain vigilance and follow the Codes, in conjunction with the attending veterinary surgeon, at all times.

Acknowledgements

With thanks to the HBLB Codes of Practice Sub Committee for updating the text. Photographs used in the Codes of Practice are by kind permission of Professor Sidney Ricketts, Animal Health Trust, The National Stud, *Equine Veterinary Education* and Istituto G.Caporale – Teramo, Italy.

CODE OF PRACTICE FOR CONTAGIOUS EQUINE METRITIS (CEM), *KLEBSIELLA PNEUMONIAE* AND *PSEUDOMONAS AERUGINOSA*

CODE OF PRACTICE FOR CEM, *KLEBSIELLA PNEUMONIAE* AND *PSEUDOMONAS AERUGINOSA*

This Code of Practice covers diseases caused by three species of bacteria:

- **Taylorella equigenitalis** (T. *equigenitalis*, the contagious equine metritis organism - CEMO)

  Contagious equine metritis (CEM), caused by this organism, was first diagnosed in 1977 in Newmarket. The cause, T. equigenitalis, was until then unknown. Following the development and application of this Code of Practice, CEM was eradicated in UK and has occurred only sporadically since. It occurs widely in the non-Thoroughbred population, and to a limited extent in Thoroughbreds, in mainland Europe.

- **Klebsiella pneumoniae** (*K. pneumoniae*)

  This organism is found in the environment and can cause infections in a variety of animal species, and in humans. There are many capsule types of K. *pneumoniae*, most of which do not cause equine venereal disease. However, types 1, 2 and 5 may be sexually transmitted in horses. Therefore, when K. *pneumoniae* is identified from breeding stock, tests to determine the capsule type(s) present must be undertaken.

- **Pseudomonas aeruginosa** (*P. aeruginosa*)

  This organism is also found in the environment and can cause infections in a variety of animal species, and in humans. Not all strains of P. *aeruginosa* cause equine venereal disease but there is no reliable method to differentiate between the strains. Therefore, all isolates should be considered as potential venereal pathogens.

Both *K. pneumoniae* and *P. aeruginosa* occur sporadically within Europe.

Notification Procedures

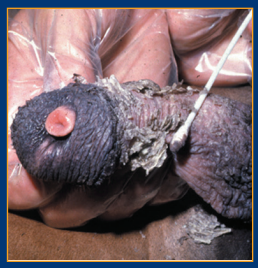
Contagious Equine Metritis (CEM)

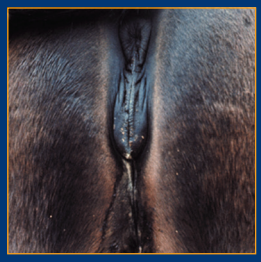
In Great Britain (England, Scotland and Wales), isolation of an organism known or suspected to be *T. equigenitalis* (CEMO) must be notified under the Infectious Diseases of Horses Order 1987 to the Animal & Plant Health Agency (APHA). Please see Appendix 1 for APHA contact details.

Laboratories that have notified a suspect isolation are required to send the swab sample and/or the swab extract for PCR testing to the APHA Veterinary Investigation Centre Penrith (Merrythought, Calthwaite, Penrith, Cumbria CA11 9RR; tel: 01768 885314; email: penrith@apha.gsi.gov.uk) for official confirmation or negation of a suspected positive diagnosis of CEM.

Following an extended consultation between Government and the equine industry a new industry-led Contagious Equine Metritis (CEM) control protocol came into effect on 1 February 2018 as an initial pilot scheme in England, Scotland and Wales; there was no change in the arrangements for control of CEM in Northern Ireland (for more details please see Appendix 11). CEM remains notifiable throughout the UK and as such the disease will continue to be confirmed by the APHA Veterinary Exotic and Notifiable Diseases Unit (VENDU)

on the instructions of the Chief Veterinary Officer (CVO) in the country in GB where the disease is suspected. In 2021 the status of the industry-led CEM control protocol was changed from a pilot to an established protocol.





The basis of this industry-led scheme in GB is that when APHA is notified by a laboratory of a suspect *T. equigenitalis* isolation, APHA will inform the owner/agent of the horse of the suspicious result and ask the owner/agent whether, if CEM is confirmed and they are compliant with the Code of Practice, they wish to take part in the protocol.

If they elect to take part in the protocol further investigation will be carried out by an approved veterinary surgeon (AVS) appointed by a specialist advisor to the equine industry. A list is held by the British Equine Veterinary Association (BEVA). The owner or agent has 24 hours to inform that advisor of their agreement and to provide them with the required information about the infected horse(s), the premises and the attending veterinary surgeon involved. The specialist advisor will appoint an appropriate specialist in agreement with the owner/keeper, who, if CEM is confirmed, will visit the positive horse and premises and will advise the advisor whether the situation is compliant with the Code of Practice or not. The specialist may be the attending veterinary surgeon if he/she is on the BEVA Approved Veterinary Surgeon (AVS) list and if he/she consents to this responsibility.

If the owner does not wish to take part in the protocol or the premises is not compliant with the Code of Practice, the advisor will advise Defra of this and APHA will take over the investigation and may make charges. Defra may serve Statutory Notices on the affected premises, declaring them an infected place and impose mandatory requirements, including:

- taking samples or obtaining information to establish the source and extent of disease;
- prohibiting or controlling movement of any horse, carcase or other item;
- prohibiting the breeding activities of any implicated horses;
- disinfection or destruction of infected articles or materials;
- cleansing and disinfection of premises and vehicles.

In the event of statutory powers being invoked, Defra would nominate the laboratories to undertake the testing of all samples required by the subsequent investigation.

Failure to comply with Statutory Notices is an offence under the Animal Health Act 1981 and may lead to prosecution.

If *T. equigenitalis* is isolated, it is advisable for owners, or a person authorised to act on their behalf, to inform the appropriate national breeders' association.

Thereafter, the outbreak and any contacts will be investigated, infected horses treated and re-tested as recommended by this Code of Practice until all infected horses are shown to have been repeatedly tested negative. If the specialist advisor is involved, it will then notify Defra that this is the case and VENDU will, if the appropriate person is satisfied, declare the outbreak over.

Klebsiella pneumoniae and *Pseudomonas aeruginosa*

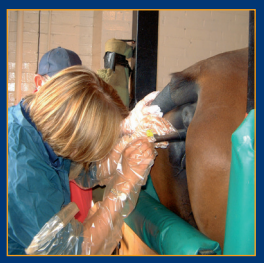
In the UK, isolation of *K. pneumoniae* or *P. aeruginosa* is not notifiable by law. However, if infection occurs in stallions, it is advisable for the owner, or a person authorised to act on their behalf, to inform the national breeders' association.

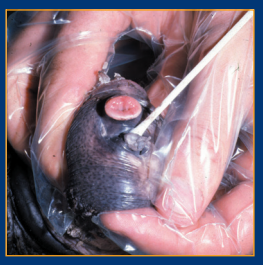
Clinical Signs

Mares

For all three bacteria, the severity of disease in mares varies. There are two states of infection:

- the active state in which the main outward sign is a vulval discharge which may range from very mild to extremely profuse;
- the carrier state in which there are no outward signs of infection. However, the mare remains capable of transmitting infection because the bacteria are established on the surface of the clitoris, in the clitoral fossa and sinuses and, in the case of *K. pneumoniae* and *P. aeruginosa,* sometimes in the urethra and bladder.





Stallions

Remember: 'stallion' means mating stallions, teasers and stallions used for AI:

- Infected stallions do not usually show clinical signs of infection but the bacteria are present on their penis, sheath and, in the case of *K. pneumoniae* and *P. aeruginosa*, sometimes in the urethra and bladder. These stallions can infect mares during mating, teasing or AI.
- Occasionally, in the case of *K. pneumoniae* and *P. aeruginosa* infections, the bacteria may invade the stallion's sex glands, causing pus and bacteria to contaminate the semen.

Note
Also see the
AI Guidelines
on page 87

Transmission of Disease

For all three bacteria, infection can be transmitted between horses in any of the following ways:

- direct transmission during natural mating;
- direct transmission during teasing. An infected teaser can transmit disease to mares through contact with his genitalia;
- indirect transmission during teasing. A teaser can transmit infected vulval discharge between mares through genital or naso-genital contact;
- transmission to mares if semen used for AI comes from infected stallions or has been contaminated with the bacteria during semen collection or processing;
- indirect transmission via the hands and equipment of staff or veterinary surgeons who have handled the tail or genitalia of an infected horse.

Prevention of Disease

Prevention is by far the most important means of control of venereal disease for the horse population. The most important means of preventing infection are:

- establishing freedom from infection before commencing breeding activities;
- checking that horses remain free from infection during breeding activities;
- exercising strict hygienic measures during breeding activities.

No vaccines against these bacterial diseases are available.

Freedom from infection

Establishing freedom from infection before, and checking that horses remain free from infection during, breeding activities involves a veterinary surgeon taking samples ('swabs') from the genitalia of mares and stallions for testing ('culturing' and/or PCR testing) in a laboratory. The laboratory will test for the presence of *T. equigenitalis*, *K. pneumoniae* and *P. aeruginosa*. If the results are negative, the horse is free from infection and breeding activities may take place. If the results are positive, the horse is infected and must be treated, re-tested and cleared. The horse must not be used for breeding activities at this time. If a swab is positive for the CEMO, the Notification Procedures on page 6 also apply, and an investigation of the source and extent of the disease will be undertaken.

No horse should be used for breeding activities until or unless all swab results are available and negative.

Different types of swab and culture are recommended for different circumstances in this Code of Practice. For further information on the types of swab, taking and submission of swabs, culture and return of results, see 'Diagnosis' on page 13.

More detailed recommendations for establishing freedom from infection in mares and stallions before breeding activities commence, and for checking that horses remain free from infection during breeding activities, follow.

Hygiene measures

Staff should be made aware of the risk of direct and indirect transmission of infection. They should always wear disposable gloves when handling the tail or genitalia and change gloves between each horse. Separate sterile and, where appropriate, disposable equipment and clean water should always be used for each horse.

Biosecurity protocols specific to AI are described in further detail in the Guidelines on AI.

Prevention recommendations

These are minimum recommendations. Mare owners should check whether the stallion stud, boarding stud or local breeders' association (e.g. NSFA) has any additional requirements. If so, these should be respected.

References to swab testing means appropriate testing by culture and/or PCR, where a laboratory is registered by BEVA for this method

Mares

After 1st January in any year and before a mare is mated, teased or inseminated, the following should be undertaken:

- Ascertain whether the mare is 'high risk' or 'low risk' (see Appendix 2);
- Complete a Mare Certificate (see Appendix 3) and send it to the stallion owner/manager;
- Arrange for a veterinary surgeon to take the appropriate swabs (see protocol on page 10) and send them to an appropriate laboratory for testing;
- Distribute the resulting Laboratory Certificates (see Appendix 4) in accordance with the protocol on page 10.

References to swab testing means appropriate testing by culture and/or PCR testing where a laboratory is registered by BEVA for this method following satisfactory Quality Assurance testing.

If the results are negative, the mare is free from infection and breeding activities may commence. If they are positive, she is infected and must not be mated, teased or inseminated until she has been treated and cleared from infection under the direction of the attending veterinary surgeon and, in the case of the CEMO, with Defra/APHA or the BEVA Approved Veterinary Surgeon (AVS) (see Appendix 11).

References to swab testing means appropriate testing by culture and/or PCR, where a laboratory is registered by BEVA for this method

Swabbing protocol for mares temporarily or permanently resident at stallion stud (pre-breeding)

Mare status	Type of swab	When/where taken	Culture/PCR
Low risk	Clitoral	Home premises or stallion stud	Aerobic and microaerophilic
	Endometrial	During oestrus at stallion stud	Aerobic
High risk (not known to have been infected)	Clitoral	Before arrival at stallion stud	Aerobic and microaerophilic
	Clitoral	On arrival at stallion stud (at least 7 days after the previous)	Aerobic and microaerophilic
	Endometrial	During oestrus at stallion stud	Aerobic and microaerophilic

High risk (not known to have been infected) mares usually come from countries other than UK, Ireland, France Germany and Italy, i.e. the signatories for these Codes. For high risk (after treatment for infection) mares, please see Confirmation of Freedom from Disease, later.

Swabbing protocol for walking-in mares (pre-breeding) or for mares being presented for AI (considered as 'low risk')

The following applies to mares which will not be resident on the same premises as the stallion, but will be 'walked in', either from their home premises or from a boarding stud. If 'high risk' walking-in mares are going to a boarding stud, that stud should either be under the control of, or meet full approval of, the stallion owner/manager. The veterinary surgeons involved should liaise closely to ensure adherence to the Code of Practice and to arrange any additional precautions that may be required.

Mare status	Type of swab	When/where taken	Culture/PCR
Low risk	Clitoral	Home premises or boarding stud	Aerobic and microaerophilic
	Endometrial	During oestrus at home premises or boarding stud	Aerobic
High risk (not known to have been infected)	2 x clitoral	At least seven days apart at home premises or boarding stud	Aerobic and microaerophilic
	Endometrial	During oestrus at home premises or boarding stud	Aerobic and microaerophilic

Protocol for distribution of Laboratory Certificates

The timely provision of acceptable Laboratory Certificates is essential to satisfy the needs of stallion stud managers. Laboratory Certificates relating to pre-breeding swabs taken from mares at the home premises should be sent in advance to the stallion owner/manager and, where appropriate, to the boarding stud. **For 'walking in' mares, acceptable Laboratory Certificates**

must at least accompany the mare at the time of presentation for mating. Certificates relating to pre-breeding swabs taken from mares at boarding studs should be sent in advance to the stallion owner/manager.

Before a mare is mated, the mare owner/manager is advised to request a Laboratory Certificate confirming the stallion's disease-free status in the current breeding season.

Mare owners/managers should not accept semen for AI without obtaining evidence that the donor stallion was free from infection when the semen was collected. In the UK, this evidence would be provided by a Laboratory Certificate confirming the stallion's disease-free status in the current breeding season. When importing semen, it should be accompanied by documentary evidence of freedom from infection with all three bacteria and the original import certificate.

If the mare does not conceive on first (or subsequent) matings, and her return to oestrus is normal, she should be swabbed again before being re-mated to check that she is not infected as a result of the previous mating or indirect transmission, according to the protocol below.

The mare may be re-mated on the basis of negative swab results. If the results are positive, she is infected and must not be mated, teased or inseminated until this has been investigated, she has been treated and cleared under the direction of the attending veterinary surgeon, and, in the case of *T. equigenitalis,* with Defra/APHA or the BEVA Approved Veterinary Surgeon (AVS) (see Appendix 11).

References to swab testing means appropriate testing by culture and/or PCR, where a laboratory is registered by BEVA for this method

Swabbing protocol for mares temporarily or permanently resident at stallion stud (repeat matings)

Mare status	Type of swab	When/where taken	Culture/PCR
Low risk	Endometrial	During oestrus at stallion stud	Aerobic
High risk	Endometrial	During oestrus at stallion stud	Aerobic and microaerophilic

Swabbing protocol for walking-in mares (repeat matings)

The following swab recommendations apply to mares which will not be resident on the same premises as the stallion, but will be 'walked in', either from their home premises or from a boarding stud. If 'high risk' walking-in mares are going to a boarding stud, it should either be under the control of, or meet full approval of, the stallion owner/manager. The veterinary surgeons involved should liaise closely to ensure adherence to the Code of Practice and to arrange any additional precautions that may be required

Mare status	Type of swab	When/where taken	Culture/PCR
Low risk	Endometrial	During oestrus at home premises or boarding stud	Aerobic
High risk	Endometrial	During oestrus at home premises or boarding stud	Aerobic and microaerophilic

Protocol for distribution of Laboratory Certificates

Laboratory Certificates relating to repeat swabs taken from mares at the home premises should be sent in advance to the stallion owner/manager

and, where appropriate, to the boarding stud. **For 'walking in' mares, acceptable Laboratory Certificates must at least accompany the mare at the time of presentation for mating.** Certificates relating to repeat swabs taken from mares at boarding studs should be sent in advance to the stallion owner/manager.

If any mare returns to oestrus at an unusual (especially shorter than normal) time (in the opinion of the attending veterinary surgeon), this may be because she is infected. Repeat clitoral and endometrial swabs should be taken and cultured under aerobic and microaerophilic conditions or by PCR test.

If any mare changes stallions between matings, repeat clitoral and endometrial swabs should be taken at least seven days after mating by the original stallion and cultured under aerobic and microaerophilic conditions or by PCR test.

These are minimum recommendations. Mare owners should check whether the stallion stud, boarding stud or local breeders' association (e.g. NSFA) has any additional requirements, e.g. requirements for microaerophilic culture or PCR testing for repeat matings.

References to swab testing means appropriate testing by culture and/or PCR, where a laboratory is registered by BEVA for this method.

Stallions

After 1st January in any year and before a stallion is used for mating/teasing or semen collection, the owner/manager should:

- ascertain whether the stallion is 'high risk' or 'low risk' (see Appendix 2);
- arrange for swabs to be taken by a veterinary surgeon in accordance with the protocol below;
- ensure that a Laboratory Certificate (see Appendix 4) confirming the mare's disease free status in the current breeding season, and a current Mare Certificate (see Appendix 3) are received for each mare to be mated, teased or inseminated at the stallion's premises;
- ensure that a Laboratory Certificate confirming the stallion's disease-free status in the current breeding season is made available to mare owners/managers.

References to swab testing means appropriate testing by culture and/or PCR testing where a laboratory is registered by BEVA for this method following satisfactory Quality Assurance testing.

Protocol for swabbing (pre-breeding)

After 1st January and before any breeding activity is commenced, two sets of swabs (see definition on page 13) should be taken from all stallions at an interval of no less than seven days and cultured aerobically and microaerophilically or by PCR.

If the results of swab testing are negative, the stallion is free from infection and breeding activities may commence. If they are positive, he is infected and must not be used for mating, teasing or semen collection until he has been treated and cleared under the direction of the attending veterinary surgeon and, in the case of the CEMO, with Defra/APHA or the BEVA Approved Veterinary Surgeon (AVS) (see Appendix 11).

The following should be carried out during the breeding season to check that the stallion has not become infected:

'High risk' stallions and any other stallion(s) standing at a stud for the first time warrant additional precautions. The first four mares mated with them

should be screened for *T. equigenitalis, K. pneumoniae* (capsule types 1, 2 and 5) and *P. aeruginosa* by taking a clitoral swab two days after mating. If the mare subsequently returns to oestrus, an endometrial swab should be taken at that time. These swabs should always be tested aerobically and microaerophilically or by PCR test.

In stallions, bacterial growth or PCR detection of *T. equigenitalis* is generally more easily achieved after mating. Swabbing of all stallions after their first few matings in any season should therefore be considered in conjunction with the attending veterinary surgeon. In addition, mid-season swabbing should be considered for all stallions and teasers. These swabs should always be tested by aerobic and microaerophilic culture and/or by PCR testing.

Remember: 'stallion' means mating stallions, teasers and stallions used for AI.

Diagnosis

Laboratory diagnosis is essential to confirm the presence or absence of *T. equigenitalis, K. pneumoniae* and *P. aeruginosa* in swabs taken from mares and stallions.

References to swab testing means appropriate testing by culture and/or PCR, where a laboratory is registered by BEVA for this method

Types of swab

Mares

There are two types of swab:

Clitoral swab: taken from two sites; the clitoral fossa and the clitoral sinuses using mini tip swabs to ensure appropriate sampling of sinus contents, at any point during the reproduction cycle to demonstrate whether these sites are free from infection.

In the case of **pregnant mares who have had difficult foalings** requiring veterinary attention and antibiotic treatments, additional clitoral swabs should be taken after foaling and more than 7 days after antibiotic treatment has finished, in addition to routine endometrial swabs, in order to rule out acquired *K. pneumoniae* and *P. aeruginosa* infections. Providing the pre-foaling clitoral swab was certified negative for *T. equigenitalis*, the additional post-foaling clitoral swab may be tested by aerobic culture only, or by PCR.

Endometrial swab: taken during oestrus from the lining of the uterus via the open cervix to demonstrate whether the uterus is free from infection.

Mare swabs taken for disease prevention purposes should be tested according to the recommendations on pages 9–12.

Note: These are minimum recommendations. Mare owners should check whether the stallion stud, boarding stud or local breeders' association (e.g. NSFA) has any additional requirements.

Stallions

Swabs should be taken from three sites; the urethra, urethral fossa and penile sheath, plus pre-ejaculatory fluid when possible. Separate swabs should be used for each site and tested by aerobic and microaerophilic culture and/or by PCR test, in all circumstances.

