GF-TADs Africa

GLOBAL FRAMEWORK FOR THE PROGRESSIVE CONTROL OF TRANSBOUNDARY ANIMAL DISEASES

Food and Agriculture Organization of the United Nations

World Organisation for Animal Health
Founded as OIE

African Union

African Horse Sickness (AHS)

The Great Trans-Boundary Concern For The African Equine Industry

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AHS is an acute or peracute viral disease of equids

It is caused by a RNA Orbivirus transmitted by Culicoides midges

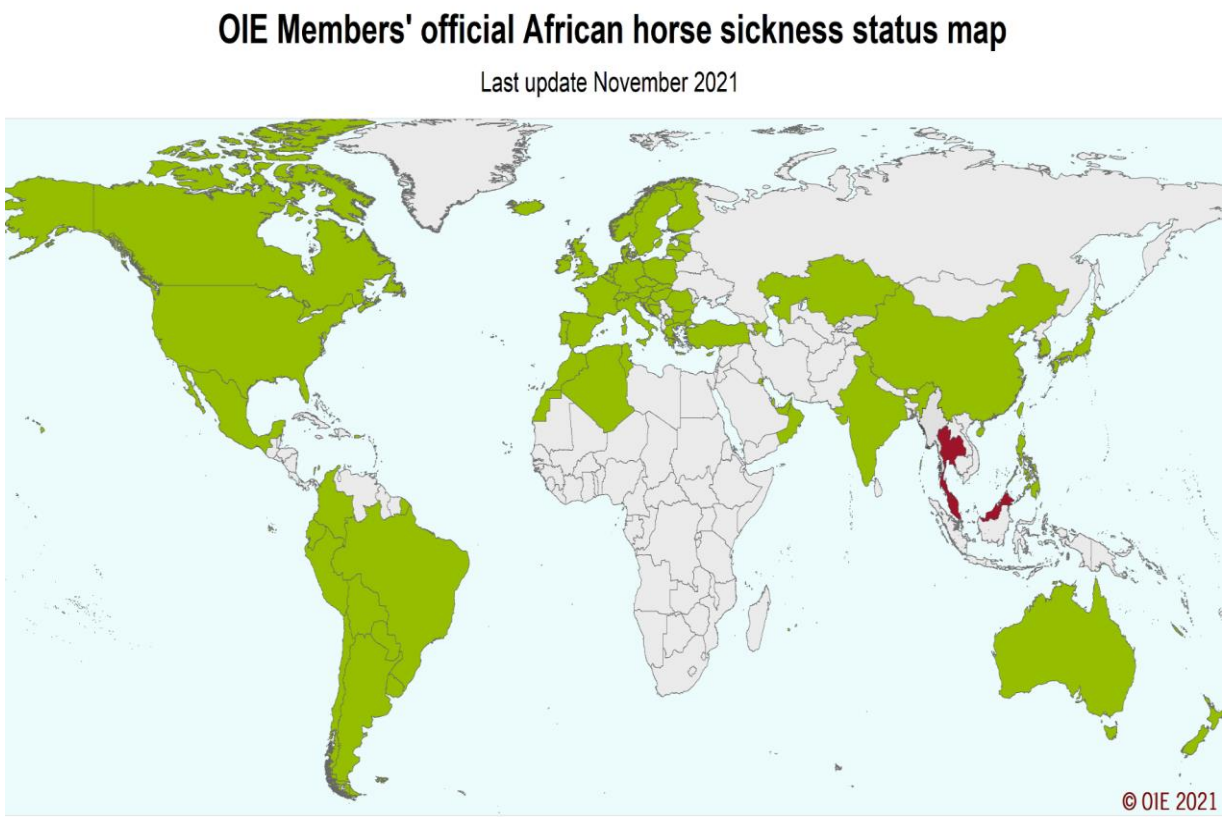
Outbreaks

The first documented outbreak of AHS (1719) was in South Africa. The worst recorded outbreak being in 1855 when 70,000 horses died.

Outbreaks have occurred in Europe most notably in Spain in 1987.

Significant outbreaks still occur to the present day, and many Sub-Saharan African countries are known to be AHS endemic, however mortalities have decreased significantly due to the availability of attenuated vaccines.