Further information on how to collect equine genital swabs in stud practice for the prevention of venereal diseases, as recommended by the Codes of Practice, is available online at: http://codes.hblb.org.uk/index.php/page/40

Taking swabs

All swabs should be taken by a veterinary surgeon, who should:

- Pay attention to the PowerPoint presentation 'How to Collect Equine Genital Swabs in Stud Practice' by Professor Sidney Ricketts FRCVS https://www/rossdales.com/wp-content/uploads/2018/01/Collecting-Swabs-2017.pdf
- Clitoral swabs must be taken using a micro tip (mini tip) swab to get deep into the clitoral sinuses.
- Submerge the swabs in Amies Charcoal Transport Medium (which must be within the expiry date) to protect them from the damaging effects of light, which will readily kill any *T. equigenitalis, K. pneumoniae* or *P. aeruginosa* present.
- label them clearly to show the date and time they were taken, the horse's name and the site of swabbing;
- indicate clearly whether aerobic, microaerophilic or both cultures, and/or PCR test are required;
- submit them to a BEVA registered Laboratory for testing. Culture must commence within 48 hours of the swab being taken.

References to swab testing means appropriate testing by culture and/or PCR, where a laboratory is registered by BEVA for this method

A list of laboratories in UK, Ireland, Germany and France registered by BEVA for the purposes of testing for the CEMO, *K. pneumoniae* and *P. aeruginosa* is available from:

https://www.beva.org.uk/PortalsResources-For-Vets-Practices/Equestrian-Sport-Guidance/BEVA-Registered-Lab-Scheme

Submitting swabs to BEVA registered laboratories

The BEVA registered laboratories must set up swabs for conventional microaerophilic culture for *T. equigenitalis* within 48 hours of them being taken from the horse as this organism is short lived, even in bacteriological transport medium. Veterinary surgeons submitting swabs by routine postal services are, therefore, advised not to take swabs on Fridays, Saturdays or Sundays as they may not arrive in time. If weekend or bank holiday swabbing is unavoidable, the veterinary surgeon should ensure that the laboratory is open and able to commence cultures within the 48 hours. In this event, a suitable courier service should be used to deliver the swabs. If a swab does not arrive in time, the laboratory should reject it and advise the veterinary surgeon to repeat the swabbing.

Note
The term 'at risk' relates to any horse which may have become infected as a result of direct or indirect transmission of the disease.

However, time constraints do not apply to swabs submitted to laboratories that are registered to run PCR tests for *T. equigenitalis* as specific DNA from non-viable organisms can be detected for long periods.

Experience suggests that swabs cultured aerobically for *K. pneumoniae* and *P. aeruginosa* are not so time sensitive and these organisms have a long life in bacteriological transport medium, as they do in the environment.

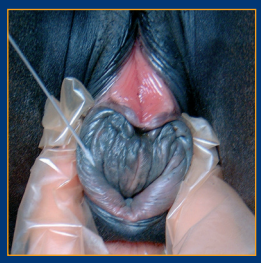
Laboratory culture of swabs

Laboratories can culture swabs in two ways: aerobically and microaerophilically (see Glossary, Appendix 10). The results of culture will be returned by the laboratory on an official Laboratory Certificate. When planning the timing of

breeding activities, breeders and veterinary surgeons should be aware that the results of microaerophilic culture results will not be available for at least seven days. Aerobic swabs require 24 hour (overnight) culture before the initial result can be reported. If these results are satisfactory, 'low risk' mares may then be mated. However, final aerobic culture results will not be available for 48 hours (to exclude the possibility of slow-growing *P. aeruginosa* organisms), so mating before these results are available is at the stallion stud's own risk. PCR test results do not have these time delays.

Other laboratory tests

Polymerase chain reaction (PCR) testing of swabs for T. equigenitalis, *K. pneumoniae* and *P. aeruginosa* is validated for industry screening purposes. PCR testing is not recognised for import/export testing in the UK. **Breeders and veterinary surgeons may find PCR test results helpful, as they may be available on the same day that a sample is received at a laboratory that is able to undertake PCR testing**. Positive PCR test results will need to be further investigated by conventional culture to help determine their significance and, in the case of *K. pneumoniae*, for capsule typing, unless being tested, in the same laboratory, for capsule typing by PCR test. Positive PCR test results for *T. equigenitalis* must be reported to Defra/APHA (see Appendix 11).



The immunofluorescence test (IFT) for *T. equigenitalis,* which is available only in France, is not acceptable on its own, although it may be used in addition to culture.

Preparing mares for covering

It has been brought to the Codes of Practice Committee's attention that some mares are now being presented for walk-in coverings with only PCR test certification and sometimes incomplete gynaecological preparation.

The Code of Practice recommends PCR testing uterine swabs from mares because this is currently the best method to rule out the contagious endometritis infections caused specifically by T. equigenitalis, K. pneumoniae and P aeruginosa infection, which is the principal objective of this Code. However, this test is not a substitute for traditional aerobic cultures and a proper full genital examination of all mares, for signs of other uterine endometritis infections or non-infectious endometritis, or other significant genital abnormality. This examination must be performed when the mare is in early oestrus, when she will have a sufficiently relaxed cervix to allow proper swabbing, and should include:

1. Visual inspection of the vulva, vestibule and vagina to confirm adequate vulval closure, correct post-partum healing of vulval tears or Caslick repairs and the absence of signs of pneumovagina, which will need correction, prior to covering.

2. Vaginascopic examination of the cervix and vagina to confirm a relaxed oestrous cervix and no signs of parturient tears or inflammation to suggest pneumovagina, which will need repair/resolution.

3. Rectal palpation and ultrasound examination to monitor ovarian follicular development to allow the optimal time for covering to be predicted and signs of ovarian and/or uterine abnormality (e.g. delayed uterine involution and/or excessive and/or turbid uterine fluid) to be ruled out. If found, these abnormalities should be treated and time allowed for resolution before the mare is sent for covering.

4. When the cervix is adequately relaxed, swabs should be taken for PCR testing (see above) **and for aerobic bacterial culture** and, ideally, at the same time, for a smear cytology test. This will allow endometritis, caused by any infectious organism (most commonly with equine skin or environmental contaminants) or

non-infectious endometritis (indicating inflammation rather than active infection) to be ruled out. The smear test will provide a more precise interpretation of the significance of bacteria cultured from the swab and will allow the diagnosis of non-infectious inflammation.

If any of these problems are detected, covering at this stage is more likely to result in failure of conception or early pregnancy failure. The mare will then require further, perhaps more prolonged, treatment to return her into a state for covering again and valuable time will have been lost out of the breeding season, for the mare to achieve a pregnancy. This is why such careful preparation of mares for covering is helpful for the mare and all concerned and is therefore recommended.

Control of Infection

If infection with any of the three organisms is suspected in any mare, stallion or teaser on the basis of clinical signs, all breeding activities must cease immediately. The affected horse(s) should be isolated and swabbed by the attending veterinary surgeon.

If *T. equigenitalis, K. pneumoniae* (capsule types 1, 2 or 5) or *P. aeruginosa* is subsequently isolated or confirmed by PCR from any mare, stallion or teaser:

1. Stop mating, teasing and collection and insemination of semen immediately;
2. Seek veterinary advice immediately;
3. Isolate and treat the infected horse(s) as advised by the attending veterinary surgeon. In the case of *T. equigenitalis*, the laboratory will have notified Defra/APHA, who will give directions on the next steps which must be followed (see Appendix 11);
4. Arrange swabbing of any in contact horses, as advised by the attending veterinary surgeon or, in the case of *T. equigenitalis*, with Defra/APHA or the BEVA Approved Veterinary Surgeon (AVS) (see Appendix 11);

   The term 'at risk' relates to any horse that may have become infected as a result of direct or indirect transmission of the disease.
5. Disinfect all equipment used for breeding procedures
6. Inform all owners of mares booked to the stallion, including any that have already left the premises;
7. Inform people to whom semen from the stallion has been sent;
8. Inform the appropriate national breeders' association;
9. Arrange for one straw from every ejaculate of stored semen from infected and at risk stallions to be tested by a laboratory. If a straw from any ejaculate is infected, all straws from that ejaculate should be destroyed;
10. Any at risk pregnant mare must be foaled in isolation. The placenta must be incinerated. Foals born to these mares should be swabbed three times, at intervals of not less than seven days, before three months of age. These swabs should all be tested by aerobic and microaerophilic culture or by PCR test;
    - Filly foals: swab the clitoral fossa.
    - Colt foals: swab inside the penile sheath and around the tip of the penis.
11. Do not resume any breeding activity until freedom from disease has been confirmed in all infected horses (see below). The approval of the attending veterinary surgeon or, in the case of *T. equigenitalis*, of Defra/APHA, should be obtained before resumption of breeding activity.

Remember: in any suspected or confirmed disease situation, the implementation of strict hygienic measures is essential.

In the case of *T. equigenitalis*, if Defra/APHA or the BEVA Approved Veterinary Surgeon (AVS) do not believe voluntary compliance is sufficient to control infection, Defra will impose statutory requirements.

Swabbing of at-risk/suspect etc horses

Sites to be swabbed (single swabs only required from each site):

- Mares – clitoral fossa, clitoral sinus & endometrium (oestrus)
- Stallions – urethra, urethral fossa & prepuce. A swab of the pre-ejaculatory seminal fluid should also be submitted if possible.

Mares covered by the infected stallion will require at least three sets of screening swabs to be considered infection free.

However, where the risk is believed to be low e.g. other stallions that have not had direct contact, have not shared artificial breeding equipment and mares covered by these stallions, but not the infected stallion etc, then a single clearance set of samples from these animals would probably be considered sufficient to give assurance that there had not been any unexpected transmission.

Treatment

Any necessary treatment will be determined by the attending veterinary surgeon. In the case of *T. equigenitalis*, Defra/APHA or the BEVA Approved Veterinary Surgeon (AVS) will determine treatment (see Appendix 11).

Confirmation of Freedom from Disease

Following infection with any of the three bacteria, breeding activities should only be resumed with approval from the attending veterinary surgeon, and in the case of *T. equigenitalis*, VENDU, who must be satisfied that infected and in-contact horses have been investigated, treated as appropriate and subsequently cleared on the basis of negative swabs.

The first post treatment swabs should be taken seven or more days after treatment has ended. All post treatment swabs should be tested by aerobic and microaerophilic culture **and** by PCR. All positive isolates of *K. pneumoniae* should be capsule typed where they are identified on post-treatment samples, irrespective of whether pathogenic *K. pneumoniae* was isolated prior to treatment. All positive *K. pneumoniae* PCR results will need culture tests also performed to provide bacteria for capsule typing, unless being tested, in the same laboratory, for capsule typing by PCR test.

As PCR is able to detect bacterial DNA remnants from non-viable organisms as positive for a period of time after treatment in mares or stallions when the corresponding cultures confirm that there is no evidence of viable bacteria, consequently only the third of the set of three consecutive negative cultures will be required to also test negative by PCR. Experience in various parts of the world from treating CEMO in mares and stallions, highlights that this may predispose to subsequent colonisation by *K. pneumoniae* or *P. aeruginosa* and, therefore, it is very important that screening post-treatment of one type of infection continues to include swabbing and testing for all three pathogens. It is emphasised that endometrial swabs, which are required for confirmation of freedom of disease, can only be successfully collected when the mare is in oestrus.

Mares

Starting not earlier than seven days after cessation of treatment for infection has ended, three clitoral swabs should be taken at intervals of at least seven days. For *K. pneumoniae* (capsule types 1,2 and 5) or *P. aeruginosa* two endometrial swabs should be taken during two oestrous periods and tested by both aerobic and microaerophilic culture **and** by PCR tests, **but** for *T.equigenitalis* three endometrial swabs should be taken during three oestrous periods and tested by both aerobic and microaerophilic culture **and** by PCR tests.

In respect of maiden mares whose pre-screening clitoral swab **only** (i.e. endometrial swab negative) was positive for *P. aeruginosa*, pre-treatment, three clitoral swabs must be taken but only one endometrial swab (taken in oestrus) is required. All swabs should be tested by both aerobic and microaerophilic culture and by PCR tests.

For mares to be considered to be free from disease, three consecutive sets of swab samples should all have returned negative culture results and at least the last of these must also be negative by PCR. If any result is positive, further investigations should be undertaken in conjunction with the attending veterinary surgeon and for *T. equigenitalis* with Defra/APHA or the BEVA Approved Veterinary Surgeon (AVS) (see Appendix 11).

Stallions

Starting not earlier than seven days after cessation of treatment for infection, three sets of penile swabs (see Diagnosis – types of swab) should be taken at intervals of at least seven days and tested by aerobic and microaerophilic culture **and** by PCR tests and negative results confirmed. For treated stallions to be considered to be free from disease, three consecutive sets of swab samples should all have returned negative culture results and at least the last of these must also be negative by PCR.

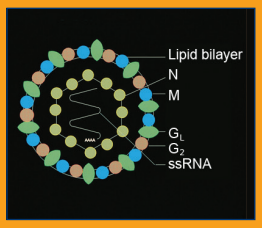
Thereafter, the first three mares mated naturally by the stallion should have clitoral swabs taken three times at intervals of at least seven days, starting two days after mating and tested by both aerobic and microaerophilic culture **and** by PCR tests. If any result in the mated mares is positive, breeding activities should cease again immediately, and further investigations should be undertaken in conjunction with the attending veterinary surgeon and, for *T. equigenitalis*, with Defra/APHA or the BEVA Approved Veterinary Surgeon (AVS) (see Appendix 11). For stallions intended solely for semen collection for artificial insemination, in addition to the set of penile swabs confirming freedom from infection, raw semen (i.e. with no semen extender and/or antibiotic added) should also be collected and tested by both aerobic and microaerophilic culture **and** by PCR tests, with all negative results confirmed before any semen is used for artificial insemination in mares.

Export Certification

Swabs taken for examination for *T. equigenitalis* from horses in the United Kingdom for the purpose of official export health certification must be sent to the designated laboratory within the APHA. This is the APHA Regional Laboratory, Penrith. In the case of horses that are to be exported from Northern Ireland, swabs should be sent to the Veterinary Science Division Laboratory, Belfast.

CODE OF PRACTICE FOR EQUINE VIRAL ARTERITIS

CODE OF PRACTICE FOR EQUINE VIRAL ARTERITIS



The Disease

Equine viral arteritis (EVA) is caused by the equine arteritis virus (EAV). The virus occurs worldwide in Thoroughbred and non-Thoroughbred populations. EVA was reported in the UK in 2019 with two separate, unconnected subclinical outbreaks. The first involved presumed respiratory (non-venereal) spread of infection. Both outbreaks involved non-Thoroughbred horses imported from other EU countries where EVA is endemic. One outbreak involved subsequent respiratory spread of infection associated with attendance at equine competition events in the UK.

Notification Procedures

In Great Britain (England,Scotland and Wales), EVA is **notifiable by law** under the Equine Viral Arteritis Order 1995. Under the Order, anyone who owns, manages, inspects or examines a horse must notify the Animal & Plant Health Agency (APHA) when:

- they suspect the disease in a stallion, either on the basis of clinical signs or following blood or semen testing;
- they suspect disease, either on the basis of clinical signs or following blood testing, in a mare that has been mated or artificially inseminated within the past 14 days.

Please see Appendix 1 for APHA Offices' contact details.

Under the Order, there are powers to:

- serve notices prohibiting the use for breeding of the suspect stallion and the collection of semen obtained from the stallion unless permitted under licence by the APHA ;
- take samples or obtain information in order to establish whether disease is present and, if so, the extent to which it has spread.

Upon confirmation of disease, Ministers may publish this fact and the name and location of the stallion concerned, followed by similar publicity if Ministers consider that the disease or virus no longer exists in that stallion.

When statutory powers under the Order are invoked, laboratories will be nominated by the authorities to undertake the testing of all the samples required for the subsequent investigation.

It is advisable for owners, or persons authorised to act on their behalf, to inform the national breeders' association if EAV is isolated.

Clinical Signs

The variety and severity of clinical signs of EVA vary widely. Infection may be obvious but there may be no signs at all. Even when there are no signs, infection can still be transmitted and stallions might still 'shed' the virus, ie excrete it in their semen. These stallions are known as 'shedders' and pose a significant risk of disease transmission if undetected. In pregnant mares, abortion may occur from two months of gestation through to term. EVA may, occasionally, be fatal.

The main signs of EVA are fever, lethargy, depression, swelling of the lower legs, conjunctivitis ('pink eye'), swelling around the eye socket, nasal discharge, 'nettle rash' and swelling of the scrotum and mammary gland. Illustrations on : https://respe.net/wp-content/uploads/2018/12/ave-current-status-and-prevention_0-1-1.pdf may be useful.

Transmission of Disease

Infection can be transmitted between horses in any of the following ways:

- direct transmission during mating;
- direct or indirect transmission during teasing;
- artificially inseminating mares with semen from infected stallions or which has been contaminated during semen collection or processing. The virus can survive in chilled and frozen semen and is not affected by the antibiotics added;
- contact with aborted fetuses or other products of parturition;
- via the respiratory route (eg via droplets from coughing and snorting).

The shedder stallion is a very important source of the virus. On infection, the virus localises in his accessory sex glands and will be shed in his semen for several weeks, months or years - possibly even for life. The fertility of shedder stallions is not affected and they show no clinical signs but they can infect mares during mating, or through insemination with their semen. These mares may, in turn, infect other horses via the respiratory route.

The 2019 UK outbreaks served to highlight the risk posed by infected stallions transmitting EAV by the respiratory route in the earlier stages of infection, particularly in shared airway stables. The acute stage of infection is usually 2 – 14 days, but can be up to 28 days. There is also evidence to suggest that chronically infected stallions may transmit EAV by other, non-venereal routes (eg via handler, tack or equipment contacts following masturbation contamination of the environment). Therefore, unless strict biosecurity is maintained indefinitely, in contact mares and other equines may be infected.

Prevention

The main ways of preventing EVA are vaccination, particularly for stallions and teasers, and the establishment of freedom from infection before breeding activities commence. However, the 2019 UK outbreaks demonstrated the capacity for respiratory (non-venereal) spread of infection and the importance of making sure that horses imported from countries where EVA is endemic into countries where it is not are serologically tested negative for EVA before importation and quarantined, monitored and re-tested after arrival.

Establishing freedom from infection

This involves checking the disease status of breeding stock before commencing breeding activities each year. Veterinary surgeons should take blood samples from horses for testing in a laboratory to detect the antibodies that the horse generates in response to infection with the virus. The horse also generates antibodies in response to vaccination against EVA.

The laboratory detects both the presence and the level of antibodies in the blood ('serological testing').

If antibodies are not present ('seronegative'), the horse is not infected and breeding activities may begin.

The presence of antibodies ('seropositive') may be the result of:

- active infection;
- previous infection;
- vaccination.

In mares, a rising level of antibody in two or more sequential samples indicates active infection and the mare should not be used for breeding activity. A stable or declining level indicates previous infection or vaccination and the mare can be used safely for breeding activity.

A stallion who is shedding virus in his semen is always seropositive but a seropositive stallion is not necessarily a shedder. Therefore, if a stallion returns a seropositive result, it is important to establish whether he is a shedder (see Appendix 5) before use for breeding activities.

Vaccination

Routine vaccination against EVA is particularly recommended for stallions and teasers. In the UK, routine vaccination of mares is not recommended and emergency vaccination might only be considered in exceptional circumstances involving widespread disease outbreaks. One vaccine, Equip Artervac (Zoetis), is available in the UK. Horses that were seronegative before vaccination will become seropositive afterwards. This positive status cannot be differentiated from positive status caused by infection. It is essential, therefore, for breeding and export purposes, to be able to demonstrate that the horse is positive because of vaccination and not infection. This is done by blood testing before vaccination to show that the horse was previously seronegative and keeping a record of the test result, certified by a veterinary surgeon, preferably in the horse's passport. The vaccine should not be administered until the blood test result is available.

Veterinary advice should be sought on the timing and administration of the

vaccine. The current datasheet requirement for the only inactivated vaccine against EVA used in Europe presently is for 6 monthly (not annual) boosters. See Appendix 8 for vaccine details.

All vaccinations (primary course and booster doses) must be recorded in the horse's passport, by the veterinary surgeon who administered the vaccine. Details should include the date and place where the vaccine was given, and the name and batch number of the vaccine.

Recommendations for prevention - domestic mares

The risk associated with any mare can vary. Decisions regarding the testing of mares visiting stallions should therefore be made in conjunction with the attending veterinary surgeon, according to the circumstances of the individual premises and the mare's history and contacts with other horses in the past year.

In any breeding season, the safest option is to blood test all mares whether intended for natural mating or AI after 1st January and within 28 days before use for breeding activities. The mare should not be used until the results are available.

- If a mare is seronegative, breeding activities may begin.
- If a mare is seropositive and had not previously been shown to be seropositive, she may be infected and must be isolated immediately. Repeat blood samples should be taken at intervals of at least 14 days and sent to the laboratory that tested the first sample. When the mare is no longer infectious, as indicated by stable or declining antibody levels, breeding activities may begin.
- If a mare was seropositive in a previous year and her current test returns seropositive, breeding activities may begin if the antibody level in the current sample is stable or declining compared to the level in her last test (the laboratory that tested the previous sample should test the current sample). If there is any doubt about the comparison of results, a second test should be done at least 14 days after the first, using the same laboratory. If the antibody level is stable or declining, breeding activities may commence. If it has increased, isolate the mare and consult a veterinary surgeon immediately.

If any mare is seropositive unexpectedly, the in-contacts should be isolated and screened for EVA by blood testing. Any foster mares on the premises should also be tested.

Recommendations for prevention - imported mares

Before importing a mare, veterinary advice should be sought on the incidence of EVA in the exporting country and the following precautions taken when the disease is known or suspected to occur in that country:

- Ensure that the mare is blood tested within 28 days before import and proceed only on the basis of a seronegative result or, if seropositive, of stable or declining antibody levels in at least one further test at an interval of not less than 14 days. Between blood testing and import, reasonable precautions should be taken to minimise the risk of infection, such as segregation from unvaccinated or untested stock.

Note
Also see the AI Guidelines on page 87

Note
'Stallion' means mating stallions, teasers and stallions used for AI.

- Immediately on arrival, place the mare in isolation for at least 21 days. Blood tests should be done immediately and repeated at least 14 days later. If the results are seronegative, or seropositive with stable or declining antibody levels, natural mating or AI may begin. If the results are unexpectedly seropositive, or the antibody level is rising, keep the mare in isolation, do not use her for breeding activities and consult a veterinary surgeon about the next steps.

Recommendations for prevention - domestic stallions

After 1st January in any year, all **unvaccinated stallions and teasers** should be blood tested. Do not use the stallion for breeding activities until the result is available. If the result is seronegative, breeding activities may commence.

If the result is seropositive, notify the Animal & Plant Health Agency (APHA) immediately and isolate the stallion while steps are taken to determine whether he is shedding the virus in his semen (see Appendix 5). He must not be used for breeding activities during this time. If he proves not to be a shedder, he may be used for breeding activities as long as any advice from the veterinary surgeon, and any conditions laid down by the APHA, are implemented. If he proves to be a shedder, he must remain in isolation until his future is decided. None of his semen should be allowed off the premises and previously released semen should be traced and the recipients notified.

Vaccinated stallions and teasers may be seropositive or seronegative, depending on when the last dose of vaccine was given and whether the horse might have become infected since the protection afforded by the vaccine declined. These horses should be blood tested after 1st January. Do not use them for any breeding activities until the results are available. If the result is seronegative, breeding activities may begin. If it is seropositive, the stallion's history in the past 12 months - including dates of EVA vaccinations, results of pre-vaccination blood testing and any post vaccination testing and contacts with other horses since the last vaccination - should be reviewed in consultation with a veterinary surgeon.

The current datasheet requirement for the only inactivated vaccine against EVA used in Europe presently is for 6 monthly (not annual) boosters. If the EVA vaccination has lapsed or expired, the stallion may be susceptible to infection and seropositive results should be investigated. If the veterinary assessment concludes that the stallion's seropositive status is likely the result of infection rather than vaccination, isolate the stallion and notify the Animal & Plant Health Agency (APHA) immediately. The stallion should then be tested further to determine whether he is shedding the virus in his semen (see Appendix 5). He must not be used for any breeding activities during this time.

Advice for Owners/Agents of stallions that may be exported either temporarily (shuttle) or permanently

At present, regulations regarding the export of EVA vaccinated stallions to countries outside the EU, such as Australia, are becoming stricter. AQUIS (Australian quarantine agency) require that stallions vaccinated against EVA comply with current OIE guidelines. At present these guidelines state: 'The horse was isolated and a single blood sample taken not less than seven days after commencement of isolation and testing using a virus neutralisation test as described in the OIE Manual for equine viral arteritis with negative results. The horse was then immediately vaccinated against equine viral arteritis and remained isolated from other equids not of equivalent health status for 21 days immediately after vaccination and has been revaccinated regularly according to the manufacturer's recommendations.'

Current Artervac booster vaccinations are recommended every 6 months, which may not be compatible with stallions shuttling to Australia and other countries where Artervac does not have a current licence.

This can lead to problems with a stallion maintaining its correct vaccination history. Other countries such as New Zealand and Argentina have slightly differing import requirements at present.

Any vaccinated stallion that fails to meet import or re-import conditions may be subject to semen testing for EVA culture. It is very important to consult a veterinary surgeon as well as possible shipping agencies with regard to possible exportation of stallions to non-EU countries.

Stallion managers accepting mares for 'walking in' may wish to seek additional reassurance by requesting pre-visit negative serum EVA antibody test results (in addition to routine pre-season tests), where visiting mares are or may be in contact with 'at risk' horses. For Thoroughbred stud farms, this may apply to mares visiting from other stud farms where there is contact with non-Thoroughbred horses.

Recommendations for prevention - imported stallions

The following applies to import of stallions normally resident overseas, returning shuttle stallions and stallions who are normally resident in the UK when they have been overseas for non-breeding purposes but will be used for breeding activities upon return to this country.

Using imported stallions for breeding activities increases the risk of spread of EVA because the disease occurs worldwide and is transmitted readily between horses via the respiratory as well as the venereal route. In the UK, the law does not require any official testing of stallions for EVA before importation from EU member states so voluntary testing to establish their EVA status should be undertaken. Official testing requirements exist for imported stallions from non-EU countries. However, they may not be adequate to prevent the import of infection. Also, horses can become infected via the respiratory route during transport with other horses. Additional voluntary precautions are therefore advisable.

Note
Under EU law, the importation of known shedder stallions is not permitted.

Before importing a stallion, veterinary advice should be taken on the incidence of EVA in the exporting country. The importer should take the following precautions when EVA is known or suspected to occur in that country:

- Ensure that the horse is blood tested no more than 28 days before import, and since he was last used for mating. If the result is seronegative, importation may proceed. If the result is seropositive, seek veterinary advice before proceeding. Between blood testing and import, reasonable precautions should be taken to minimise the risk of infection, such as segregation from unvaccinated stock.
- Immediately on arrival, place the stallion in isolation for at least 21 days. Two blood samples should be taken, one immediately and the second at least 14 days later. They should both be sent to the same laboratory. If the results are seronegative, breeding activities may commence. If any result is seropositive, notify the Animal & Plant Health Agency (APHA) immediately, keep the stallion in isolation and consult a veterinary surgeon about the next steps. The stallion must not be used for mating, teasing or semen collection during this time.

Sport horse stallions

Where stallions are imported into the UK for competition purposes, their EVA status should be established if it is decided, after their arrival, to use them for mating or semen collection while they are in the country. The stallion should be isolated for at least 21 days, and blood tested immediately and again at least 14 days later, using the same laboratory each time. If the results are seronegative, breeding activities may commence. If any result is seropositive, notify the Animal & Plant Health Agency (APHA) immediately, keep the stallion in isolation and consult a veterinary surgeon about the next steps. The stallion must not be used for mating, teasing or semen collection during this time.

Note
Equine arteritis virus survives in chilled and frozen semen and is not affected by the antibiotics added.

Recommendations for prevention - artificial insemination and embryo transfer

Semen should not be used from any stallion unless that stallion has been tested for EVA according to the previous recommendations for domestic (page 24) and imported (page 25) stallions.

When semen is collected from a stallion:

- The stallion owner/manager must record the dates of movement of the stallion on and off the premises, collection and movement of semen and insemination of mares at the stallion's premises.
- The disease status of the stallion at the time when the semen was collected must be established by blood testing. If the stallion was seropositive, the semen must not be used unless it can be proved that he was not a shedder (see Appendix 5).

Under EU law, import of semen from shedder stallions is not permitted.

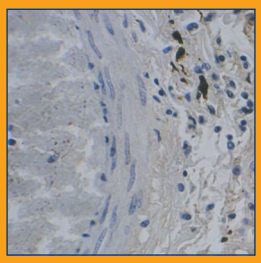
Mare owners planning to use semen from overseas stallions should check the EVA status first. Semen should be accompanied by documentation certifying that the stallion or the semen was tested negative for EVA shortly after the semen was collected in the country of origin. Frozen semen should additionally be tested on arrival in the UK. It is only necessary to test one straw from each ejaculate. If the result is negative, the semen may be used. If it is positive, all straws from that ejaculate should be destroyed. For practical reasons it is not possible to test chilled semen on arrival. Appropriate testing in the exporting country is, therefore, essential. When transferring embryos, whether conceived in the UK or overseas, the disease status of both the stallion and mare at the time of conception must be established. Mares should have seronegative status, or seropositive status with stable or declining antibody levels. Stallions should have seronegative status, or seropositive status with proof that they are not shedders.

Diagnosis

Because of the variability or the possible absence of signs of EVA, clinical diagnosis is not always possible. Laboratory diagnosis is therefore essential. Laboratories can identify the presence and level of antibodies to the virus by testing blood, and can screen for the actual virus in blood and other samples. Laboratories generally require blood serum for antibody detection and heparinised or EDTA blood (preferably EDTA) or semen for virus detection. Other samples may be required. If in doubt, veterinary surgeons should check with the laboratory.

Where abortion or newborn foal death may be EVA-related, a detailed clinical history of the mare must be sent to the laboratory immediately, together with blood samples from the mare, samples of the placenta and the fetus or carcase for specific examination for the EAV.

Control of Infection



If EVA infection is suspected in any horse, stop all breeding activities immediately, notify the APHA as set out on page 20, isolate the horse(s) concerned and seek veterinary advice about the next steps.

If EVA is confirmed in any mare, stallion or teaser:

1. Stop mating, teasing and collection/insemination of semen, and stop movement of horses on and off the premises immediately;
2. Notify the APHA immediately as set out on page 20 and seek veterinary advice. Any directions given by the APHA must be followed;
3. Isolate and treat clinical cases as advised by the attending veterinary surgeon and/or officers;
4. Group the in-contacts away from other horses on the premises and ask the attending veterinary surgeon to take samples for virus detection. When the results are available, separate any healthy horses which have tested negative away from those which have tested positive. Horses which have tested positive should be treated as advised by the attending veterinary surgeon and local APHA officers, and kept in isolation until freedom from active infection is confirmed;

5. Ask the attending veterinary surgeon to screen all other horses at the premises by blood testing. If any of these return positive results, they should be separated from those with negative results, and be treated as advised by the veterinary surgeon and the local APHA officers. They should be kept in isolation until freedom from active infection is confirmed;

6. Arrange for one straw from each ejaculate of stored semen from infected stallions and their in-contacts to be tested by a laboratory. If any straw is infected, all straws from that ejaculate should be destroyed;

7. Inform:

   - owners (or persons authorised to act on their behalf) of horses at, and due to arrive at, the premises;
   - owners (or persons authorised to act on their behalf) of horses which have left the premises;
   - recipients of semen from the premises;
   - the national breeders' association;

8. Clean and disinfect stables, equipment, including that used for semen collection and processing, and vehicles used for horse transport. Defra publishes a list of approved disinfectants at http://disinfectants.defra.gov.uk/DisinfectantsExternal/Default.aspx?Module=ApprovalsList_SI (select only 'General' for products suitable for EVA).

9. Good hygiene must be exercised. If possible, separate staff should be used for each different group of horses to prevent indirect transmission of infection between the groups;

10. Arrange for the attending veterinary surgeon to repeat the blood testing after 14 days and again every 14 days until freedom from active infection is confirmed. Use the same laboratory for repeat samples as for the first samples. If any of the previously healthy or seronegative horses become ill or seropositive, they should be moved into the appropriate group and treated as advised by the veterinary surgeon and the local APHA officers. Testing of these horses should continue until freedom from active infection is confirmed. Seropositive stallions and teasers must be investigated to determine whether they are shedders (see Appendix 5). Those which prove to be shedders must be kept in strict isolation until their future is decided and must not be used for breeding activities during this time;

11. Do not resume any breeding activities or movement on and off the premises until freedom from active infection is confirmed in all infected and in-contact horses. Breeding and movement should only be resumed with the approval of the attending veterinary surgeon and the local APHA Field Service office;

12. Pregnant mares must be isolated for at least 28 days after leaving the premises. Those remaining on the premises should be kept in isolation for at least 28 days after active infection has stopped;

13. Any mares who became infected after their pregnancy began should be foaled in isolation. If in any doubt, consult a veterinary surgeon.

Treatment

There is no treatment available for EVA itself, although there may be treatments to alleviate some of the clinical signs. These should be determined by the attending veterinary surgeon.

Confirmation of Freedom from Disease

Following infection with EVA, breeding activities should only be resumed with approval from the attending veterinary surgeon and the local APHA officers, who must be satisfied that infected and in-contact horses have been investigated and subsequently cleared of active infection on the following basis:

Mares

Prior to resumption of breeding activities, a mare should have two sequential blood tests taken, at least 14 days apart, and tested in the same laboratory. The first test should be taken 14 days after the appearance of clinical signs or contact with infected horses. If the two tests demonstrate stable or declining antibody levels, breeding activities may resume.

Stallions

Prior to resumption of breeding activities, it must be demonstrated that the stallion is not shedding virus in his semen (see Appendix 5). Semen testing must be carried out in a laboratory designated by Defra.

Veterinary surgeons and horse owners should be aware that the current datasheet requirement for the only inactivated vaccine against EVA used in Europe presently is for 6 monthly boosters and NOT 12 monthly (annual) boosters as was previously the case for this vaccine. See Appendix 8 for vaccine details.

Export Certification

For official export certification purposes, samples for EVA blood testing must be sent to the APHA Weybridge (tel: 01932 357335).

CODE OF PRACTICE FOR EQUINE HERPESVIRUS

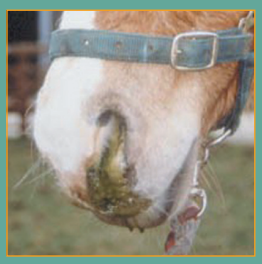
The Disease

Equine herpesvirus is a common virus that occurs in horse populations worldwide. The two most common types are EHV-1, which causes respiratory disease in young horses, abortion in pregnant mares and neurological disease in horses of all ages and types, and EHV-4, which usually only causes low-grade respiratory disease but can occasionally cause abortion. Following first infection the majority of horses carry the virus as a latent (silent) infection that can reactivate at intervals throughout life. EHV-3 is a venereal disease that causes pox-like lesions on the penis of stallions and the vulva of mares (Equine Coital Exanthema - see page 45) and EHV-5 is a virus that is currently associated with unusual sporadic cases of debilitating lung scarring (Equine Multinodular Pulmonary Fibrosis) in adult horses.

EHV abortion can occur from two weeks to several months following infection with the virus, reflecting either recent infection or recrudescence (re-activation) of latent infection in a carrier horse. Abortion usually occurs in late pregnancy (from eight months onwards) but can happen as early as four months. Respiratory disease caused by EHV is most common in weaned foals and yearlings, often in autumn and winter. However, older horses can succumb and are more likely than younger ones to transmit the virus without showing clinical signs of infection. It is the continual cycling of EHV respiratory disease in young horses and the periodic reactivation of latent EHV in older horses that maintains the risk of EHV abortion in pregnant mares and EHV neurological disease in horses of all types and ages.

Although EHV-1 may cause outbreaks of abortion, particularly in non-vaccinated mares, EHV-4 has only been associated with single incidents and is not considered a risk for contagious abortions.

Occasionally, EHV-1 can cause neurological disease, which ranges in severity from a mild incoordination of the hindlimbs to quadriplegia (total paralysis where the horse is unable to stand). The most important risk factors for this form of disease include animals greater than 5 years of age, season (autumn, winter and spring when animals are more likely to be stabled or UV light levels are low). Clinically, the onset of neurological signs may be sudden, with no prior clinical signs of respiratory disease and usually occurs in the second week following infection.



Notification Procedures

There are no legal notification requirements for EHV in the UK although it is recommended that owners inform their national breeders' association if EHV abortion or neurological diseases occur. In the UK, Thoroughbred breeders should notify the Thoroughbred Breeders' Association and non-Thoroughbred breeders their relevant breed association.

Because the infection may spread easily between horses and can have severe consequences, it is very important to quickly alert owners of horses that might be at risk of infection through contact with infected horse(s) or premises.

Clinical Signs

Signs of respiratory disease include mild fever, occasional coughing and discharge from the nose.

Foals born alive but infected in utero are usually abnormal from birth, showing weakness, jaundice, difficulty in breathing and occasionally neurological signs. They usually die, or require euthanasia, within three days. The most common sign in older foals, usually following weaning, is a nasal discharge. Less commonly, secondary bacterial infection may cause pneumonia.

There are usually no warning signs of abortion caused by EHV. A sudden and unexpected abortion with a sometimes-jaundiced foal enclosed within the placenta ("red bag" placenta), should always be treated with suspicion, the mare isolated and veterinary help sought to confirm or rule out EHV infection without delay.

Horses affected by neurological EHV often display incoordination of the hind, and occasionally front limbs, urine and/or faecal retention and, in severe cases, recumbency (lying down and unable to stand). These signs may or may not be preceded by initial respiratory signs and there may have been a history of EHV abortion on the premises. A sudden and unexpected incoordinated or collapsed horse should always be treated with suspicion, the horse isolated and veterinary help sought to confirm or rule out EHV infection without delay.

Transmission of Disease

Infection can be transmitted between horses in any of the following ways:

- EHV respiratory infections are spread most commonly via the respiratory route (e.g. via droplets from coughing and snorting);
- When mares abort with EHV infection, the fetus, fetal membranes and fluids are particularly dangerous sources of infection, releasing large quantities of infectious virus into the local environment, to be inhaled via the respiratory route (particularly when abortions occur in enclosed shared air space environments) and transmission may occur indirectly via attendants and their implements;

- Mares who have aborted or whose newborn foals have died from EHV infection may transmit infective virus via the respiratory route or genital tract and transmission may occur indirectly via attendants and their implements;
- Older foals with EHV respiratory disease ('snotty noses') and sometimes horses with neurological signs are highly contagious and can transmit infection to other horses via the respiratory route and by shedding virus into the environment;
- EHV does not travel long distances (greater than 50 metres) as an aerosol so close contact between horses should be minimised by physical separation into smaller group sizes;
- All these sources of infection are intensified when infected horses are stabled, particularly in shared air space stables, e.g. 'American-type barns'. Evidence from outbreaks linked to this type of stabling suggests that large quantities of infective virus can be released into the surrounding air following any EHV abortion. When this happens at pasture, there is a greater opportunity for dispersal and dilution of the viral 'cloud' than if the abortion occurs when horses are stabled. Breeding stock, particularly pregnant mares and their foals at foot should spend as much time as possible turned out in small groups in adequately sized and well managed paddocks and, when essential, in individually ventilated stabling with provision for heads to be out in the fresh air. It is believed that fresh air has beneficial effects on horses' natural respiratory and immune defence mechanisms. It may help the horse's natural respiratory defence system to feed hay from the ground;
- Indirect EHV transmission can occur through the environment because the virus may survive for up to a month, once it has been shed by the horse. Very often the circumstances and handling/management of the first case of abortion is critical to the risk of exposure of other animals on the stud to EHV and ultimately whether there are subsequent abortions due to EHV infection. Consequently, stud farms should develop appropriate biosecurity protocols before any major outbreaks of disease with appropriate protective clothing, equipment, utilities and hand washing facilities for staff specifically allocated when abortions occur, in order to prevent indirect spread of infection to other pregnant mares.

The nature of herpesviruses means that all horses can be 'carriers' of EHV in a latent form (meaning that horses are not always infectious to others), which can, under conditions of stress, be reactivated, meaning that they may then transmit infection without showing signs of illness. As EHV is a common endemic infection, it is probable that the vast majority of adult horses are latent carriers and as such have the potential to act as a source of reactivated EHV-1. Currently there is no reliable test for carrier status. In carriers, illness (respiratory, abortion or neurological) may become apparent from time to time, especially after stress (particularly travelling and changing of location and social groups) or after

suffering another disease. The virus is potentially contagious at these times and may be transmitted to otherwise healthy but susceptible horses, who may then develop EHV disease.

In late pregnant mares, transport, location, social group change and other types of stress may increase the risk of carrier horses, shedding virus from the nose (often with no accompanying clinical signs of disease in the carrier) as well as the virus crossing the placenta in the pregnant uterus, resulting in fetal infection, leading to abortion. Stud owners and managers should think ahead and group pregnant mares in small group sizes with similar due dates, early in their pregnancies, which can then be maintained without transportation and re-mixing until they foal. Pregnant mares that arrive from sales or from overseas, following associated transportation and social disruption, should always be considered 'high risk' for EHV abortion and should be quarantined and managed accordingly. All new arrivals and horses returning from elsewhere should be quarantined and maintained separately from resident horses.

Prevention

The most important ways to prevent EHV infection are good management of breeding stock, good hygiene at all times, especially during breeding activities, and regular vaccination of all equine animals as part of a good biosecurity protocol.