List of OIE Member Countries with AHS Free Status



The OIE dedicated webpage for official disease status displays a map and a list of Members with AHS free status officially recognised by the OIE (in green) according to Article 12.1.2. of the Terrestrial Code.

The countries/territories in grey have not been officially recognised as free from AHS, thus, they are considered as with an AHS undetermined status.

Zebras are generally resistant to the disease but are the main virus reservoir in much of Africa.

The donkey has been implicated as a reservoir for AHS virus (AHSV) in the absence of zebras but its role remains speculative.

Species	**AHS Mortality**
Horses	70 - 95%
Mules	50 - 90%
Donkeys	10%
Zebra	0%
Dogs	Dead - End host Infected by meat, not midges

AHSV SEROTYPES

Nine serotypes (1-9) are known to exist. All are present in Southern Africa and Kenya (*Davies et al 1993*), whereas in other countries the distribution is often unknown due to non-reporting.

The first polyvalent attenuated tissue culture vaccines were produced in South Africa in 1974.

Six countries currently produce AHS vaccines, but the biggest producer is still Onderstepoort Biological Products (OBP) in South Africa.

AHS Vaccines

Merial, France: Inactivated serotype 4, used in trials in Europe and North Africa (Spain and Morocco), discontinued but master seed preserved.

Onderstepoort Biological Products, South Africa: Attenuated, live viruses, South African isolates – 7 serotypes – Combination 1 – serotypes 1, 3 & 4; Combination 2 – serotypes 2, 6,7 & 8 not included 5 and 9; 5 produced disease in foals and 9 was not very immunogenic.

Societe de Productions Biologiques et Pharmaceutiques Veterinaires, Morocco (Biopharma): Attenuated, live serotype 4 virus.

Veterinary Serum and Vaccine Research Institute, Cairo, Egypt: Killed oil emulsion of serotypes 7 & 9, but they keep all 9 strains for attenuated vaccines if needed, last outbreak of serotype 9 in 1971

Central Veterinary Research Laboratory, Khartoum, Sudan: Attenuated, live virus, serotypes 1, 2, 4, 5, 7, 8. Types 3, 6 & 9 are available as master seeds.

National Veterinary Institute, Debre Zeit, Ethiopia: live attenuted serotype 9

Senegal, Dacca: live attenuated serotype 4

Inactivated Vaccines

Safe and ?efficacious- Complete inactivation of virus is essential, but difficult.

They are more expensive to produce and multiple inoculations are required to elicit and maintain high levels of protective immunity

Vaccinated animals do not develop a viraemia after vaccination or subsequent challenge

'Equipest' developed by Merial against AHS type 4 is no longer commercially available

Sub-unit Vaccines

So far AHS sub-unit vaccines have not been developed commercially.

The technology for sub-unit vaccines has been available for several years, but the vaccines have not been commercialized

This may be a reflection of cost and/or difficulties with large-scale production.

Both attenuated and killed AHS vaccines have concerns:

Attenuated vaccines have produced atypical AHS - neurological conditions

Post vaccinated horses may still develop disease.

Multiple vaccinations with attenuated vaccines may result in hypersensitivity and diminished immunity.

Poor seroconvertion:

- multivalent – 3 years to aquire full protection

- over or under-attenuation for different breeds and species immunogenicity

- inactivated – no virus replication – minimum 2 shots

- no information on protection following inactivated, polyvalent vaccination

AHS - Control and treatment

There is no specific treatment for infected animals apart from rest and good husbandry. Complicating and secondary infections e.g. biliary fever, should be treated appropriately during the recovery period

AHSV is non-contagious and can only be spread via the bites of infected vector species of *Culicoides*.

AHS - Control

Animal movement restrictions - to prevent infected animals initiating new foci of infection

Vector control - Reducing the number of midges.

Habitat alteration - eliminate breeding sites: remove dung heaps, repair leaking taps and drinking troughs, drain surface water, etc.

AHS - Control

Denying or reducing the access of vectors to susceptible animals.