Management of breeding stock

All horses and ponies, including foals, can be a source of EHV. Breeding stock should, therefore, be managed in ways that will minimise the risk of spread of infection between horses:

- Pregnant mares should be kept separate from all other stock, e.g. young stock (weaned foals, yearlings and horses out of training), non-pregnant horses of all types and ponies;
- Pregnant mares should spend as much time as possible in small groups with similar due dates, out at pasture and should not be stabled, especially in shared air space stabling, unless essential. Larger mare groups in close proximity, particularly in shared airspace stabling, increase the risk of transmission of infection to more mares in the event that there is EHV abortion and/or respiratory EHV infection, potentially overwhelming vaccinial immunity. EHV does not travel long distances as an aerosol so close contact between horses should be minimised by sensible management;
- Suddenly stabling pregnant mares who have been out at pasture may precipitate an EHV abortion, even in a vaccinated herd;
- Where possible, mares should foal at home and go to the stallion with a healthy foal at foot;

- If foaling at home is not possible, pregnant mares should go to the stallion or boarding stud at least 28 days before foaling is due. These mares should be placed in quarantine for 2 weeks and then isolated in small groups with other healthy mares who are at a similar stage of pregnancy. The groups should be as small as possible in order to minimise transmission of infection in the event that EHV abortion and/or EHV respiratory infection occur;
- Mares arriving from sales yards or from overseas are particular risks as they are more likely to have recently mixed with other animals of unknown EHV infectious and vaccinal status and should be grouped and isolated away from other pregnant mares;
- Isolated groups and individual pregnant mares should be separated as far as possible from weaned foals, yearlings, horses out of training and all other types of non-pregnant horses and ponies. On studfarms, fillies out of training are a particular risk to pregnant mares but the same is true for all young horses;
- Pregnant mares should not travel with other horses, particularly mares that have aborted recently;
- Any foster mare introduced to the premises should be isolated, particularly from pregnant mares, until it has been proved that EHV did not cause her own foal's death;
- Stallions should wherever possible be housed in premises separate to the mare operations and should be attended by separate dedicated staff, adopting strict biosecurity measures. If it is not possible to have dedicated stallion staff then it is even more important that strict biosecurity measures are adopted to minimise indirect transmission of infection between different horse groups on the stud.

Hygiene

All horses can be potential sources of infection, and the virus may survive in the environment for up to one month, depending on conditions, following excretion by a horse. Good hygiene is therefore essential:

- EHV is destroyed readily by heat and contact with virucidal disinfectants. Stables, equipment and vehicles for horse transport should therefore be cleaned, steam cleaned and then disinfected with an approved disinfectant regularly as a matter of routine and certainly between occupants. Wherever possible virucidal disinfectant should be allowed to dry naturally in contact with surfaces in order to maximise the chance of destroying the virus;
- Staff should be made aware of the risks of indirect (by people) transmission of EHV and hand washing/alcohol sprays should be provided and used, whenever possible, for the use of staff when moving between horses;

- Wherever possible, separate staff should deal with each group of mares. If this is not possible, pregnant mares should be handled first each day in order to avoid the possibility of indirect transmission of EHV from other horses and strict biosecurity measures, including hand washing/alcohol sprays, separate tack, change of clothes etc. are even more important;
- Separate equipment and clean water should be used for each horse or group of horses;
- Foaling staff should wear single use disposable coveralls and a new pair of disposable gloves each time they foal a mare and then must dispose of them safely afterwards.

Vaccination

Specific vaccination of all horses in a herd will raise the level of protection within the population against EHV. Although it will not prevent individual animals from aborting due to EHV infection, experience suggests that vaccination is advantageous in reducing the risk of multiple abortions (so-called 'abortion storms') on stud farms. Experience shows that 'abortion storms' are much less likely to occur in properly vaccinated pregnant mare populations and specific vaccination is highly recommended. However, because of the nature of herpesviruses and their ability to cause latent (carrier) infections, vaccination will not provide total protection, so good management and biosecurity remain paramount.

It is recommended that a herpesvirus vaccine, licensed for use as an aid in the prevention of both abortion and respiratory disease caused by EHV-1 and/or EHV-4, is used for all horses on stud farms.

It is recommended that **all horses resident on a stud farm** are fully vaccinated with **a primary course followed by regular 6-monthly boosters**. Pregnant mares should be **additionally booster vaccinated at 5, 7 and 9 months of gestation**.

Consult your veterinary surgeon. See Appendix 8 for vaccine details.

Diagnosis

Although it may be suspected on clinical grounds, the presence of EHV can only be definitively diagnosed by a suitably equipped and experienced laboratory. Where disease is suspected, the attending veterinary surgeon should take the following samples and submit them to an appropriate laboratory:

- Suspected respiratory disease: blood samples and nasopharyngeal swabs;
- Following any abortion, stillbirth or newborn foal death: fetus and placenta or foal carcass for specific post mortem examination for EHV at a suitable pathology facility where spread of infection can be contained, thereby preventing the possibility of further contamination of the stud farm environment and/or personnel;

- Suspected neurological disease: blood samples and nasopharyngeal swabs. In the event of death, the whole carcass should be submitted for specific post mortem examination. If this is not possible, contact the laboratory to agree appropriate post mortem samples to be sent.

Veterinary surgeons should submit blood samples preserved with heparin or EDTA in addition to clotted (serum) samples.

For members of the Thoroughbred Breeders' Association in Great Britain, a contribution may be available towards laboratory costs for aborted fetuses or foals that die within 14 days of birth. Further details are available from the TBA.

Control of Infection

No horse known or suspected to have disease caused by EHV should be sent to a stallion stud or to premises where there are brood mares, particularly pregnant mares.

Where abortion, stillbirth, foal death or illness in a foal within 14 days of birth may be EHV related, the following actions should be taken:

1. Seek veterinary advice immediately;
2. For abortions, stillborn foals and newborn foal deaths:
    - Where it was found, immediately place the aborted fetus and its placental membranes or the dead newborn foal in double wrapped strong leak-proof bags and/or containers, taking care to avoid further contamination of the stud farm environment and/or personnel during transportation;
    - Place the mare in strict isolation;
    - Immediately cordon the area where the aborted fetus and its placental membranes were found to prevent other pregnant mares (including those that the aborted mare has been in contact with prior to abortion) accessing the area and once the material has been safely removed apply liberal amounts of virucidal disinfectant to the area;
    - In conjunction with the attending veterinary surgeon, arrange for appropriate samples (preferably the entire aborted fetus with its placental membranes or the dead newborn foal, carefully double-wrapped in strong leak-proof plastic bags and containers) to be sent to a suitable laboratory for specific examination for EHV. These materials must be handled under strict hygienic conditions;
    - Ensure that the attendant dealing with the aborted material and area has no contact with other horses, especially pregnant mares.

3. For sick, live foals:

   - Place the mare and foal in strict isolation;
   - In conjunction with the attending veterinary surgeon, arrange for samples (usually nasopharyngeal swabs and heparinised or EDTA blood) to be sent in leak-proof containers to a laboratory for specific examination for EHV;
   - Ensure that the attendant has no contact with other horses, especially pregnant mares.

4. Stop horse movements off the premises and do not allow any pregnant mare onto the premises until EHV is excluded as the cause of the abortion, stillbirth, foal death or foal illness;

5. Disinfect and destroy contaminated bedding; clean and disinfect the premises, equipment and vehicles used for horse transport under the direction of the attending veterinary surgeon;

6. If preliminary laboratory results indicate EHV, divide pregnant mares with which the infected mare had contact into smaller groups of similar foaling dates to minimise the spread of any infection and turn them out into isolated paddocks on the same studfarm as the abortion occurred. If the infected mare was already in a small group of pregnant mares, divide the group into even smaller groups, as some may still abort and this may minimise further spread of infection. Any non-pregnant mares with which the infected mare had contact should be maintained as a 'closed' group until EHV infection is ruled out.

If EHV is confirmed:

1. Maintain isolation, movement restrictions and hygiene measures for at least 28 days from the date of the last EHV abortion, stillbirth or newborn foal death.

2. Barren mares, maiden mares and mares with healthy foals at foot, can be admitted onto the premises (providing there is no sign of infection at their home premises) but must be kept separate from pregnant mares.

3. Barren mares, maiden mares and mares with healthy foals at foot on the affected premises can be moved 28 days after the last EHV abortion, providing they can be placed in quarantine for 14 days following arrival at their new premises. Serological monitoring at a 10-14 day interval to look for signs of seroconversion during this period is advised.

It may be possible, under the direction of the attending veterinary surgeon and in consultation with stud owners/managers of where they may move, to move non-pregnant mares earlier than 28 days e.g. for mating if:

- The geography and management of the studfarm (separate staff and utilities, e.g. tractors, feed deliveries and muck disposals) allows for strict isolation of the aborted mare(s). This should include separate

access roads, stables and paddocks, with adequate separation between the isolated area and the other mares (see Appendix 6);

- The non-pregnant mares for movement, including for mating as a walking-in mare, have been isolated from pregnant mares and handled by separate staff (see Appendix 6)at least from the time of the abortion, stillbirth or newborn foal death;
- testing of blood samples taken immediately and again 14 days later (in the same laboratory as a paired serological assay) indicates that they have not been infected;
- there is no other clinical or laboratory evidence of spread or infection;
- the owner/manager of the premises (or stallion unit) to which the mare(s) is(are) to be moved understands full details of the EHV infection and, following his/her own veterinary advice, agrees to the move or to allow the mare to walk in.

4. Pregnant mares due to foal in the current season must stay on the premises until they foal a healthy foal;

5. Mares that have aborted must be isolated from other horses for 28 days after abortion and from pregnant mares due to foal that season and mares in early pregnancy for the remainder of that season;

6. Present evidence indicates a low risk of spread of infection if mares are mated on the second (30 days) heat cycle after their EHV abortion. Following veterinary advice further testing may be requested by the stallion owner before mating is allowed.

7. Mares that return home pregnant from premises where abortion occurred the previous season should foal in isolation at home. If this is not possible, the stud to which the mare is to be sent in the current season must be informed so that they can seek veterinary advice and take appropriate managerial and biosecurity precautions.

Walking-in mares

If the stallion unit is separated geographically from the pregnant mares, and is attended by separate staff, walking-in for covering by the stallions can continue unhindered (except for pregnant mares who have aborted or are in contact with an abortion, for at least 28 days following the last abortion – see above). Following mating, the mare(s) involved should be kept isolated from any pregnant mares who are still due to foal that season.

If neurological EHV is suspected in any horse:

1. Seek veterinary advice immediately;

2. Stop all breeding activities unless (where the affected horse(s) is(are) not at the stallion unit) the stallion unit is separated geographically from the pregnant mares, and is attended by separate staff;

3. Stop all movement on and off the premises until neurological EHV has been ruled out or, if it is confirmed, for at least 28 days after resolution of the last case;
4. Keep the affected horse in isolation with strict barrier nursing and biosecurity;
5. Arrange for separate staff to attend to the affected horse(s), using appropriate protective clothing and biosecurity protocols to reduce the risk of spread of infection;
6. In conjunction with the attending veterinary surgeon, arrange for appropriate samples, including the carcasses of dead animals (see 'Diagnosis' on page 36) or appropriate samples in leak-proof containers to be sent to a laboratory for examination;
7. Divide horses into small groups in order to minimise exposure in the event that there is EHV infection active among the affected group of animals, keeping pregnant mares separate from all others;
8. Do not allow any pregnant mare onto the premises until EHV has been excluded as the cause of the neurological disease;
9. Disinfect and destroy bedding; clean and disinfect premises, equipment and vehicles used for horse transport, under the direction of the attending veterinary surgeon), using appropriate protective clothing and biosecurity protocols.

If neurological EHV is confirmed, a policy should be decided with the attending veterinary surgeon. This should include screening and clearance of each group before individuals in the group return home. Individuals should then be isolated at home, especially pregnant mares until after foaling. Detailed advice on specific cases can be obtained from equine infectious disease experts or specialist equine veterinary practices. An outline control protocol for neurological EHV is provided below:

- Implement high standard biosecurity and biocontainment procedures as advised by the attending veterinary surgeon;
- Wherever possible attending veterinary surgeons should liaise closely with equine infectious disease experts and/or specialist equine veterinary practices
- In the early stages of many neurological EHV outbreaks it is necessary for an entire premises to be quarantined and tested in order to establish the likely extent of the infection, that may be entirely subclinical (no obvious clinical signs) in some horses. These animals may act as an important source of new infection in susceptible horses;
- The most effective sampling strategy for neurological EHV involves:
    - Two clotted blood samples taken at a 10-14 day interval from onset of clinical signs for serological testing (antibody levels in the blood),

- Blood sample taken in heparin or EDTA anticoagulant tubes for PCR testing or virus isolation (during viraemia, when the virus is circulating in the bloodstream),
- Nasopharyngeal swabs for PCR testing (when the virus is being shed from tissues in the nose and throat);

- It is recommended that a second clotted blood sample is taken to detect fourfold or greater rises in antibody levels (seroconversion) that would indicate infection occurring at about the time of the first sample (a technique called 'paired serology');
- Initial laboratory testing may quickly establish that the infection is geographically restricted to isolated parts of the premises. In these situations it may be possible, following review of laboratory data and with the approval of the attending veterinary surgeon and the testing laboratory, to resume normal operations in the non-affected parts of the premises, usually though with heightened disease awareness and biosecurity measures in place.
- Approval to resume normal operations on the entire premises is made by the attending veterinary surgeon and the testing laboratory in the light of accruing clinical and laboratory information.

In all the situations above, communication of and about the EHV infection is extremely important. Failure to communicate can contribute to spread of infection to the detriment of all owners and their horses, particularly mare owners. The owner/manager of the affected horse(s) or premises should inform:

- The national breeders' association;
- Owners (or those authorised to act on their behalf) of:
  - Mares at the premises;
  - Mares due to be sent to the premises;
- Others:
  - Those responsible for the management of premises to which any horses from the stud are to be sent;
  - Those responsible for the management of premises to which any horses have been sent in the previous 28 days, with the condition that owners of those horses (or those authorised to act on their behalf) must be informed immediately;
  - Those responsible for the management of premises to which any pregnant mares (that have been in-contact after the first three months of pregnancy) have been sent, with the condition that owners of those mares (or those authorised to act on their behalf) must be informed immediately.

Treatment

No validated specific anti-equine herpesviral treatments are currently available. Any necessary treatment of clinical abnormalities and complications will be determined by the attending veterinary surgeon.

Good stud management and vaccination of all horses against EHV-1 and EHV-4 is recommended as a general principle (see Prevention above). The costs of prevention are likely to be far less than the costs associated with an abortion storm and significantly less than the disruption following a single abortion.

When cases of EHV neurological disease occur, caution must be exercised when considering the vaccination of previously unvaccinated horses either on the same premises or those that have recently left. The latter may have had contact with infection and may therefore be in the process of incubating the disease. Experience suggests that vaccination during the incubation stage can increase the chances of neurological signs.

Confirmation of Freedom from Disease

EHV respiratory disease is, to a certain extent, endemic among the horse population in the UK. Total freedom from disease can never be confirmed and vigilance is therefore important in the management of breeding stock, particularly pregnant mares, in order to minimize cases of EHV abortion, stillbirth, newborn foal death and neurological disease.

Export

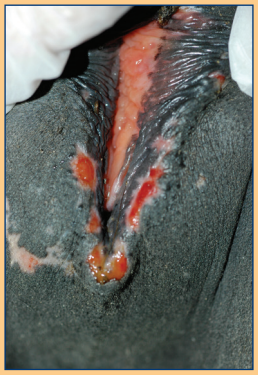
EHV is not notifiable by law. However, no horse with clinical signs or recent contact with the disease should be exported.

CODE OF PRACTICE FOR EQUINE COITAL EXANTHEMA (EQUINE HERPESVIRUS-3 INFECTION)

CODE OF PRACTICE FOR EQUINE COITAL EXANTHEMA (EQUINE HERPESVIRUS-3 INFECTION)

The Disease

Equine coital exanthema (ECE) is a predominantly sexually-transmitted disease caused by infection with Equid Herpesvirus 3 (EHV-3), a highly contagious but otherwise non-invasive and relatively benign virus. EHV-3 is distinct from the other equine herpesviruses. Typical 'pox-like' skin lesions appear on the penis of stallions and the vulva of mares. The virus is endemic in UK and most horse breeding populations internationally.



Notification Procedures

There are no legal notification requirements for ECE in the UK although it may be helpful to inform the national breeders' association if infection occurs.

Clinical Signs

After an incubation period of 5–9 days, small (1–3 mm) raised papules, which are often not noticed, appear on the skin of the penis of stallions and the vulva of mares. Over 24–48 hours these progress to fluid-filled vesicles, which mature and rupture leaving purulent 'pox-like' craterous lesions. These may remain as individuals or may coalesce into a raw or encrusted skin erosion or ulcer, before healing usually by 10–14 days. Secondary infection with bacteria will delay healing and may require local antiseptic or antibiotic treatment. Lesions specifically on the urethral process of the stallion sometimes result in inability/unwillingness to ejaculate.

Signs of systemic illness and genital discomfort are unusual but some stallions become uncomfortable enough to be unwilling to mate until lesions have healed. Some infected stallions take longer to recover and may develop secondary complications. Mares seldom show signs of systemic illness and lesions usually heal within 10–14 days, often leaving white (depigmented) skin scars.

Latent carrier infection occurs in both mares and stallions. These individuals may or may not have shown previously recognisable signs of disease at primary or reinfection and usually do not do so at recrudescence. The anatomical site of virus latency is unproven.

A non-venereal form of EHV-3 infection occurs uncommonly in maiden colts and fillies, causing pyrexia (raised temperature) and very painful coalescing skin lesions around the anus and vulva (in fillies), over the perineum and between the hindlegs and on the scrotum (in colts).

In breeding horses the infection causes no immediate or longer term direct effect on the fertility of stallions or mares, but temporarily disrupts mating schedules while the stallion recovers and becomes no longer infectious. Where infection occurs towards the end of the breeding season, missed mating opportunities may result in reduced pregnancy rates. The virus has not been reported to cause abortion in mares.

Transmission of Disease

EHV-3 is highly infectious between susceptible horses and may be transmitted by direct or indirect genital contact. The virus may be transmitted from subclinically infected animals that have no recognisable signs of skin lesions.

Horses that have recovered from infection and those that showed no recognisable signs of typical skin lesions may become latent carriers of EHV-3. It is believed that the most common source of infection for ECE is the periodic recrudescence of virus (resumption of viral shedding) from a latently infected carrier mare or stallion that does not have clinical signs.

Nasogenital transmission of EHV-3 between mares at pasture and at teasing, with demonstrable nasal, lip and nostril lesions, has been reported. The role of stable flies for potential vulval to vulval transmission is proposed but unproven.

Prevention

All stallions and mares should be routinely and carefully inspected for signs of papules, vesicles, pustules or 'pox-like' craterous lesions on the skin of their penis/prepuce and vulva/perineum before mating proceeds. If there is any suspicion of infection, veterinary advice should be sought before mating is allowed to proceed.

Veterinary surgeons or assistants who are handling the genitalia of infected horses should wear disposable gloves that are changed between horses and veterinary surgeons should use disposable vaginascopes. Utensils such as jugs/buckets and saline solution should not be shared between horses, and disposable paper towels should be used rather than shared sponges.

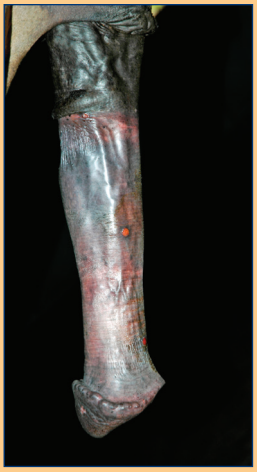
There is no commercially available vaccine for EHV-3 infection. Although it is unusual for stallions or mares to show signs of infection again after natural infection, it is probable that natural immunity is short-lived as individuals have shown recurrent ECE in sequential breeding seasons.

Diagnosis

A presumptive diagnosis of ECE may be made on the basis of typical clinical signs. Confirmation can be made on the basis of paired serology (rising EHV-3 antibodies in clotted blood samples) with samples collected at the time of first suspicion and 14–21 days later, and tested for EHV-3 neutralising (VN) antibody[1]. A fourfold or greater rise in antibody level between the first (acute) and second (convalescent) samples usually confirms recent EHV-3 activity. ECE cannot be

conclusively ruled out on the basis of less than a four-fold rise in antibody titre as VN antibody production may be lower in some cases.

Confirmation of diagnosis may also be made on the basis of isolation of EHV-3 from active lesions, although care should be taken that failure to isolate virus does not necessarily preclude that infection has occurred recently.



Treatment

Any necessary treatment for lesions affecting the genitalia or for systemic illness will be determined by the attending veterinary surgeon.

Control of Infection

In horse populations with endemic EHV-3, where occasional reactivations of latent virus with shedding by latently infected carriers is undetectable and therefore unavoidable, early diagnosis and containment of spread of infection is most important. Staff involved with stallion mating management should be trained in the recognition of genital skin lesions characteristic of ECE and what to do should signs be suspected.

When infection is suspected or diagnosed in a stallion, mating should cease until the stallion is confirmed free of disease (see below). This usually takes 10-14 days but may take longer in individual stallions. Although, in stallions with no systemic signs of illness, it may be tempting for managers of busy commercial stallions, with the encouragement of some mare owners, to continue to mate mares, this is inadvisable. This is because the stallion may become sore and unwilling to mate/ejaculate and the potential for development of systemic signs of illness and secondary complications will be increased. In addition, this is likely to slow the stallion's healing and recovery process, will increase the numbers of mares infected and as such will inevitably increase the numbers of latently infected carriers in the horse population.

When infection is diagnosed in a stallion, all owners with mares mated to that stallion should be informed so that they may ask their attending veterinary surgeon to examine their mares for signs of infection. Mare owners should be warned of the delay that is anticipated before the stallion will be available for mating again.

When infection is diagnosed in a mare that has been mated within 3 weeks, the mating stallion owner/manager should be informed so that he/she may cease mating with the stallion and ask the attending veterinary surgeon to examine the stallion for signs of infection. The stallion owner/manager should then notify owners/managers of other mares mated by that stallion within the previous 3-4 weeks so that their veterinary surgeons may examine for signs of infection. Mating should only recommence when the stallion is free from signs of infection; when reports reveal no signs of infections in other mares that he has mated; and veterinary opinion is that he is not in the stage of incubating the infection.

Whilst ECE should be avoidable by the careful use of artificial insemination (AI) (where allowed by registration authorities) with effective barrier management, the potential for virus spread during AI has not been explored.

EHV-3 is quickly destroyed in the environment by lipid solvents, detergents, heat, drying and commonly-used disinfectants. Hygienic management of mare examination stocks and handling areas, particularly at covering barns, is important in the prevention of ECE and other sexually-transmitted diseases.

Confirmation of Freedom from Disease

Resumption of mating should be based upon freedom from clinical signs of infective lesions rather than set time periods, as the latter will vary with individual circumstances. However, stallions that are immediately rested and palliatively treated are usually ready for resumption of mating by 10-14 days. Stallions may be considered recovered when any systemic signs of illness have resolved and the penis and prepuce have been thoroughly examined, with the penis erect, and no vesicular or pox-like skin lesions are visible or previously diagnosed lesions have healed over, leaving non-inflamed, smooth scars. The vulvas of mares should be examined thoroughly after washing. No vesicular or pox-like skin lesions should be visible or previously diagnosed lesions should have healed over, leaving non-inflamed, smooth scars.

Export

ECE is not notifiable by law. However, no horse with clinical signs or recent sexual contact with the disease should be exported.

CODE OF PRACTICE FOR EQUINE INFECTIOUS ANAEMIA

CODE OF PRACTICE FOR EQUINE INFECTIOUS ANAEMIA

The Disease

Equine Infectious Anaemia (EIA), sometimes known as Swamp Fever, is caused by the equine infectious anaemia virus (EIAV). The virus occurs worldwide, including in parts of mainland Europe, in Thoroughbred and non-Thoroughbred horse populations.

Notification Procedures

In Great Britain (England, Scotland and Wales), EIA is **notifiable by law** under the Infectious Diseases of Horses Order 1987. Under the Order, anyone who owns, manages, inspects or examines a horse which is affected or is suspected of being affected by the disease must notify the Animal & Plant Health Agency (APHA). Please see Appendix 1 for APHA contact details.

Under the Order, the premises where disease is suspected may be declared as an infected place and restrictions on horses at those premises may be imposed. A veterinary enquiry will be carried out imposed the APHA to determine if EIA is present. The Order also provides powers to enforce measures for vector control and disinfection.

As there is currently no cure for EIA, any horse testing positive will be subject to compulsory slaughter and disposal under the control of the APHA. Any requests to exempt an infected equine from destruction will be considered on a case by case basis.

The Equine Infectious Anaemia (Compensation) (England) Order 2006 and The Specified Diseases (Notification and Slaughter) (Amendment) and Compensation (Scotland) Order 2014 provided, in England and Scotland, for the nominal payment of £1 for animals that have tested positive for EIA and subsequently been humanely destroyed for disease control purposes. Parallel legislation for Wales could be effected as emergency legislation if required.

Information on the Equine Infectious Anaemia Control Strategy for Great Britain can be found here: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/842206/equine-infectious-anaemia-control-strategy.pdf

Clinical Signs

The disease may take an acute, chronic or sub-clinical form and clinical signs are extremely variable.

Outward signs of the acute form include fever, depression, increased heart and respiratory rate, haemorrhaging, bloody diarrhoea, loss of co-ordination, poor performance, ataxia, rapid weight loss, skin swelling and jaundice. Acutely infected horses carry high levels of virus in the blood and are potentially infectious to other horses and donkeys.

The chronic form may be characterised by recurring bouts of fever, depression, anaemia, weakness or weight loss, interspersed with periods of normality.

Any horse displaying severe, unexplained anaemia should be isolated and tested for EIA as soon as possible.

Sub-clinically infected horses may not show any clinical signs of disease.

Transmission of Disease

The EIAV is transmitted between horses by transfer of infected blood or blood products. This can occur in the following ways:

- By insect vectors such as biting flies (including horse, deer and stable flies) and (very rarely) mosquitoes.
- By administration of infected blood products (including plasma) and unauthorised blood-based veterinary medicinal products.
- By contaminated veterinary or dental equipment.
- By other equipment that may become contaminated by blood and act as a vector between animals, e.g. twitches and curry combs.
- From mare to foal via the placenta, or, rarely, via virus-contaminated colostrum or milk in newborn foals.

Transmission through semen is uncommon but is a potential risk.

Both clinically and sub-clinically affected horses can be a source of infection for other horses, although animals suffering acute disease or recurring bouts of chronic disease are likely to be the most highly infectious.

Prevention

There is no vaccine available for EIA. Prevention of EIA is therefore based on the establishment of freedom from infection by blood ("serological") testing.

A blood sample for the EIA test can be collected from the horse at the same time as the blood sample for the EVA test (which should be taken after 1 January and within 28 days before mating).

Recommendations for prevention – all horses

In every year, the safest option is to establish freedom from infection, by means of a blood test, in mares, stallions and teasers before breeding activities commence. This includes all resident horses and horses due to visit the premises, prior to arrival.

Mare owners should check the stallion and/or boarding stud's requirements well in advance of the mare's date of travel. Stallion studs may require pre-mating EIA testing of all visiting mares, whether or not they have recently or ever visited a country where EIA is endemic or has occurred recently. If testing is required, the blood sample should be taken after 1 January and ideally within 28 days of mating.

The same timing and recommendations apply to pre-season testing of stallions (including teasers) in any year.

The relevant breeders' association may have additional testing requirements.

Recommendations for prevention – horses intended for travel to countries affected by EIA

Owners should attempt to ensure, as far as possible, that their horse will not come into direct contact with horses at risk of EIA infection while in a country where EIA is endemic or has occurred recently. This includes horses quarantined for EIA, horses at premises that are restricted or under investigation for EIA and horses that do not have a recent negative EIA blood test result.

Recommendations for prevention – horses arriving in or returning to the UK from an affected country

The level of risk associated with any particular horse will depend on the management of the horse while it was in the affected country. Depending on the particular scenario, the following recommendations apply:

1. Horses coming from infected premises or premises under quarantine or investigation for EIA, or that have had contact with any horse considered to be a primary contact in an affected country

These horses should not be imported and should be prevented from being imported by the affected country's veterinary authorities.

If, for whatever reason, importation does occur, **in all cases, the safest option is to isolate the horse in a vector-proof stable and to blood test the horse at least 30 days after the last known contact or the date of importation.** The test should be repeated at 60 and 90 days under the direction of the APHA.

Horses regarded as primary contacts (those arriving from premises which are infected, quarantined or under investigation for EIA) are at increased risk of disease and should be placed in isolation and **reported immediately to the APHA**, who will arrange for a veterinary enquiry to be carried out. The APHA will decide on measures to be taken, taking into consideration the risk factors involved. Restrictions may be placed on the premises where the horse is located.

The level of risk for horses regarded as secondary contacts (those which have come into contact with primary contact horse(s)) depends on the degree and nature of the connection with the primary contacts. Each individual case should be considered carefully but all such horses should be closely monitored and, if there is any cause for concern, the horse should be isolated and reported to the local APHA Field Service office.

2. Other horses arriving from an affected country

Horses arriving or returning from an affected country that have not visited infected premises or premises under quarantine or investigation, or come into contact with infected horses or primary contacts, have a low risk of infection. The health of the horse should be monitored and veterinary advice sought if there is any cause for concern.

Diagnosis

Due to the variability and possible absence of outward signs of EIA, clinical diagnosis is not always possible. Laboratory diagnosis, through blood testing, is essential.

The laboratory tests the blood sample for the presence of antibodies against EIAV proteins. Detectable antibodies are usually present in the blood 7-14 days after infection and remain present for the rest of the horse's life. Diagnosis should be by means of the Coggins test (also known as the Agar Gel Immunodiffusion test, AGID). The Coggins test is currently the only test recognised officially for the purpose of international movement of horses.

An ELISA test for EIA has recently been developed. As this test can provide results more quickly and economically than the Coggins test, it is widely used for routine screening in populations where EIA is not suspected, e.g. pre-breeding, pre-sales and pre-sporting events. Greater sensitivity means that the ELISA test can produce occasional false positive results and positive results must therefore be clarified by the Coggins test. The Coggins test should always be used to test horses with clinical signs, to test horses that have been in contact with others who have or are at risk of having EIA and for official export certification. In such cases, samples for EIA (Coggins) blood testing must be sent to the APHA Weybridge (tel: 01932 357335).

Control of Infection

Control of EIA is primarily by preventing transmission of infection to other horses through insect vector control, avoiding high risk procedures and detection of infected animals and their prompt destruction.

If infection is suspected, or a horse is suspected of having been in-contact with an infected horse:

- Stop all movement of horses on and off the premises.
- Seek veterinary advice.
- Isolate the horse (ideally in a vector-proof stable) and notify the APHA immediately. Isolate any other horses with which the horse has had contact ("in-contact" horses).
- Any directions given by the APHA must be followed, including implementation of vector control.
- Treat the horse(s) as advised by the APHA and the attending veterinary surgeon (see treatment advice below).
- Group all other horses on the premises away from in-contact horses until freedom from infection is confirmed.
- Any non-urgent actions that could pose a risk of transmission of infection between horses on the premises (such as non-essential veterinary treatment or non-essential contact with staff) should be halted. For

essential treatment, the principle of one syringe and one needle for each horse should be strictly followed.

- Veterinary procedures represent a particular risk. Veterinary equipment must therefore be either destroyed after use or appropriately sterilised.
- In addition to the APHA, inform:
  - Owners (or persons authorised to act on their behalf) of horses at, or due to arrive at, the premises;
  - Owners (or persons authorised to act on their behalf) of horses which have recently left the premises;
  - The national breeders' association.
- Stables, equipment and vehicles used for horse transport must be cleaned and disinfected.
- Good hygiene must be exercised, including the use of different staff and equipment for each group of horses, where possible. If this is not possible, staff who have handled infected or in-contact horses must disinfect their hands and change clothes before handling other horses. If separate equipment cannot be used for different groups of horses, it must be sterilised or appropriately disinfected before each use.
- The virus can survive in blood, faeces and tissue so all such material must be removed and destroyed promptly and surfaces disinfected.

Horses that have come into contact with an infected horse or a horse which is suspected of being infected must be quarantined for a minimum of 90 days post-exposure. Blood testing must be repeated as directed by the APHA until freedom from disease is confirmed.

Any horse testing positive for EIA will be subject to compulsory slaughter and disposal under the Animal Health Act 1981.

Treatment

There is currently no effective treatment for EIA.

Any treatment to alleviate the signs of the disease and otherwise support the horse will be determined by the attending veterinary surgeon, until such time as a positive diagnosis is confirmed by Coggins testing and compulsory slaughter is carried out.

Confirmation of Freedom from Disease

Restrictions on the affected premises and/or the horses in it may only be lifted, and any breeding activities resumed, after authorisation by the APHA and approval by the attending veterinary surgeon, who must be satisfied that all in-contact horses have been investigated and found to be negative for EIAV.

Note: If statutory restrictions have been imposed, the requirements of the supervising Defra officials must be met in order that the restrictions can be lifted.

Export Certification

For official export certification purposes, samples for EIA (Coggins) blood testing must be sent to the APHA Weybridge (tel: 01932 357335).

CODE OF PRACTICE FOR DOURINE

CODE OF PRACTICE FOR DOURINE

The Disease

Dourine, also known as maladie du coit or genital glanders, is caused by the protozoan parasite, *Trypanosoma equiperdum* and is a serious, often chronic, venereally transmitted disease of horses and other equids. Once widespread, dourine has been eradicated from many countries but is still seen in horses in Asia, Africa, South America, southern and eastern Europe, Mexico and Russia. It was reported in June 2011 in Sicily and then just north of Naples, on the Italian mainland. There was evidence based on subsequent testing of blood samples collected in 2010 of subclinical seropositivity to dourine in many regions of Italy. There is currently no proven long term cure for dourine and so euthanasia is considered the best policy, on grounds of equine health, welfare, and disease control.

Notification Procedures

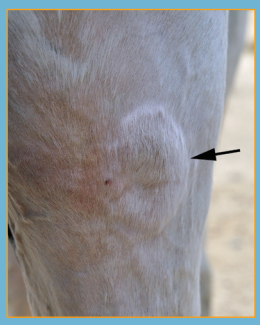
In Great Britain (England, Scotland and Wales), dourine is **notifiable by law** under the Infectious Diseases of Horses Order 1987. Under the Order, anyone who owns, manages, inspects or examines a horse, which is affected or is suspected of being affected by the disease must notify the Animal & Plant Health Agency (APHA). Please see Appendix 1 for APHA contact details. Under the Order, the premises where disease is suspected may be declared to be an infected place and restrictions imposed on horses at those premises. A veterinary enquiry will be carried out by the APHA to determine if dourine is present. The Order also provides Defra with powers to enforce measures for vector control and disinfection.

Clinical Signs

Clinical signs of dourine are highly variable in manifestation and severity. The disease is characterised mainly by swelling of the genitalia, cutaneous plaques and neurological signs but severity varies with the virulence of the strain, the nutritional status of the horse and stress factors. Clinical signs often develop over weeks or months, frequently waxing and waning with relapses, probably precipitated by stress. This can occur several times before the animal either dies or experiences an apparent recovery. The mortality rate is believed to be in excess of 50%.

Genital oedema and reproductive tract mucopurulent discharges are often the first signs. Mares develop a mucopurulent vaginal discharge, and the vulva becomes oedematous; this swelling may be marked leading to vaginal prolapse and may extend along the perineum to the ventral abdomen and mammary gland and may result in depigmentation, similar to that seen in coital exanthema with EHV-3 infection. Abortion can occur with more virulent strains. Stallions develop oedema of the prepuce and glans penis with paraphimosis in some cases, and can develop a mucopurulent urethral discharge. The swelling may spread to the scrotum, perineum, ventral abdomen and thorax and the affected skin may become depigmented.

Characteristic raised oedematous patches 2-10 cm in diameter (sometimes called 'silver dollar plaques') may appear on the skin on the neck, hips, lower parts of the abdomen and particularly over the ribs. These cutaneous plaques usually last for 3 to 7 days and are pathognomonic for the disease, although they do not occur with all infecting strains.



Neurological signs can develop with signs of progressive weakness, incoordination and, eventually, paralysis. Facial paralysis, which is generally unilateral, may be seen in some cases. Conjunctivitis and keratitis are common, and in some outbreaks, ocular disease may be the first sign of dourine and anaemia and intermittent fever may also be found. Dourine also results in a progressive loss of condition and affected animals may become emaciated, although their appetite remains good.

Transmission of Disease

Dourine is caused by the protozoan parasite, *Trypanosoma equiperdum*, which unlike other trypanosomal infections, is sexually transmitted during natural mating or by artificial insemination (AI) with infected semen. Transmission from stallions to mares is more common, but mares can also transmit the disease to stallions. *T. equiperdum* can be found in the vaginal secretions of infected mares and the seminal fluid, mucous exudate of the penis, and sheath of stallions. Periodically, the parasites disappear from the genital tract and the animal becomes non-infectious for weeks to months. Transmission is most likely early in the disease process as non-infectious periods are more common late in the disease. Male (jack) donkeys can become asymptomatic carriers and sexually immature jacks that become infected can transmit the organism when they mature.

Rarely, infected mares pass the infection to their foals, possibly before birth or through colostrum and milk, and infections may also be acquired through mucous membranes such as the conjunctivae. There is currently no evidence that arthropod vectors play a significant role in transmission of dourine, but this possibility cannot be ruled out.

Prevention

There is no vaccine available for dourine. As dourine is primarily a venereal disease, prevention of natural mating or AI with infected horses (stallions or mares) or infected stallion semen is the most important means of control. Prevention of dourine is therefore based on the establishment of freedom from infection and this is done by testing blood for the presence of antibodies against *T. equiperdum,* which is more reliable than testing for the presence of the protozoan parasite itself.

Any introductions of horses from endemic areas or areas of incursion should be isolated and blood tested for antibodies by complement fixation test (CFT). Horses in isolation must not be allowed to mate and semen must not be collected or used for AI until negative dourine test results are confirmed. Any seropositive results, or any horses showing clinical signs of dourine should be reported as required by national law (APHA in GB) and will then be dealt with under official supervision. Dourine should be eradicated from an incursion into a non-endemic area by identification of the source, thorough tracing and testing of all in-contacts and euthanasia of infected and seropositive horses.

Stallions or mares should not leave endemic areas or areas of incursion without veterinary confirmation that:

- The horse(s) has/have not been in contact with cases of dourine.
- The horse(s) is/are healthy and show(s) no clinical signs of dourine, prior to leaving.
- Negative CFT blood sample result(s) for dourine, performed by an authorised laboratory, collected within one month of leaving, are certified.

On arrival in an area where dourine does not occur, these stallion(s) or mare(s) should be isolated until repeat negative CFT blood sample result(s) for dourine, performed by an authorised laboratory, collected 10-14 days after arrival, has been obtained. Under no circumstances should the stallion(s) or mare(s) involved be mated and no semen should be collected and used for AI purposes before this reassurance has been obtained.

Diagnosis

Due to the variability and possible absence of outward signs of dourine, clinical diagnosis is not always possible and laboratory diagnosis is necessary to confirm diagnoses of dourine.

The complement fixation test (CFT) is the prescribed test for international trade, and has been used successfully in eradication programs. Some uninfected animals, particularly donkeys, often have non-specific CFT reactions due to anticomplementary activity of their serum, thereby rendering results difficult to interpret. Indirect fluorescent antibody tests (IFAT) may help to resolve these cases. Enzyme linked immunosorbent assays (ELISAs) and agar gel

immunodiffusion (AGID) tests have also been used to diagnose dourine. Although no serological test is specific for dourine as cross-reactions occur with other trypanosomes (especially *T. brucei and T. evansi*), this is not a problem where these infections are all considered to be exotic and requiring eradication.

CFT should always be used to test horses with clinical signs, to test horses that have been in contact with others who have or are at risk of having dourine and for official export certification. In such cases, samples for dourine (CFT) blood testing must be sent to the APHA Weybridge (tel: 01932 357335).

Definitive diagnosis by identification of the parasite is not undertaken for routine screening as the organisms are extremely difficult to find and are usually not detectable in blood smears. *T. equiperdum* cannot be distinguished microscopically from *T. evansi*.

Control of infection

If dourine is suspected in any horse, stop all breeding activities immediately, identify the horse(s) concerned, notify the APHA and seek veterinary advice about the welfare of the horses and the next steps.

If dourine is confirmed, further action will be controlled by Defra. Mating, teasing, collection/insemination of semen and movement of horses on and off the premises must stop until the disease outbreak is confirmed to be over. The premises concerned will be subject to official movement restrictions.

Any venereal contacts with confirmed infected horses must be isolated and will be blood tested to determine if they produce antibodies, i.e. to determine if they have become infected.

Inform:

- Owners (or persons authorised to act on their behalf) of horses at, and due to arrive at, the premises.
- Owners (or persons authorised to act on their behalf) of horses that have left the premises.
- Recipients of semen from the premises.
- The national breeders' association.

T. equiperdum is a parasite, which cannot survive outside a living host. It dies quickly with its host. Various disinfectants, including 1% sodium hypochlorite, 2% glutaraldehyde and formaldehyde, as well as heat of 50-60°C, will kill the parasites in the environment, but their transient life outside the host makes this unnecessary, although good stable hygiene is always recommended.

Treatment

There is currently no effective treatment for dourine, although treatment has been attempted with quinapyramine sulphate (3 mg/kg, given subcutaneously). However, *T. equiperdum* may persist in an asymptomatic carrier form after treatment and apparently recovered treated horses are considered unsafe for breeding purposes.

Confirmation of Freedom from Disease

Restrictions on the affected premises and/or the horses in it may only be lifted, and any breeding activities resumed, after authorisation by the local Field Service office of the Animal & Plant Health Agency (APHA) and approval by the attending veterinary surgeon, who must be satisfied that all in-contact horses have been investigated and found to be negative for dourine.

Note: If statutory restrictions have been imposed, the requirements of the supervising APHA officials must be met in order that the restrictions can be lifted.

Export Certification

For official export certification purposes, samples for dourine (CFT) blood testing must be sent to the APHA Weybridge (tel: 01932 357335).