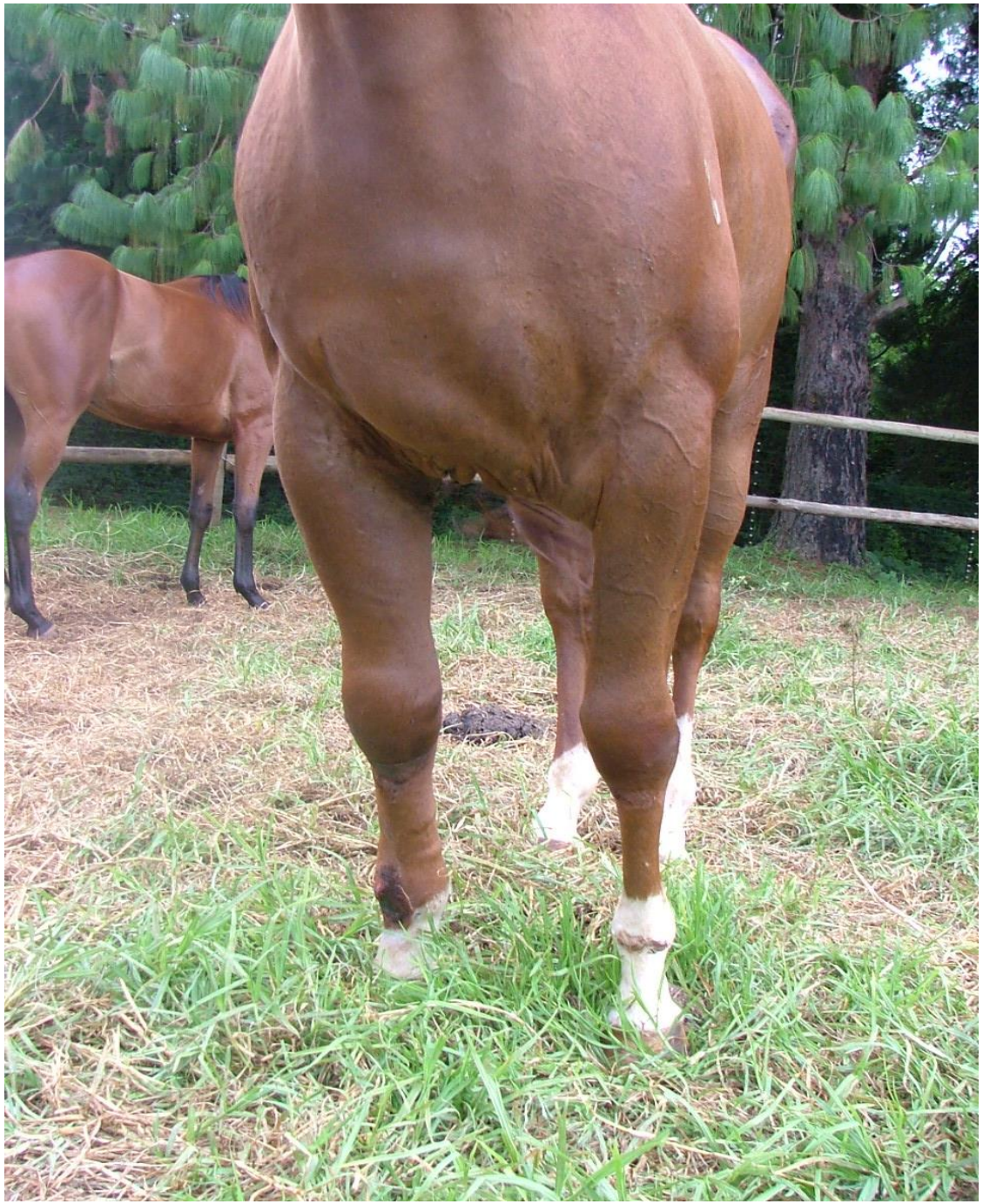
Most *Culicoides* vectors are exophilic, so stabling susceptible equids during times of maximum vector activity may help.