Further information for veterinary surgeons

https://www.oie.int/app/uploads/2021/03/dourine.pdf

GUIDELINES ON EQUINE INFLUENZA (EI)

GUIDELINES ON EQUINE INFLUENZA

These guidelines discuss the principles of disease prevention and control for Equine Influenza (EI) and apply to studfarms of all types and sizes. Not to take appropriate steps to follow them, in consultation with attending veterinary surgeons and, where appropriate, expert advice, will undoubtedly increase the risk for introduction of EI onto the studfarm and increase the risk of spread of EI within and from the studfarm. This will potentially compromise animal health and welfare and the successful activities of studfarm businesses, racing and other equine events.

The Disease

Equine Influenza (EI) is a highly contagious, rarely fatal, respiratory disease of horses, ponies and other equine animals, caused by the equine influenza virus. Although historically there were two subtypes of the virus: H7N7 and H3N8, for more than 30 years now only the H3N8 subtype has been shown to be circulating and does so now as two distinct clades, known as Florida clades 1 and 2. EI viruses are distinct from the viruses that cause human and avian influenza. EI occurs all over the world with the known exceptions of Australia (where a major incursion occurred in 2007, followed by eradication), New Zealand and Iceland. A major outbreak of EI Florida Clade 1 occurred in north western Europe, including UK, Ireland, France and Germany, in late 2018 and into 2019, mostly involving unvaccinated horses but also some vaccinated horses.

Notification Procedures

EI is listed in the World Organisation for Animal Health (OIE) Terrestrial Animal Health Code and countries are obliged to report the occurrence of disease according to the OIE Code. In UK, EI is not notifiable to Defra but it is notifiable to the British Horseracing Authority, under their Rules of Racing (Part 3, 30), when it occurs in horses on licensed racehorse premises, because of its potential to interrupt the racing calendar.

Clinical Signs

Clinical signs of EI are highly variable, relating to infectious dose and immune status, the latter principally governed by vaccination status. In susceptible horses, clinical signs include fever and a harsh dry cough followed by a nasal discharge, in what can become 'explosive' outbreaks, rapidly spreading between individuals, with a short incubation period of 1-3 days. Depression, loss of appetite, muscular pain and weakness can occur. Epidemic coughing is always a worrying sign as this is not so commonly seen in association with the other, more common, upper respiratory viral infections of horses.

Clinical signs usually abate within a few days, but complications associated with secondary opportunist bacterial infections (e.g. pharyngitis, sinusitis, pneumonia) sometimes occur. Rarely, some cases progress to pleuropneumonia and may die or require euthanasia on humane grounds. Young foals appear most susceptible to fatal pulmonary complications, showing severe respiratory distress and failure. Foals have died during the 2019 outbreak in UK. Most infected adult horses recover in seven days to two weeks but in others, especially if not rested, recovery may be prolonged to as much as six months, before they regain their normal health and fitness.

Many fully vaccinated horses that are challenged by field infection show mild or no clinical signs at all. Infected vaccinated horses that do show signs are usually less severely affected than unvaccinated horses and recover more quickly and shed less infectious virus into the environment. Secondary pulmonary complications occur less commonly in challenged vaccinated horses. Clinical experience from outbreaks and evidence from scientific research shows that horses, especially younger ones that receive 6-monthly booster vaccinations, are better protected than those being revaccinated at longer intervals.

Transmission of Disease

EI virus is highly infectious, spreading effectively through close contact between animals but it also has the potential to transmit over longer distances via wind-borne spread when viral aerosols are produced during coughing. Live EI virus can also be spread indirectly by people via their hands, clothing, equipment and tack etc., and by the sharing of horse transport and in stables that have not been adequately cleaned and disinfected between animals.

Prevention

Vaccination

Vaccination and a sensible biosecurity policy, in partnership, are the key to best prevention for EI infection.

Vaccination is of primary importance to help safeguard horse health and welfare and to help protect equine businesses. All equine animals in UK should be fully and properly vaccinated as it is our most effective tool in the prevention and control of EI. No vaccines against EI, nor any other infections, are 100% protective and influenza vaccines, for all species, including humans, are recognized to be unable to fully protect against the continual viral genetic changes ('genetic drift') that occur naturally. Nevertheless, it is clear that even during the 2018/2019 EI outbreaks reported throughout Europe, including UK, whilst infection did occur in the occasional vaccinated horse, clinical signs were either absent or much milder and infected animals recovered more quickly with fewer cases of secondary pneumonic complications. That being the case, viral shedding and aerosol spread to other horses would have been reduced. It was also clear that horses that were last vaccinated within 6-months of challenge, were at less risk of succumbing to infection, when challenged, than those that were last vaccinated at longer intervals.

It is recommended that all horses resident on all studfarms are fully vaccinated at least in accordance with the datasheet requirement of the specific EI vaccine, as recommended by the attending veterinary surgeon, but recognising that **younger animals intended for racing will need to comply with racing's regulatory requirements for EI vaccination**. This will usually include vaccine manufacturers recommending a primary course of 2 doses administered 4-6 weeks apart, followed by a first booster 5 months after the second primary dose, with at least annual boosters thereafter. As noted above and following experience in the 2018/2019 outbreak, booster vaccinations are now being recommended every 6 months rather than annually. See Appendix 8 for vaccine details.

It is recommended that in order to provide optimal antibody levels in colostrum that pregnant mares are booster vaccinated for EI approximately 4-6 weeks prior to their predicted foaling date, with their tetanus vaccine booster, using a combined vaccine. Foals that receive adequate maternal antibody should not commence their own vaccination programmes until they are at least 6 months of age when maternally derived antibody from colostrum has adequately declined and will not interfere with the foal's immune response to vaccination.

NB From 1 January 2022 the British Horseracing Authority revised EI vaccination requirements will apply to all equines entering racecourse property.

Biosecurity

Sensible biosecurity measures based upon a specific risk assessment performed in consultation with the attending veterinary surgeon and, where necessary, others with expert knowledge of equine contagious disease control, are essential to minimize the risk of introduction of infected horses and aerosol or mechanical transfer of infective virus to non-infected horses.

Effective quarantine for new horse arrivals is of major preventive importance. It is clear that during the 2018/2019 EI outbreaks reported throughout Europe, including UK, many reported cases of EI followed the introduction of new horses into stables, some from abroad, some from sales and others from stables elsewhere in UK. Ideally, in-coming horses should be held at a separate location, with dedicated staff, for 10-21 days, during which time they are monitored daily for any clinical signs of all infectious diseases (e.g. raised rectal temperature, nasal discharge, coughing, diarrhoea, skin lesions, inappetence, depression). If these occur, they can be investigated, treated, recovered and proven to be of no further risk of transmission, in isolation, before they are introduced to the main stables. If multiple horses are involved, the whole batch is quarantined and monitored in this manner before being released 'into the herd'. For studfarms without separate facilities, an appropriately separated yard or a section of stables should be designated as a quarantine area, under the supervision of the attending veterinary surgeon, with designated staff with appropriate protective clothing and work practices.

If contagious disease is diagnosed in quarantine, the stables and paddocks become an isolation unit (see Appendix 6). For studfarms with only a few horses, introduction of EI means that the whole unit needs to be 'isolated' until the infection has taken its course and the horses are recovered and confirmed to be free of disease and no longer constitute a risk of spread to other horses.

On studfarms, pregnant mares, mares with foals at foot and non-pregnant mares should be managed separately, with separate staff and there should be designated quarantine facilities, staff and protocols for incoming horses and for when contagious infections occur, to avoid their spread.

Vaccination and biosecurity measures may help to avoid an epidemic developing and spreading. However, EI infected horses can shed infectious virus before they show clinical signs so significant spread may occur before the first case is diagnosed. Horses may show minimal clinical signs and therefore specific testing (see diagnosis) should be performed without delay, if EI is considered a risk, irrespective of clinical signs.

Prevention

Vaccinate all equine animals against EI on the premises.

Quarantine all incoming horses on arrival and monitor for signs of illness/infection.

Isolate all infected horses until confirmed free of disease and no longer a risk of spread to other horses.

Separate staff looking after horses in quarantine and isolation must understand and be equipped to follow appropriate hygiene and biosecurity protocols, as recommended and monitored by the attending veterinary surgeon, with expert advice, where necessary.

Diagnosis

Confirmation or rule out of equine influenza virus infection can be performed relatively quickly (same day if samples can be delivered to a prepared laboratory in good time) with the specific polymerase chain reaction (PCR) test. Upper respiratory tract sampling should be performed using special long nasopharyngeal swabs taken by a veterinary surgeon, in a satisfactory manner and placed into specific viral transport media. The PCR test determines whether specific EI viral RNA is present in the test sample, consistent with EI virus infection.

Confirmation or rule out of a specific immune response (antibodies) to EI can be made by the testing of blood (serum) samples collected during the early phase (acute sample) of the infection and then from the same horse 10-14 days later, when the animal is recovering (convalescent sample). A 4-fold or greater rise in specific EI antibody level (titre) in the second blood sample compared to the first (seroconversion) confirms an immunological response to EI infection and suggests a diagnosis of EI if the horse has not been recently vaccinated. However, this test relies on taking two blood samples 10-14 days apart and the interpretation of results for horses that have been fully and recently vaccinated may not be easy to interpret.

Therefore, for the most timely confirmation and rule out of the virus at the time that clinical signs are present or when there is any suspicion of upper respiratory infectious disease, the specific nasopharyngeal swab PCR test is required. Nevertheless, serological (antibody) blood testing may also be helpful in assessing the development of immunity and recovery and/or risk of transmission, in particular circumstances.

Control of Infection

Firstly, as soon as clinical signs or risk are suspected, all equine animals on the premises should be swabbed (see diagnosis) to confirm or rule out EI infection and to clarify those that are actively shedding virus. It may then be possible to manage infected/ shedding and non-shedding horses into isolated groups to minimise the risk of spread to those that are not yet infected. On studfarms, in particular, not yet infected pregnant mares and mares with foals at foot should be managed separately from the infected group, to try to avoid infection of their foals, who may become more seriously ill (see clinical signs). Stallions should be housed and managed separately from mares and, if not yet infected, biosecurity measures should be in place to avoid their direct or indirect contact with infected mares or other horses.

Vaccinated horses should be additionally vaccinated, if they have not been booster vaccinated within the last 6 months and even if they have, there is research evidence to suggest that additional vaccination may be helpful in controlling an outbreak of EI.

The health and welfare of infected animals should be specifically addressed by the attending veterinary surgeon until recovery from all clinical signs and repeat swabbing confirms no further shedding of virus, demonstrating that all horses are no longer actively infected.

Treatment

There is no specific treatment for EI itself, but the attending veterinary surgeon should be consulted and will treat the clinical signs, where necessary, to speed recovery, to minimise viral shedding and to avoid progression to secondary complications. Appropriate early treatment for horses with pulmonary complications is an urgent priority.

Confirmation of Freedom from Disease

Following infection with EI, freedom from disease risk is confirmed when all clinical signs have resolved and repeat nasopharyngeal swabbing confirms negative PCR tests, i.e. there is no evidence of further shedding of virus. As a guide, most horses stop shedding virus about 10 days after initial uncomplicated infection.

GUIDELINES ON PIROPLASMOSIS

GUIDELINES ON EQUINE INFLUENZA

The Disease

Piroplasmosis is caused by blood-borne intracellular parasites that are spread naturally by a specific tick species, when they feed on a horse but may also be transmitted iatrogenically through transfer of infected blood via contaminated equipment such as re-using needles or syringes between horses. The two parasites species that cause disease in horses are *Babesia caballi (B. caballi)* and *Theileria equi (T. equi)*. The parasite enters red bloods cells and destroys them and the clinical signs a horse displays are associated with the rupture of these infected blood cells. The disease is widespread and although the UK is currently considered free from endemic natural disease, cases have been occasionally confirmed and do occur in other European countries. With no formal UK requirement for pre-import screening, the international movement of horses and the demonstration of the presence of the tick species capable of transmission disease, there is a risk that the disease could be present and establish in the UK.

Notification

There are no legal notification requirements for piroplasmosis in the UK although it is recommended that owners inform their national breeders' association if disease occurs. In the UK, Thoroughbred breeders should notify the Thoroughbred Breeders' Association and non-Thoroughbred breeders their relevant breed association.

Piroplasmosis is endemic in many parts of the world. Although the UK is currently considered free from endemic natural piroplasmosis, disease can be introduced through importation of infected subclinical 'carrier' animals that have no outward signs of disease or through the introduction of infected ticks. Pre-import piroplasmosis screening is not currently a requirement for entry into the UK and there is an increased concern for the disease to establish in the UK as the tick species capable of transmitting the infection has been demonstrated to be present.

Clinical signs

Horses can have a range of severity and duration of clinical signs. Early stage, acute clinical signs include fever, inappetence and lethargy. A subacute form exists in which horse have these acute signs with an intermittent fever, weight loss and pale mucus membranes. They may also appear jaundiced with yellowed mucus membranes, such as the white of their eyes (sclera). Bleeding and/or bruising (petechiation and/or ecchymoses) may also be visible on mucus membranes.

Horses can be chronically infected, sometimes referred to as a 'carrier state'. Clinical signs can be absent or non-specific and include weight loss and poor performance. Horses can also become carriers of the infection with no overt clinical signs although flare ups of disease are possible and may be associated with factors causing immunosuppression, such as stress following transportation. Severe disease can be fatal. If a pregnant mare is infected, the infection can be transmitted to the unborn foal, causing abortion, or neonatal infection which can be fatal.

Transmission of disease

B. caballi and *T. equi* are spread by ticks and ticks become infected from feeding on infected animals. Tick species capable of transmitting the disease include Ixodes, Dermacentor and Haemaphylis. Disease can also be transmitted through transfer of infected blood between horses, such as through contaminated needles, syringes or blood transfusions and associated equipment.

Prevention

As disease is most likely to be introduced through the importation of an infected animal, horses should be subject to pre-movement screening including a veterinary examination to confirm they are not demonstrating any clinical signs of disease prior to movement, that negative diagnostic test results have been obtained and that the horse was free from tick exposure 30 days prior to travel.

In countries where disease is endemic, measures should be in place to reduce the exposure of horses to ticks and these include regular inspection of horses for ticks and the applications of repellents or acaracides. This is applicable to horses in the UK travelling to countries with endemic infection, where the risk of exposure is considered plausible.

Precautions should be taken to avoid transmission through blood, including stringent use of single-use needles and syringes and screening of horses prior to the collection of blood for transfusion purposes.

Diagnosis

Haematology and biochemistry analysis on a blood sample may be suggestive of piroplasmosis, with findings including anaemia and evidence of red blood cell break down. Laboratory testing is required to definitively diagnose disease and tests can either identify the agent or an immune response to infection. Agent detection tests are applied to whole blood and include microscopic examination of blood smears, however, the parasites may not be easily visible in the blood, despite a horse being infected. A PCR test helps to overcome the issue of detection of a positive case, particularly if parasites levels are low. However, due to the chance for false negative test results when applying agent detection tests, the use of serology to detect specific antibodies against *B. caballi* and *T. equi*, alongside agent detection tests, is strongly recommended. There are three different serological tests available that are commonly used to detect piroplasmosis and their relative merits will need to be taken into account when interpreting the results of these tests. It may be appropriate to use a second test to confirm the results if a first test gives a positive or borderline result.

Control of Infection

If horses in the UK are found to be PCR positive or seropositive with antibodies against *B. caballi* or *T. equi,* they should be isolated from other horses and tick vectors until treatment has been conducted, to avoid onward transmission to vectors and subsequently to other horses.

Treatment

Treatment approaches will depend on the disease status of a country and whether a country has endemic disease. In some endemic countries, treatment may be aimed at reducing the severity of clinical signs and preventing fatalities, but it may

not be advised to treat 'carrier horses' as a low level of infection may be deemed to be protective in preventing severe acute disease, as horses will have continued re-exposure from infected ticks.

Treatment in a non-endemic country such as the UK is applied with the intention of complete clearance of infection, although this may not be readily achievable with currently available treatments. There is no licensed treatment for piroplasmosis, but off-license use of antiprotozoal agents has been reported, with varying success at clearing infection.

Confirmation of Freedom from Disease

Following confirmation of infection in a horse, freedom from disease may not be possible to confirm due to the complexities of the disease's epidemiology and limitations of current available treatments and diagnostic testing methods to confirm freedom of disease. Therefore, freedom of disease may not be an appropriate term for piroplasmosis cases.

Export Certification

Piroplasmosis is not notifiable by law in the UK. However, no horse with clinical signs or recent contact with ticks in a country where disease is present, should be exported to the UK.

Further information for veterinary surgeons

https://onlinelibrary.wiley.com/doi/epdf/10.1111/jvim.12168

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6572709/

GUIDELINES ON STRANGLES

GUIDELINES ON STRANGLES

The Disease

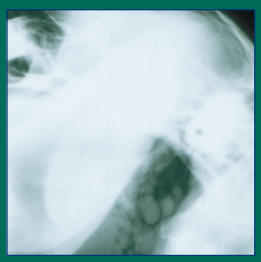
Strangles is a disease of the lymph nodes of the equine upper respiratory tract. It is caused by the bacterium *Streptococcus equi (S. equi)* and is endemic within the horse population of the United Kingdom.

Notification Procedures

There are no legal notification requirements for strangles in the UK, although it is advisable to inform the national breeders' associations if infection occurs. Under the Rules of Racing (Section C30 Duty to report communicable diseases), racehorse trainers are obliged to report likely or confirmed strangles to the British Horseracing Authority (BHA) when it occurs among horses in training.

Clinical Signs

Affected horses typically have a high temperature, cough, poor appetite, nasal discharge and swollen or abscessed lymph nodes of the head, which can appear as open sores. Some infected horses may become very ill and the disease may become fatal if the bacterium spreads to other parts of the body ('bastard strangles') or the respiratory tract is occluded by swollen lymph nodes (hence the term 'strangles'). However, in some horses, a nasal discharge without glandular swelling is sometimes all that is seen.



Transmission of Disease

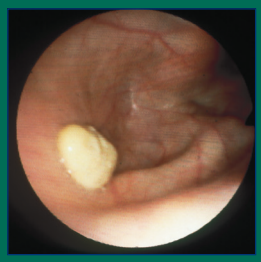
Direct contact between infected horses is the most obvious means of transmitting the infection but the hands and equipment of staff, farriers or veterinary surgeons can spread it indirectly. The bacterium is discharged (shed) from draining abscesses and the nose, and it may survive in the environment, particularly in water troughs. Good hygiene is therefore essential in controlling the disease. The incubation period (the time between infection occurring and clinical signs developing) is usually about one week but may be longer. Horses incubating the disease may shed *S. equi* before the onset of obvious clinical signs and so may spread the infection to in-contacts before the first case becomes apparent.

A small but important proportion of horses that have recovered from strangles become persistently infected (most commonly in their guttural pouches) with *S. equi* for months or even years. These 'carriers' are less susceptible to reinfection, and they

may have no obvious clinical signs of disease but can intermittently shed *S. equi,* which can then infect naive horses. These subclinical carriers are probably the most important factor in persistence of infection on premises between outbreaks and can initiate new outbreaks following their inadvertent movement to new premises.

Prevention

More details on methods for prevention of introduction of strangles onto equine premises are available in the 'Strategy to eradicate and prevent Strangles (STEPS)' document (https://ww1.sruc.ac.uk/media/5v3jl2yq/steps-guidelines.pdf)



Ideally, all horses entering any stud or stable premises should be quarantined for a period of 3-4 weeks and monitored closely for any clinical signs of an infectious disease, including daily temperature monitoring, particularly in the period immediately after arrival. Any horse that develops a nasal discharge or other signs consistent with strangles should be isolated and tested for the presence of, or exposure to, *S. equi.*

The strangles blood test can be used to identify horses that have elevated antibody responses to *S. equi* and are therefore likely to have been exposed to this pathogen in the recent past, enabling the identification of potentially infectious animals before or immediately after movement. A further blood test at the end of the quarantine process can be used to identify animals that may have seroconverted since their arrival, consistent with recent exposure to *S. equi*. It is recommended that any quarantine batches of horses that include seropositive animals, as well as those seroconverting whilst in quarantine, not be released until their infectious status has been shown to be negative for presence of *S. equi* (see Diagnosis below).

A live attenuated strangles vaccine, Equilis StrepE, was first licensed in the UK in 2005 and is administered by submucosal injection.

It is expected that a new protein subunit vaccine will be licensed for use in GB and Europe in late 2021/early 2022.

Veterinary advice should be sought to determine whether use of the vaccine may be appropriate on the basis of a specific risk assessment and bearing in mind that this vaccine may trigger positive results in diagnostic tests for strangles.

Diagnosis

Strangles is diagnosed either directly by detection of *S. equi* itself or indirectly by detection of rising levels of antibody against *S. equi* in blood samples, although presence of antibodies against *S. equi* does not necessarily indicate that an animal is still infectious to other horses.Direct detection of *S. equi* is either by laboratory isolation or by qPCR detection of its DNA from nasopharyngeal swabs, abscess contents and/ or guttural pouch washes or contents (empyema/chondroids). It should be noted that low bacterial numbers, the concurrent presence of the closely related *S. zooepidemicus* or recent antibiotic treatment, may make the detection of *S. equi* by culture more difficult and less sensitive than qPCR.