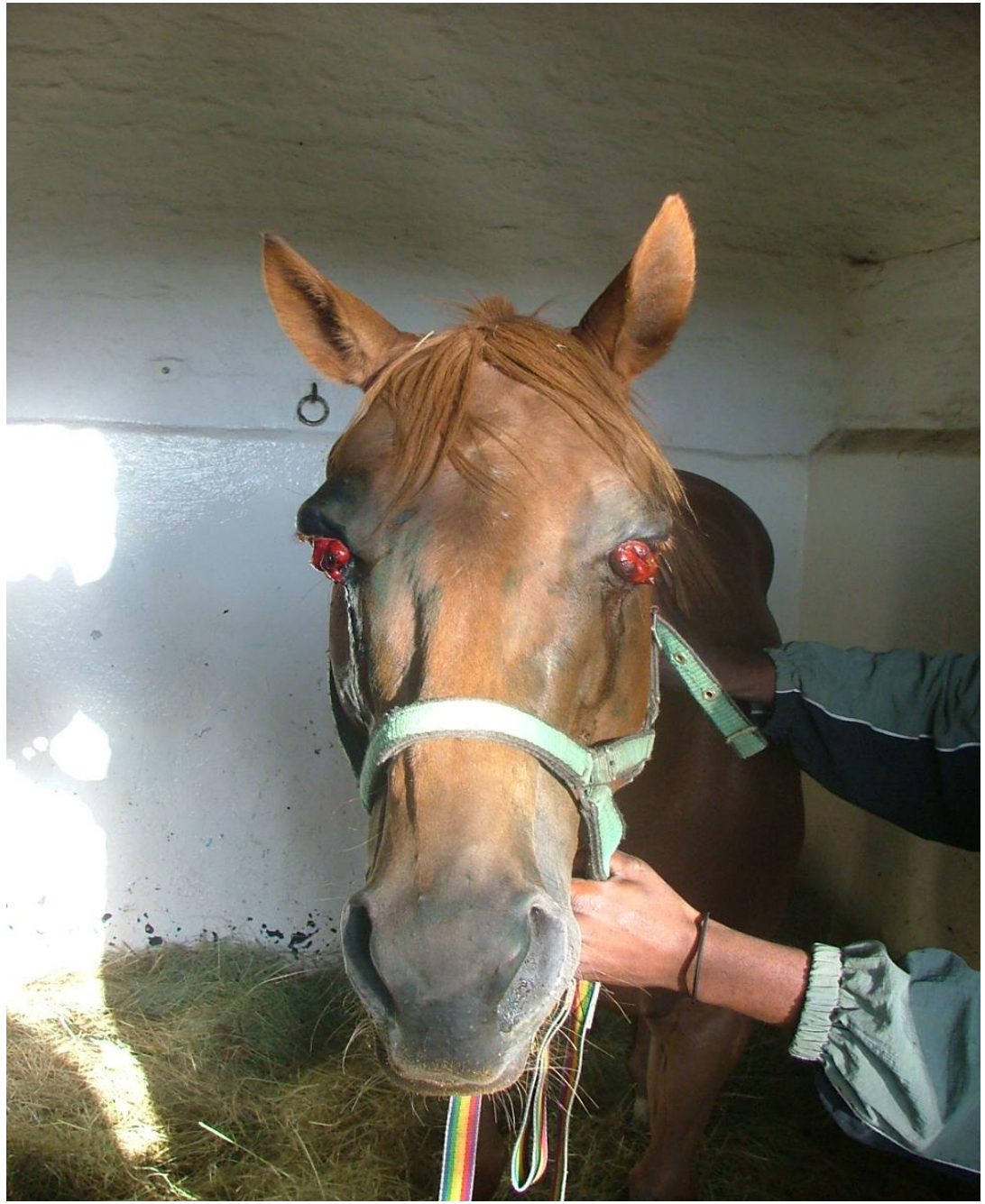
Windows and doors should be screened with mesh (e.g. sand-fly netting) or with coarser material impregnated with insecticide (e.g. a synthetic pyrethroid).

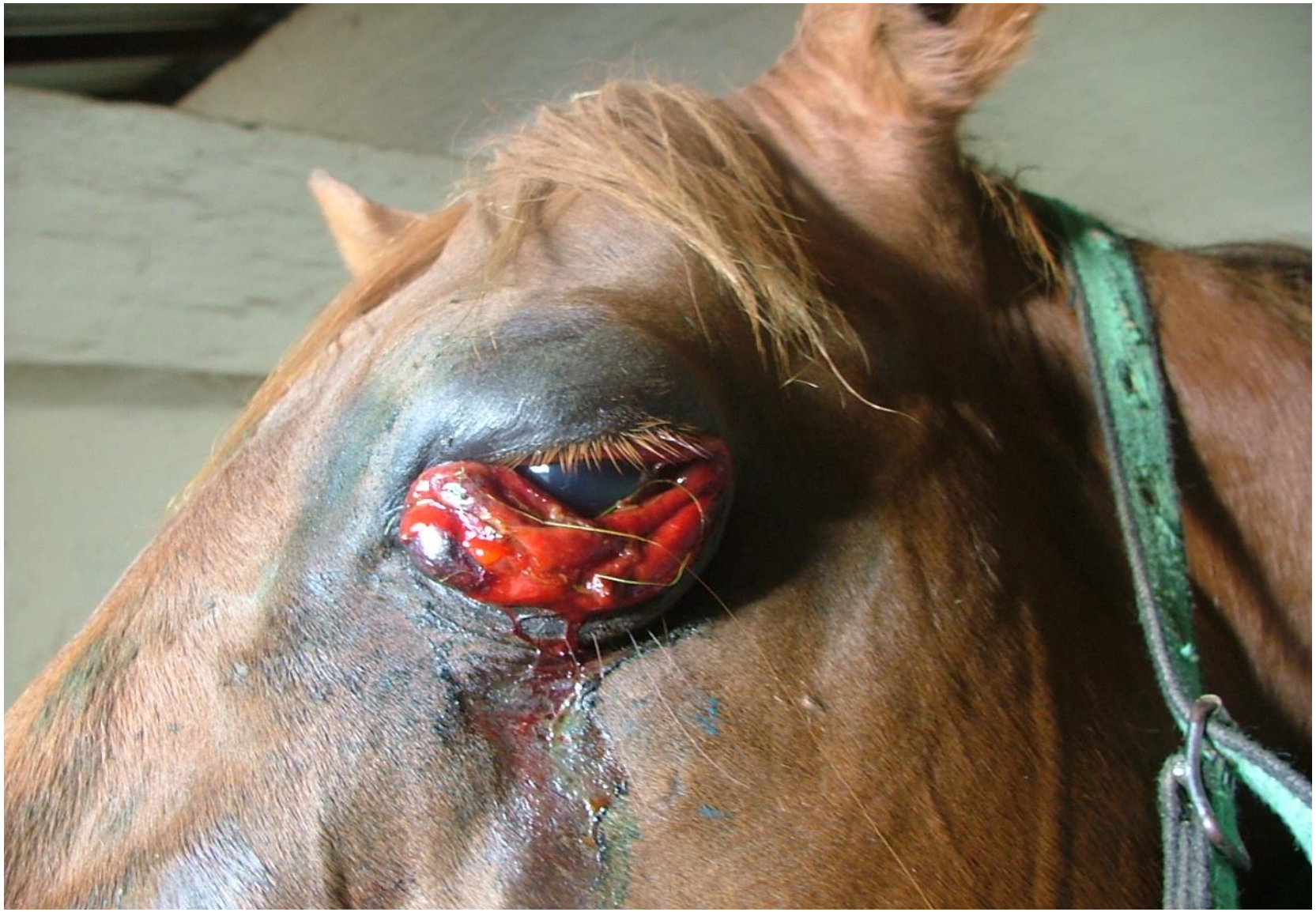
Pathology

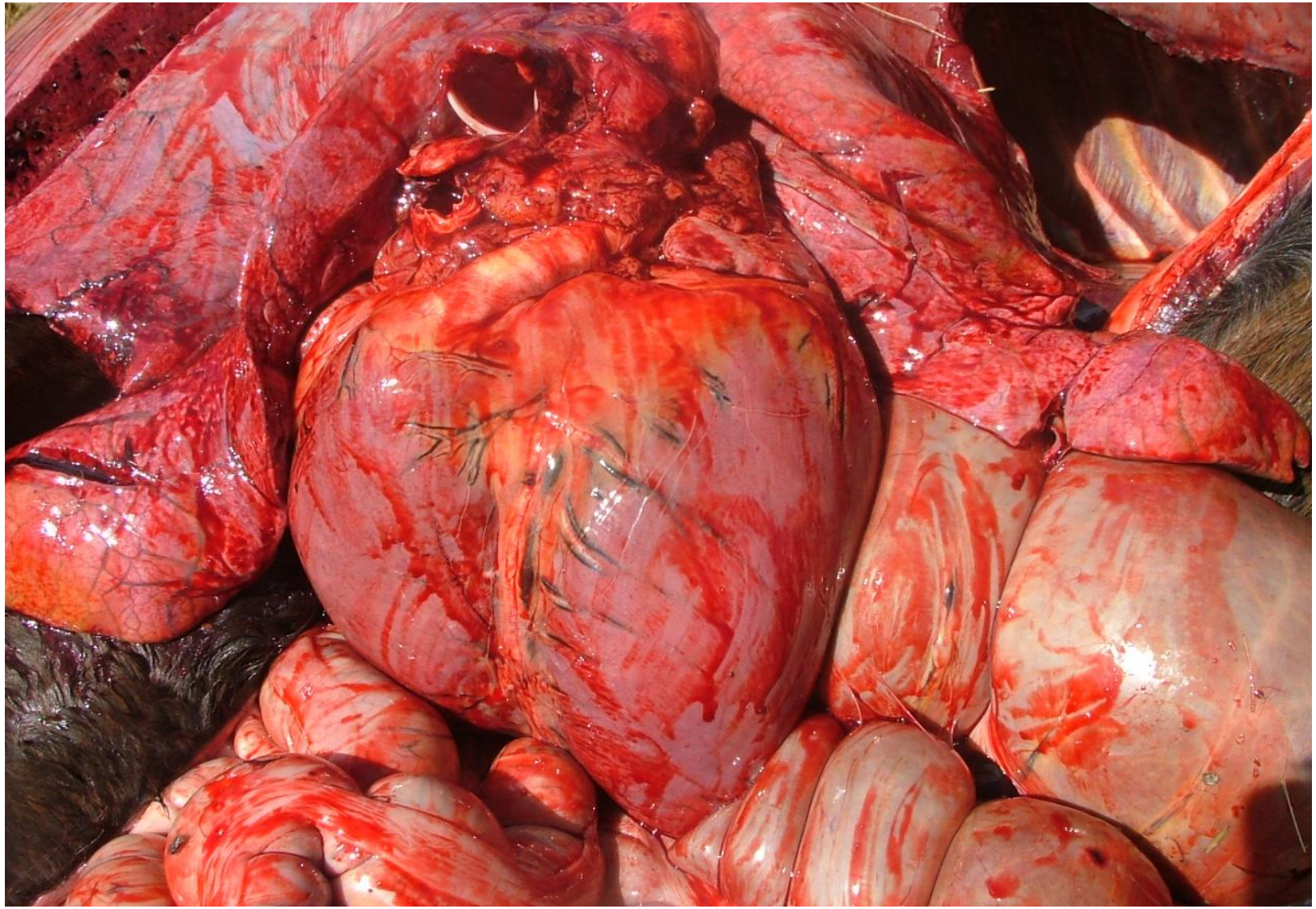
Three AHS forms exist

- Pulmonary
- Cardiac
- Mixed









Diagnostic Tools

Isolation of the virus on permanent cell lines (eg BHK)

Antibody ELISA from sera (group specific)

Antigen capture ELISA from tissue or isolated virus strains

PCR from tissue or isolated virus strains (group specific)

Intra-cerebral baby mouse inoculation and subsequent virus isolation/identification

Differential Diagnosis

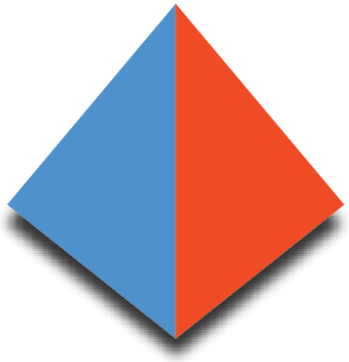
Equine Enscephalosis Virus (EEV)

Conclusion

The Onderstepoort attenuated vaccines (combination1with strains 1,3,4 and combination 2 with strains 2,6,7,8) produce ELISA antibodies, but would horses with high ELISA antibodies withstand a challenge?

Although horses develop high ELISA antibodies after one or two vaccinations, young horses should receive the complete recommended vaccine programme (3yrs) to ensure that they have developed antibodies against all 7 vaccine strains

Ideally foals should be tested by ELISA at 6 months and before they receive their first shot to ensure that only foals with no or very low maternal antibody levels are vaccinated



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