When taking nasopharyngeal swabs, it is particularly important to sample the back of the pharynx around the opening of the guttural pouch, using

specially designed elongated swabs with enlarged absorbent heads (see 1 below). There is no need to use smaller, guarded swabs as the main purpose of swabbing for strangles is to optimise the chances of detecting the organism if it is present. Shedding of *S. equi* into the nasopharynx often occurs intermittently, so repeated swabbing is recommended to confirm negative results. *S. equi* should be more reliably confirmed or excluded following testing by qPCR alone or by culture and qPCR of frank pus from obvious draining abscesses, nasal discharges or guttural pouch washes or contents (empyema or chondroids).

The carrier state (continued presence of *S. equi* infection in the absence of clinical signs) may be diagnosed or excluded by sequential nasopharyngeal swabs or, preferably, endoscopic examination ('scoping') of the guttural pouches and submission of guttural pouch washes or contents (empyema or chondroids) for testing by qPCR alone or by culture and qPCR. A series of three nasopharyngeal swabs, usually collected one week apart, will result in detection, by positive qPCR, on at least one of the swabs in >90% of carrier horses. As the sensitivity of *S. equi* detection for identifying guttural pouch carriers on three nasopharyngeal swabs is broadly equivalent to testing bilateral guttural pouch samples, the latter approach is the recommended sampling protocol for determining infectious status in seropositive, healthy horses.

Although carriers only shed *S. equi* intermittently, most carriers maintain specific antibodies in their blood and these antibodies can be detected by a blood ELISA test, which may provide a useful tool to help identify some, but not all, carrier animals. Recent investigations of the blood ELISA in detecting chronic carriers have highlighted that negative blood ELISA results, either as single or paired samples, do not guarantee absence of a carrier state. It is therefore preferable for all potential carriers irrespective of their serological status, especially those of high or unknown risk status, to be examined by guttural pouch endoscopy and sampling with screening for *S. equi* by qPCR alone or by culture and qPCR.

Control of Infection

More details on methods for control and eradication of strangles on equine premises are available in the 'Strategy to eradicate and prevent Strangles (STEPS)' document, which is accessible at

https://ww1.sruc.ac.uk/media/5v3jl2yq/steps-guidelines.pdf.

The spread of *S. equi* may be limited by the early detection of shedders among newly affected horses and their in-contacts by appropriate testing (see above). Any suspected cases should be isolated immediately.

Young and elderly horses are most susceptible to infection and should be monitored closely. All infected horses and their in-contacts should remain in strict isolation, under the direction of the attending veterinary surgeon, and with the highest possible standards of hygiene.

Regular disinfection of water troughs should be performed in order to minimise the infectious dose that in-contact horses receive and so reduce the severity of disease.

Horses should not enter affected premises unless they can be kept in strict isolation from all possible sources of infection. No infected or in-contact animal should be released from isolation or veterinary supervision until they have been tested conclusively negative for active shedding and the carrier state, as described above.

Treatment

The treatment of horses with clinical signs of strangles using antibiotics remains controversial and any essential treatment will be determined by the attending veterinary surgeon, who will be best placed to consider all relevant risks. For further advice regarding the treatment of carrier horses please consult the attending vet.

Confirmation of Freedom from Disease

Shedding of *S. equi* usually ends rapidly after complete recovery but may continue intermittently for several weeks after clinical signs have resolved in some carrier horses. Therefore, no convalescent horse or in-contact can be considered free from infection until either three negative nasopharyngeal swabs have been obtained or the horse has been tested negative on bilateral guttural pouch samples. Negative results for S. equi by qPCR alone or by culture and qPCR indicate freedom from infection and the carrier state in the large majority of cases, but not all, so vigilance must be maintained. In deciding on the best time to commence testing to confirm freedom from infection after an outbreak of strangles it should be noted that this is likely to be a trade-off between starting sooner and finding a proportion of convalescing horses that continue to harbour S. equi that would if left longer have cleared the infection naturally and starting later and identifying fewer true subclinical S. equi carriers that require treatment and re-testing. Experience suggests that the best compromise is for clearance testing to commence at least four weeks after the last clinical signs of strangles have been observed.

Export Certification

Strangles is not notifiable by law. However, no horse with clinical signs or recent contact with this disease should be exported.

Further information for veterinary surgeons

1 Swabs with extra long shafts and an enlarged absorbent head can be obtained by emailing equinesurveillance@gmail.com

Strategy to eradicate and prevent Strangles (STEPS): https://ww1.sruc.ac.uk/media/5v3jl2yq/steps-guidelines.pdf

Streptococcus equi infections: current best practice in the diagnosis and management of 'strangles': http://www.sciencedirect.com/science/ article/pii/S1090023312003103

Streptococcus equi Infections in Horses: Guidelines for Treatment, Control, and Prevention of Strangles—Revised Consensus Statement:

https://onlinelibrary.wiley.com/doi/full/10.1111/jvim.15043

infected horses may or may not have clinical signs or they may be subclinical carriers. All new arrivals should be examined for signs of illness (high temperatures, dullness, not eating, nasal discharge, swollen or abscessed lymph glands around the head or neck). Any horses with such signs should be immediately isolated and veterinary advice sought.

Routine use of the strangles ELISA blood test during isolation can identify previously infected and potentially infectious horses quickly. Ideally samples should be taken on arrival and after three weeks isolation to check for rising antibody levels (seroconversion) indicating an immune response after exposure to *S. equi*. If any of the quarantined horses are ELISA blood test positive on either the first or second test then further swab/wash testing (using qPCR or culture and qPCR) is required in order to determine whether the positive animals are carrying *S. equi* (see Diagnosis above).

Export Certification

Strangles is not notifiable by law. However, no horse with clinical signs or recent contact with this disease should be exported.

Testing horses at the end of a strangles outbreak

Following an outbreak of strangles, the best time to detect a carrier horse is a minimum of 30 days after the last clinical signs are seen. Shedding usually ends rapidly after recovery although it may continue intermittently in some horses.

Further information for veterinary surgeons

[1]Swabs with extra long shafts and an enlarged absorbent head can be obtained by emailing equinesurveillance@gmail.com

Strategy to eradicate and prevent Strangles (STEPS): https://www.sruc.ac.uk/download/downloads/id/1489/steps_guidelines.pdf

Triplex qPCR for detection of *S. equi*: http://www.sciencedirect.com/science/article/pii/S1090023312003103

ELISA blood test for detecting response to exposure to *S. equi*: http://www.sciencedirect.com/science/article/pii/S1090023313000567

GUIDELINES ON WEST NILE FEVER (WNF)

GUIDELINES ON WEST NILE FEVER

The Disease

West Nile (WN) fever (WNF), also referred to as WN encephalitis, is an infectious, non-contagious disease in horses caused by the flavivirus West Nile virus (WNV). WNV is insect vector-borne by various species of mosquito and there are two strains of the virus, lineage 1 and lineage 2. WNV is naturally maintained in infection cycles between wild birds through mosquitoes but the infection may spill-over into other species, including humans (WNV is zoonotic) and horses when infected mosquitoes feed on them. However, infected horses do not act as a source of sufficient virus for feeding mosquitoes to infect other animals and, as with humans, are considered 'incidental' or 'dead-end' hosts of the virus.

Clinical signs of WNV infection can vary markedly from subclinical (no obvious signs seen) through to severe neurological disease, with a high fatality rate (see Clinical signs below). Although WNF describes the disease seen in humans, fever is not always a feature of the disease in horses. WNV occurs worldwide, with the only report of an equine clinical case in Great Britain being in 2013 in an imported horse that recovered. The pattern of cases in infected countries is seasonal, linked to when mosquito numbers rise in a region, such as in the late summer months (so called vector seasons).

Notification Procedures

In Great Britain (England, Scotland and Wales), WNF is **notifiable by law** under the Infectious Diseases of Horses Order 1987. Under the Order, anyone who owns, manages, inspects or examines a horse or carcase which is affected or is suspected of being affected by the disease must notify the Animal & Plant Health Agency (APHA). Please see Appendix 1 for APHA contact details.

Under the 'testing to exclude' process, APHA now provides testing for WNV as part of a veterinary surgeon's clinical work up of cases with non-specific neurological signs where WNV is very low on the list of differentials. The private vet must first contact APHA (see Appendix 1) to discuss the case with an APHA duty vet after these discussions it is decided that the clinical signs are suggestive of WNV, APHA will initiate a field investigation.If the case is not suspected to be WNV, a sample can be submitted to APHA under the 'testing to exclude' process. Further details of this scheme are available at http://apha.defra.gov.uk/vet-gateway/tte/wnv.htm.

Clinical signs

As the virus can breach the blood-brain barrier and result in damage to the brain and spinal cord, neurological disease is the predominant presentation among horses showing clinical signs. These can include non-specific signs such as inappetence, some cases may demonstrate a fever and others may commonly be subclinical. Encephalitis ranges in severity from mild depression to head pressing and a state of drowsiness. Additional neurological signs can include behavioural changes, facial twitching, impaired vision, inability to swallow, heightened sensitivity, muscle fasciculations, weakness (paresis) or paralysis of front and/or hind limbs, loss of bodily function (ataxia), aimless wandering, recumbency, coma and death.

Transmission of disease

WNF is a vector-borne disease spread by various species of mosquito and there is no direct spread between horses. Indirect transmission has been reported in humans through blood donations, organ transplants or vertical transmission from mother to child. Wild birds are the natural reservoir of the virus and act as an amplifying host by increasing the amount of virus available for transmission. Mosquitoes are infected when blood feeding on birds and then act as vectors to infect other birds and other animals. When other animals are infected (such as, but not exclusively, humans and horses), they are considered as 'dead-end' or 'incidental' hosts as they cannot transmit the virus due to a low blood viral load compared to birds.

Prevention – Vaccination

If travelling horses abroad to regions where the WNV is active or if in the future WNV emerges in Great Britain, vaccination, with regular boosters may be recommended. There are currently two WNV vaccines available for administering to horses in Great Britain, licensed from 5 or 6 months of age to reduce the number of viraemic horses and the severity and duration of clinical signs. Several years' experience of the use of these vaccines for horses in North America suggests that they are safe to use and, if used correctly, effective in preventing clinical disease. Vaccination can interfere with serological testing as the Enzyme-Linked Immunosorbent assay (ELISA) cannot differentiate infected from vaccinated animals (so called DIVA capability) and it may therefore interfere with serological testing.

Consult your veterinary surgeon. See Appendix 8 for vaccine details.

Prevention – Biosecurity

As WNV is vector-borne and non-contagious between horses, biosecurity measures should be directed at:
a) effectively managing potential mosquito breeding areas, which in particular includes removing and/or treating accumulations of stagnant or standing water
b) prevention of mosquito biting by use of insecticide treated meshes on horse stabling
c) application of insect repellent topical treatments directly onto horses
d) applying physical horse coverings such as blankets with head and neck protection
People who ride horses in WNF areas are recommended to wear long sleeves and trousers and hats and to apply topical insect repellent to exposed areas of skin on hands, heads and necks.

Diagnosis

Suspect WNV cases in Great Britain can be tested by APHA under the 'testing to exclude' process, provided the case has been discussed with an APHA duty vet before any samples are submitted. If after these discussions it is decided that the clinical signs are suggestive of WNV, APHA will initiate a field investigation. If the case is not suspected to be WNV, a sample can be submitted to APHA to exclude WNV under the 'testing to exclude' process.

There are two serological tests available that are able to detect antibodies against WNV and these are available in UK at the government's APHA laboratory. The IgM ELISA detection test is for the presence of IgM WNV antibodies raised shortly after infection or vaccination and is advised to be used in conjunction with WNV total antibody detection ELISA (cELISA), which alone cannot differentiate recent IgM from longer lasting or post-vaccination IgG responses. These ELISAs cannot differentiate between vaccinated and infected animals.

Highly sensitive virus detection using PCR can be carried out on infected tissues recovered at post mortem examination.

Control of infection

Although WNF is a notifiable disease, as a dead-end host, only the individual affected horse would require euthanasia on humane grounds. Restrictions may be applied to the horse while investigations take place and all other equidae on the premises may be considered for vaccination.

If WNV is identified in Great Britain, the government's response will be driven by the risk to public health due to the virus being zoonotic. This will include increased public health messaging, increased surveillance of horses and wild birds, controlling mosquitoes and (to protect horses) vaccinating horses in regions considered to be at risk.

Treatment

There is no specific treatment for infected horses apart from symptomatic treatment and supportive care. This can be optimised through the early detection of clinical cases.

Confirmation of freedom from disease

Restrictions on the affected horse and contacts may only be lifted after authorisation by the APHA.

Export certification

For official export certification purposes, samples for WNV blood testing must be sent to the APHA Weybridge.

Further information for veterinary surgeons

https://www.oie.int/doc/ged/D14013.PDF#:~:text=West%20Nile%20fever%20is%20a%20

https://www.jdata.co.za/iccviewer/media/dsr20201.pdf (Focus article on WNV on pages 14-18 of the surveillance report)

GUIDELINES ON ARTIFICIAL INSEMINATION (AI)

Introduction

These guidelines supplement the information contained in the Code of Practice for each specific disease. Please refer to the disease Code for detailed advice and use this section for additional recommendations specific to AI in horse breeding.

All veterinary practitioners and horse breeders who use artificial reproductive techniques are recommended to read the British Equine Veterinary Association (BEVA) Guide to the use of Artificial Insemination in Horse Breeding for further practical advice and information (www.beva.org.uk).

Checklist for the use of artificially inseminated semen

All of the bacterial and viral venereal diseases which may be transmitted during natural mating can also be transmitted in artificially inseminated semen, be it fresh, chilled or frozen. Owing to the large number of mares that can be inseminated by an infected stallion and the fact that the diseases are endemic in many countries from which semen may be imported, the potential for disease transmission via the use of artificially inseminated semen is significant. It is therefore essential that all semen is accompanied by certification provided by the sender confirming the disease free status of the stallion at the time of collection. It is also essential that no semen is artificially inseminated unless the person performing the insemination can verify the following:

I. For semen originating within the UK (fresh, chilled or frozen)

A. Each dose of semen must be clearly labelled with:

i. The name of the stallion;

ii. The time and date on which the semen was collected;

iii. The insemination dose per mare;

iv. The progressive motility of the semen;

v. The concentration of the (extended) semen.

B. Each dose of semen must be accompanied by a certificate available to download at www.beva.org.uk, stating that:

i. The stallion has been tested for the CEMO, *Klebsiella pneumoniae* capsule types 1, 2 and 5, *Pseudomonas aeruginosa* and equine infectious anaemia according to the current HBLB Code of Practice, with negative results after 1st January of the current year.

ii. The stallion has *either* been tested seronegative for Equine Arteritis Virus according to the current HBLB Code of Practice after 1st January of the current year or has been vaccinated against EVA having been tested seronegative prior to vaccination or has been tested seropositive, is not vaccinated against EVA but has been proven by virus isolation test not to be shedding the Equine Arteritis Virus in his semen.

II. For semen originating outside the UK (fresh, chilled or frozen)

A. Each dose of semen must be clearly labelled with:
i. The name of the stallion;
ii. The time and date on which the semen was collected;
iii. The insemination dose per mare;
iv. The progressive motility of the semen;
v. The concentration of the (extended) semen.

B. Each and every consignment of semen being imported into the UK from within the EU must be accompanied by an **original**, **valid** Intra Trade Health Certificate (ITHC), issued in the country of origin, specifying the name of the stallion whose semen the certificate relates to. In the case of chilled semen, electronic copies of the original ITHC may accompany the consignment so long as the original documentation follows. **(These requirements will change following EU Exit)**

C. Each and every consignment of semen being imported into the UK from outside the EU must be accompanied by a completed Common Veterinary Entry Document (CVEDA) and by an **original, valid health certificate** issued in the country of origin.

D. It is an option to have a shipment of chilled semen tested by PCR if there is any doubt about its status. Laboratories registered for testing by PCR are listed at www.beva.org.uk . This does not substitute for the correct paperwork accompanying the shipment, which will still be required.

Use of artificial insemination is not permitted where the progeny is to be registered with the Weatherbys General Stud Book. However, disease spread via AI has the potential to impact on Thoroughbred breeding operations through Thoroughbred/non-Thoroughbred cross breeding.

Full details of the legal requirements for equine semen imported into the UK are available at: http://archive.defra.gov.uk/foodfarm/animaltrade/imports/iins/genetic/genetic-a11.htm

Biosecurity protocols for AI/semen collection

Stallions

Collection of semen

1. When collecting semen, the stallion handler, the person in charge of collecting from the stallion and anyone else in the area (for example someone holding a teaser mare) should be suitably clothed including secure shoes/boots, a hard hat, back protector and clothes that cover the arms and the legs. Footwear must be readily disinfected.
2. Stallions must have proof of negative testing for infectious disease (CEM, EVA and EIA) according to the HBLB Codes of Practice prior to

mounting the phantom mare. If semen is to be exported, you must ensure that you are aware of and conform to the import requirements for the countries concerned with respect to collection facilities and health testing.

3. Stallions should demonstrate that they have no evidence of clinical disease prior to collection.

4. The entire phantom mare and surrounding collection area, including the floor area, must have the ability to be fully disinfected between stallions. The dummy must be disinfected between stallions.

5. A clean, sterilised artificial vagina (AV) should be used for each collection. Ideally, each stallion should have its own AV and lubricant. Separate AVs should be used for collection of semen for UK distribution and for collection for EU/worldwide export. See British Equine Veterinary Association Guide to the use of Artificial Insemination in Horse Breeding for more details (www.beva.org.uk).

6. Clean, sterilised collection jars should be used during each collection process.

7. DEFRA has a list of minimum requirements for DEFRA approved semen collection centres. This status is essential if semen is to be collected for export from the UK. Information on EU trade is at: https://www.gov.uk/government/publications/livestock-and-equine-semen-collection-approved-premises

Semen handling

1. Semen should be handled carefully to reduce external contamination.

2. Gloves, and clean clothing/lab coat should be worn when handling semen.

3. Extenders added to semen should be from a reputable manufacturer and should be used within the 'use by' date of the product.

4. Semen extender ingredients must comply with international regulations if semen is to be shipped internationally.

5. If semen is to be shipped outside the UK, then a separate handling area and a separate AV preparation/cleaning area to the main collection area is required and these areas must be in separate air spaces.

Semen processing

1. All equipment used in the processing of semen must be easily cleaned and disinfected between semen samples to prevent lateral spread of disease.

2. All stored samples or samples for transport must be sealed in a manner, which will prevent contamination and spillage.

3. Processing of all semen samples must be documented and such documents must be included in all transported samples.

4. A log of semen processing, storage and transport should be kept to ensure quality control.

5. Semen for export must not be processed in the same laboratory at the same time that non-export semen is being processed and must be processed prior to non export semen.

6. For international export, all stored semen must comply with the import regulations of the country of destination and original health papers must accompany the shipment.

7. Semen stored for export must be stored in a separate room to that being stored for UK distribution.

Mares

Preparation of mares

1. Every mare should be tested for CEMO according to the recommendations of the HBLB Code of Practice before being inseminated.

2. It is recommended that mare and stud owners familiarise themselves with the HBLB Codes for EVA and EIA and discuss any testing requirements with their veterinary surgeon.

3. The mare must be well restrained, preferably in stocks.

4. The vulva and perineum should be thoroughly cleaned to prevent contamination and the tail bandaged.

5. All relevant paperwork of semen to be checked including ORIGINAL health papers if from outside the UK.

6. All semen samples must have proof of negative testing for infectious disease according to the HBLB Codes of Practice as a minimum requirement.

Insemination of mares

1. Use sterile/unused disposable rectal gloves to reduce contamination.

2. When handling semen, be careful not to contaminate hands or facilities with semen.

3. If using frozen semen, care should be used when handling liquid nitrogen. Gloves and eye protection should always be worn when handling liquid nitrogen, as well as a long sleeve top to protect arms.

4. Keep all containers upright to avoid spillage.

5. Wear gloves and use appropriate forceps to handle frozen semen straws.

6. Use fresh water in clean receptacle to thaw straws.

7. Use clean paper towel to dry straws and minimise risk of contamination.

All equipment should be cleaned and disinfected or disposed of after each use.

Further reading

All veterinary practitioners and horse breeders who use artificial reproductive techniques are recommended to read the British Equine Veterinary Association (BEVA) Guide to the use of Artificial Insemination in Horse Breeding for further practical advice and information (www.beva.org.uk).

APPENDIX 1

Contact information for reporting notifiable disease suspects to Animal & Plant Health Agency (APHA) Field Offices in England, Scotland and Wales:

There are statutory requirements that suspicion of the notifiable diseases such as CEM, EVA, EIA and dourine must be reported immediately to the Animal & Plant Health Agency (APHA). When you telephone APHA, you will be put through to a Duty Vet. The Duty Vet is trained to handle reports of notifiable disease and will discuss the case with you. Many reports can be ruled out based on information gathered during this initial telephone conversation.

If a notifiable disease cannot be ruled out, the Duty Vet will arrange for an APHA Veterinary Inspector to visit the premises, usually within two hours. If considered to be appropriate, restrictions preventing movements on or off the premises, may be served verbally over the phone at this time.

When the Veterinary Inspector visits, they will serve restrictions and examine the affected animal, together with the other animals on the premises. Disease is often ruled out at this point and restrictions are lifted immediately. If disease cannot be ruled out by this examination and inquiry, then samples may be taken and sent to a laboratory for testing. In this case, restrictions will remain in place until disease can be ruled out.

England:

In England, call the Defra Rural Services Helpline on 03000 200 301 and choose the relevant options for APHA.

Wales:

In Wales, call 0300 303 8268.

There is an option for callers to hear the telephone message in Welsh. APHA will try to connect you to a Welsh-speaking person.

Scotland:

In Scotland, contact your local Field Services Office (see below).

The Helplines are open Monday to Friday, 8.30am to 5pm. There is an out of hours facility on the same number for reporting suspicion of notifiable diseases in animals or urgent animal welfare issues.

Ayr

Telephone: 03000 600703
APHA Field Services
Russell House
King Street
Ayr
KA8 0BE

Galashiels

Telephone: 03000 600711
APHA Field Services
Cotgreen Road
Tweedbank
Galashiels
TD1 3SG

Inverness

Telephone: 03000 600709
APHA Field Services
Longman House
28 Longman Road
Longman East
Inverness
IV1 1SF

Inverurie

Telephone: 03000 600708
APHA Field Services
Thainstone Court
Inverurie
Aberdeenshire
AB51 5YA

Perth

Telephone: 03000 600704
APHA Field Services
Strathearn House
Broxden Business Park
Lamberkine Drive
Perth
PH1 1RX

APPENDIX 2

Definition of 'high risk' and 'low risk' mares and stallions

'High risk' mares are:

1. Mares from which the CEMO, *K. pneumoniae* (capsule types 1, 2 or 5) or *P. aeruginosa* has been isolated. The 'high risk' status will remain until freedom from infection has been confirmed with a full set of negative swabs as required by the relevant protocols described under 'Confirmation of Freedom from Disease'.
2. Mares which have visited any premises on which the CEMO has been isolated within the previous 12 months;
3. Mares arriving from France, Germany, Ireland, Italy and the UK which have been mated during the last breeding season with stallions resident outside these countries;
4. All mares who have been in countries other than France, Germany, Ireland, Italy and the UK within the last 12 months.

'Low risk' mares are any mares not defined as 'high risk'.

'High risk' stallions are:

1. Stallions which have not previously been used for breeding purposes;
2. Stallions from which the CEMO, *K. pneumoniae* (capsule types 1, 2 or 5) or *P. aeruginosa* has been isolated. The 'high risk' status will remain until treatment has been undertaken and required swab results (see page 17, 'Confirmation of freedom from disease') are negative;
3. Stallions which have, in the last 12 months, been at any premises on which the CEMO, *K. pneumoniae* (capsule types 1, 2 or 5) or *P. aeruginosa* has been isolated;
4. Stallions which have mated a mare which has not been swabbed negative in accordance with the Code of Practice.

'Low risk' stallions are any stallions not defined as 'high risk'.

APPENDIX 2

BEVA

CONTAGIOUS EQUINE METRITIS AND OTHER EQUINE BACTERIAL VENEREAL DISEASES

2022 SEASON

MARE CERTIFICATE

This certificate must be completed by the mare owner/manager and be lodged with the prospective stallion owner/manager before the mare's arrival.

Name of mare _____

Passport Number (where available) _____

Name and address of owner _____

_____

Address of premises where mare currently resides _____

_____

In 2019 the above mare boarded* at _____ stud

whilst visiting _____ (stallion) result _____

In 2020 the above mare boarded* at _____ stud

whilst visiting _____ (stallion) result _____

In 2021 the above mare boarded* at _____ stud

whilst visiting _____ (stallion) result _____

Additional information including the results of positive bacteriological examinations for the CEMO, Klebsiella pneumoniae and Pseudomonas Aeruginosa at any time:

_____

_____

Name (please print) _____

Signature _____ Date _____

* If no boarding stud was used, provide the name and address of the premises where the mare resided.

APPENDIX 4

BEVA

LABORATORY CERTIFICATE

(CERTIFICAT LABORATOIRE)

2022 SEASON

For use only by Registered Laboratories* (Laboratoires certifiés)

Swabs contained in transport medium and labelled as collected from the stallion/teaser/mare named (Nom du cheval)

_____

Passport number (where available) (Numéro SIRE/carnet signalétique) _____

from the following sites (Prélèvements effectués) _____

_____

were submitted by (Nom du vétérinaire ayant effectué les prélèvements) _____

_____

for bacteriological examination on (date[s]) (Fait le) _____

I (je) _____

of (Laboratory) (Num du laboratoire certifié) _____

certify that the above swabs were examined: (je sousigné/e atteste que les prélèvements mis en culture),

	a) with the following results: (ont livré les résultats suivants):		b) by testing method: (méthode utilisée):	
	POSITIVE positif	NEGATIVE négatif	CULTURE	PCR
Taylorella equigenitalis (CEMO) (Métrite contagieuse des Equidés)	☐	☐	☐	☐
Pseudomonas aeruginosa (Pseudomonas aeruginosa)	☐	☐	☐	☐
Klebsiella pneumoniae (Klebsiella pneumoniae)	☐	☐	☐	☐

Where K. pneumoniae was isolate, capsule type (s) identified were _____
(Type(s) capsulaire[s])

Name and qualifications (Responsable du laboratoire certifé) (please print) _____

_____

Signature _____ Date _____

Laboratory name and address (Nom et adresse du laboratoire certifié) _____

_____

*A registered Laboratory is one whose name is published on the British Equine Veterinary Association website for the year December 2020 - November 2021 †In the event of a positive Klebsiella pneumoniae isolate, capsule typing should be performed and the results detailed to aid the determination of potential venereal pathogenicity.

APPENDIX 5

EAV – Identification of shedding stallions

When a seropositive stallion is identified, it is vital to establish whether he is shedding the equine arteritis virus (EAV) in his semen. If so, he is a primary source of infection. If the serology result cannot be fully explained by vaccination, further testing to determine the presence of EVA in semen has to be carried out through either of the methods below while the stallion is kept under strict isolation. If the initial veterinary assessment concludes that the stallion is likely to have been infected the local Field Service APHA office has to be notified.

Detecting virus in semen

The virus isolation (VI) test for EAV in semen is the test prescribed for international trade but for non-export screening purposes PCR (Polymerase Chain Reaction) testing may be used to provide an initial indication of EAV in semen.
A whole ejaculate of semen should be sent to a laboratory; a second whole ejaculate should be collected at least seven days later and sent to the same laboratory. Transport requirements (eg cooling) should be arranged with the laboratory. If EAV is detected in either sample, the stallion is a shedder. He must be kept in isolation and not be used for any breeding activities while he is still shedding, unless permitted under an official licence issued by Defra.
In the event of negative results for both semen samples, experience has shown that it is advisable to confirm these results by test mating.

Test mating

This must be done in strict isolation and under veterinary supervision. The stallion and mares must have no contact with other horses. The following procedure should be followed:

- Identify at least 2 seronegative mares;
- Take and store blood samples from each and then isolate the mares. Consult the testing laboratory about storage conditions;
- Mate each mare twice a day with the stallion on 2 consecutive days;
- Keep the mares in isolation;
- After 28 days, take blood samples and send them, with the pre-isolation samples, to the laboratory.

If the mares remain seronegative, the stallion is unlikely to be a shedder and can be released after a clinical examination.
If one or more mares become seropositive, the stallion is a shedder. He must be kept in isolation and not be used for breeding activities while he is shedding, unless permitted under an official licence issued by Defra.
Seropositive mares must remain in isolation until they have a stable or declining antibody level in two sequential blood tests taken at an interval of at least 14 days.

APPENDIX 6

Guidance on isolation

The Codes of Practice often refer to the isolation of horses. In the biosecurity sense, 'isolation' means a separate facility with separate staff, separate protective clothing, separate utensils/equipment and thorough steam cleaning and disinfection of stables between each occupant. Ideally, isolation areas should be able to operate as separate premises from their main operations, including having their own dedicated accesses.

Premises

1. The isolation facility should be a separate, enclosed building of sound, permanent construction, capable of being cleansed and disinfected effectively.
2. It must not be possible for other horses to approach within 100 metres of the isolation facility while it is in use.
3. An adequate supply of fresh, clean water must be available at all times for the isolated horses and for cleaning purposes.
4. Adequate supplies of food and bedding material for the whole of the isolation period must be made available and stored within the isolation facility before isolation commences.
5. Equipment and utensils used for feeding, grooming and cleansing must be used only in the isolation facility.
6. Protective clothing must be available at the entrance to the isolation facility and not be taken outside of this facility.
7. A separate muck heap should be used within the isolation facility.

Procedures

1. Before use, all fixed and moveable equipment and utensils for feeding, grooming and cleansing within the isolation facility must be disinfected using an approved disinfectant. A list of these is provided on the Defra website http://disinfectants.defra.gov.uk/DisinfectantsExternal/Default.aspx?Module=Approvals List_SI (select only 'General' for suitable products).
2. Attendants of the isolated horses must have no contact with any other horses during the isolation period.
3. The isolation period for all isolated horses shall be deemed to start from the time of entry of the last horse.
4. No person may enter the isolation facility unless specifically authorised to do so.
5. When no attendants are on duty, the facility must be locked securely to prevent the entry of unauthorised persons.

If such strict measures are not possible in practice, the owner/manager of the premises where isolation is needed should devise their own isolation programme and procedures in conjunction with the attending veterinary surgeon and if appropriate with additional input from a recognised expert in equine infectious disease control. These might include, for example:

- The designation of a yard and associated paddock as an isolation area in a geographically separate area of the premises, ideally such that it operates completely independently of the main premises.

- The designation of individual staff to work in the isolation facility with separate protective clothing and approved disinfectants as and when required. Ideally, these individuals should not be involved with work on the rest of the premises during periods of isolation, or if this is practically not possible they should complete their work on the rest of the premises before entering the isolation area. They should not return to other areas of the premises thereafter that day and until they have showered and had a change of clothes.

- The establishment of 'standard procedures' for dealing with occurrences of equine infectious disease on a premises, the precise details of which should be agreed with the attending veterinary surgeon and if appropriate with additional input from a recognised expert in equine infectious disease control, as they might vary according to individual circumstances.

APPENDIX 7

Transport

There is significant potential for transmission of infectious disease during transport.

Cleanliness and hygiene on board all forms of transport is the responsibility of the vehicle owner in private transport and the vehicle operator in contracted transport. The following notes are for guidance in either case.

1. Vehicles should be cleaned and disinfected frequently and regularly, using approved disinfectants capable of killing bacteria and viruses. A list of these is provided on the Defra website http://disinfectants.defra.gov.uk/Default.aspx?Module=ApprovalsList_SI (select only 'General' for suitable products).
2. Vehicles should be cleaned before horses are loaded.
3. Prior vaccination of horses may reduce the risk of disease transmission during transport. Ideally, these should be booster vaccinations but, if horses have not been vaccinated previously, then sufficient time should be allowed before transport for both primary and secondary vaccinations to produce adequate immunity.
4. When mixed loads (eg breeding and competition horses; pregnant and non-pregnant mares) are unavoidable, give careful consideration to the categories of horses which are transported together so as to minimise the disease risk (eg risk to pregnant mares of EHV-1 infection; risk of spread of EVA infection).
5. Horses should only travel if they are considered fit to do so by a veterinary surgeon.
6. Sick animals should not be transported except when they are travelling to obtain veterinary treatment. If transport of such horses is unavoidable, they must not be put in mixed loads without the consent of other owners (or those authorised to act on their behalf) of horses in that load. Veterinary advice should be taken.
7. If horses or their in-contacts are ill on, or shortly after, arrival at their destination, veterinary advice should be taken and the sick horses isolated if necessary. The transport operator should be informed at once and should then inform other clients with animals in the same load.
8. Facilities should, if necessary, be made available for cleaning/mucking out of lorries at premises where loading/unloading stops are made.

APPENDIX 8

Information on vaccines available (at the time of review, November 2021) in the UK and relevant to the HBLB Codes of Practice

Brand name	Manufacturer	Licensed use according to manufacturer's datasheet
Equip Artervac*	Zoetis	For the active immunisation of horses and ponies against equine arteritis virus (EAV) in order to reduce clinical signs and shedding of virus in bodily secretions after infection.
Equip EHV-1,4	Zoetis	For active immunisation of horses to reduce clinical respiratory signs due to infection with EHV-1 and EHV-4 and to reduce abortion caused by EHV-1 infection.
EquipF	Zoetis	For active immunisation of horsesagainst EI, to reduce clinical signs and shedding of virus after infection.
Equilis Prequenza	MSD Animal Health	For active immunisation of horses against EI, to reduce clinical signs and shedding of virus after infection Proteq Flu Boehringer Ingelheim For active immunisation of horses against EI, to reduce clinical signs and shedding of virus after infection
Equilis Strep E	MSD Animal Health	For immunisation of horses against *Streptococcus equi* to reduce clinical signs and occurrence of lymph node abscesses. The vaccine is intended for use in horses for which a risk of *Streptococcus equi* infection has been clearly identified, due to contact with horses from areas where this pathogen is known to be present, e.g. stables with horses that travel to shows and/or competitions in such areas, or stables that obtain or have livery horses from such areas.

NB From 1 January 2022 the British Horseracing Authority revised Equine Influenza vaccination requirements will apply to all horses entering racecourse property.

Veterinary advice should be sought on the choice, timing and administration of any vaccine.

*Veterinary surgeons and horse owners should be aware that the current datasheet requirement for the only inactivated EAV vaccine currently licensed for use in Europe (Equip Artervac) is for six monthly boosters and not 12 monthly (annual) boosters as was originally the case for this vaccine. This has been the requirement since April 2005, when the vaccine was granted a full market authorisation by the Veterinary Medicines Directorate (VMD) in the UK. Noncompliance with this booster interval requirement may necessitate investigation of the viral shedding status of stallions by Defra/APHA under the Equine Viral Arteritis Order 1995.

Vaccination is recommended as one means of aiding the prevention of disease. The listing of vaccines above is for information purposes only and does not imply endorsement of the products by the HBLB, its Veterinary Advisory Committee or Sub-Committees. The information given is accurate at the time of printing.

APPENDIX 9

Further reading and relevant publications

Infectious Diseases of Horses Order

Reference: 1987 No. 790. Obtainable from HMSO.

www.legislation.gov.uk

Equine Viral Arteritis Order

Reference: 1995 No. 1755. Obtainable from HMSO.

www.legislation.gov.uk

Equine Veterinary Education

1996 Volume 8 (3) 166–170. Obtainable from Equine Veterinary Journal Ltd, Mulberry House, 31 Market Street, Fordham, Ely, Cambs CB7 5LQ.

www.evj.co.uk

BEVA Guide to the use of Artificial Insemination in Horse Breeding

Obtainable from the British Equine Veterinary Association, Mulberry House, 31 Market Street, Fordham, Ely, Cambs CB7 5LQ.

www.beva.org.uk

Newmarket Stud Farmers Association Breeding Regulations

Obtainable from Rustons and Lloyd, 136 High Street, Newmarket, Suffolk CB8 8JP.

www.nsfa.org.uk

National Trainers Federation Code of Practice for Infectious Diseases of Racehorses in Training

This guide for trainers and their veterinary advisors is available from the NTF.

www.racehorsetrainers.org

Defra's Code of Practice for the Welfare of Horses, Ponies, Donkeys and their hybrids (2017)

At https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/700200/horses-welfare-codes-of-practice-april2018.pdf

APPENDIX 10

Glossary of terms used in the Codes of Practice

Aerobically	In the presence of oxygen
Antibody	Protective protein produced by the body in response to the presence of a virus or bacteria
Cervix	Neck of the uterus opening into the vagina
Clitoris	A body of tissue found just inside the vulva
EDTA blood	Blood sample which has been prevented fromclotting by the addition of ethylenediamine tetraaceticacid (EDTA)
Endometrium	Tissue that forms a lining inside the uterus
Genitalia	Genital (ie reproductive) organs
Guttural pouch	Two large sacs connected to the tube (eustachian) between the horse's ear and throat
Heparinised blood	Blood sample which has been prevented fromclotting by the addition of heparin
Immunofluorescence	A test that uses a specific antibody and a fluorescent compound to detect a specific organism Jaundice Condition in which a yellow colour can be seen in the mouth, eye and vagina
Microaerophilically	In the virtual absence of oxygen (10% of carbon dioxide)
Nasopharyngeal swab	Swab taken from the nose and throat
Oestrus/oestrous period	In heat or in season
Placenta	Membrane which surrounds the fetus in the uterus
Polymerase chain reaction (PCR)	A laboratory technique that produces multiple copies of the genetic material of a micro-organism contained within a clinical sample (eg swab). The technique amplifies the genetic material so that even tiny amounts can be detected, thereby permitting diagnoses of infections to be made.
Urethra	Tube through which urine is discharged from the bladder
Uterus	Womb
Venereal disease	A sexually transmitted disease
Vulva	External opening of the vagina

APPENDIX 11

Industry Protocol for the Control of Contagious Equine Metritis in Great Britain

Following an extended consultation between government veterinary authorities and the equine industry a industry-organised CEM control protocol is in place in England, Scotland and Wales. There are no changes in the arrangements for control of CEM in Northern Ireland. CEM remains a notifiable disease throughout the UK.

Background

In 2013, as part of the coalition government's deregulation initiative (the so-called 'red-tape challenge') the notifiable disease status of CEM was reviewed. The Thoroughbred Breeders' Association, the British Equine Veterinary Association (BEVA) and others in the equine industry highlighted the potential negative effect on compliance with the HBLB International Code of Practice and trade risks associated with changing CEM's status. It was subsequently agreed that CEM would retain its notifiable disease status, but that more responsibility for the control of the disease in Great Britain should be undertaken by the equine industry.

CEM control protocol

The principle of the CEM control protocol is to encourage compliance with the Horserace Betting Levy Board (HBLB) Code of Practice for the disease and involve the APHA only in cases of non-compliance. Under the protocol, horse owners or their representatives in Great Britain will be able to elect to have most of the work dealing with both suspect and confirmed cases of CEM carried out by equine veterinary surgeons on an approved list, rather than by APHA veterinary surgeons. These approved veterinary surgeons will follow the CEM control guidance provided in the HBLB International Code of Practice (http://codes.hblb.org.uk/index.php/). If the owner does not accept this invitation, follow-up action will be taken by the APHA under the Infectious Diseases of Horses Order 1987, including the possible serving of animal movement restrictions and making appropriate charges. For those that accept this invitation, the specialist advisor to the equine industry will coordinate the activities of the approved vets, receiving reports, initiating tracings off the premises and being responsible for any epidemiological investigations. BEVA hold a list of suitably qualified equine veterinary surgeons approved to undertake the work ('the approved list'). Approval is based on their Official Veterinarian (OV) status relating to export certification, their current stud experience and their knowledge of the HBLB Code of Practice in relation to the provisions of the new CEM control protocol in Great Britain.

Role of approved vets

Where the presence of *T. equigenitalis* (the CEM organism, CEMO) is suspected by a private BEVA approved laboratory on routine samples taken in Great Britain by a stud vet and confirmed by the APHA reference laboratory, disease will be confirmed in the normal way by the Chief Veterinary Officer in the country where the disease has been identified. With the agreement of the owner or their representative, the specialist advisor to the equine industry will arrange for a veterinary surgeon from the BEVA approved list to deal with the outbreak. The affected stud's attending veterinary surgeon may act as the approved veterinary surgeon so long as he or she is on the approved list and is content to do so.

The approved veterinary surgeon will visit the premises to carry out any necessary treatment and further sampling and to assess compliance with the HBLB Code of Practice and evaluate any need for tracings. In complying with the HBLB Code, voluntary movement and breeding restrictions will be implemented immediately and, where necessary, tracings will be initiated by the specialist advisor to the equine industry on the advice of the approved veterinary surgeon. Formal action by the APHA under the Infectious Diseases of Horses Order 1987, such as the serving of movement restrictions, will not ordinarily be necessary unless the owner fails to meet the requirements of the HBLB Code of Practice, as assessed by the approved veterinary surgeon. The costs of the subsequent treatment and resampling by the approved veterinary surgeon will continue to be borne by the owner in accordance with usual practice. If Defra/APHA deal with the outbreak, they may make charges.

Inclusion on the BEVA Approved List

Veterinary surgeons in Great Britain who would like to support the industry by applying to join the list of equine veterinary surgeons available to investigate any future cases of CEM in England, Scotland or Wales are requested to contact BEVA at info@beva.org.uk BEVA will provide an application form that will ask the veterinary surgeon to confirm that they have the necessary expertise to go on the list. There will be no extra training required, nor will BEVA make any charge. Veterinary surgeons do not have to be BEVA members to apply to join the approved list.

NOTES

NOTES