

# Equine infectious anaemia Fact Sheet

## 1. Disease overview

Equine infectious anaemia virus (EIAV) causes equine infectious anaemia, a persistent non-contagious viral disease that primarily affects members of the Equidae family. The disease is transmitted mechanically by biting insects and iatrogenically through blood-contaminated equipment. It presents with variable severity across three clinical forms (acute, chronic and inapparent). Infected equids frequently become lifelong viraemic carriers (Timoney, 2020; WOAAH, 2025b).

Equine infectious anaemia is a WOAAH-notifiable disease, listed in the European AHL under categories D, E.

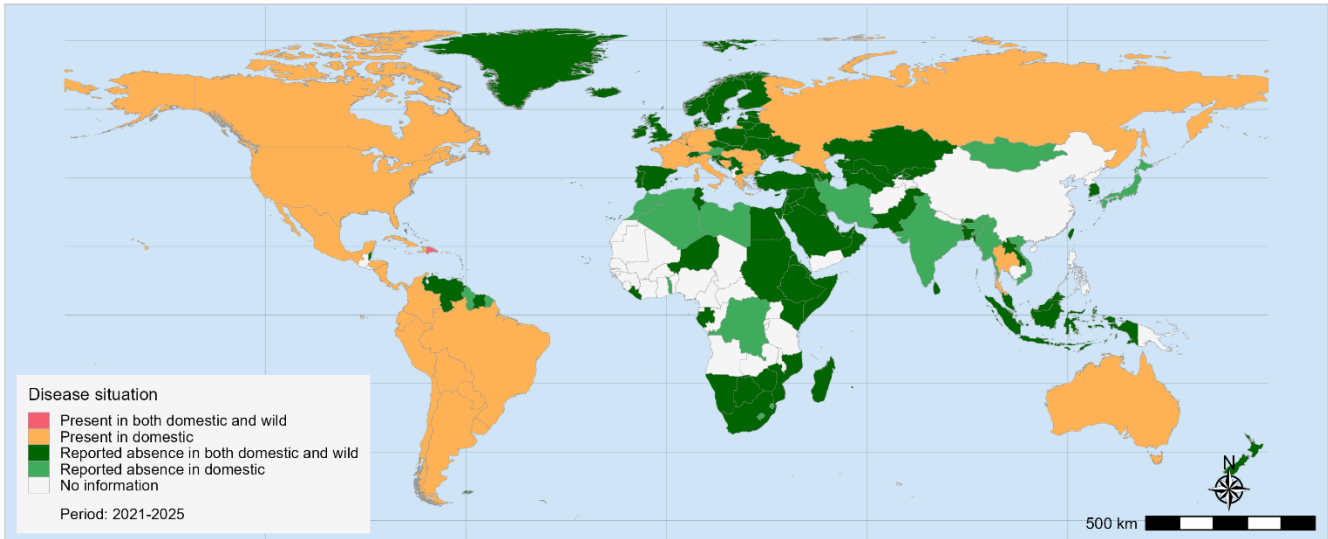
## 2. Agent

EIAV is an enveloped, single-stranded, positive-sense RNA virus in the Lentivirus genus of the Retroviridae family. The virion is pleomorphic, around 80–120 nm in diameter, with a diploid genome inside a conical core that encodes the structural proteins Gag, Pol and Env, as well as regulatory proteins Tat, Rev and S2. The surface glycoprotein gp90 determines viral antigenicity and is the main target of neutralizing antibodies. EIAV does not have clearly defined serotypes analogous to those of orbiviruses; rather, variation occurs through genetic drift in the encoded envelope proteins, which influences virulence, antigenicity, and immune evasion (Cook et al., 2013; WOAAH, 2025).

EIAV persists in infected equids as a lifelong viraemia and is highly stable in refrigerated blood, although it is inactivated by heat and common disinfectants (Cook et al., 2013; WOAAH, 2025).

## 3. Geographical Distribution

Equine infectious anaemia has a worldwide geographical distribution, but its prevalence varies significantly by region. The highest prevalence rates for EIAV are generally found in Central and South America. According to WAHIS the disease has been reported in Europe in the last 5 years (Figure 13). Up to date maps based on WAHIS are available in the online version of the Disease Profile (accessible via the button in the top right corner).



**Figure 1.** Geographical distribution of EIAV detected events (2021-2025), as reported to WOA. H.

## 4. Animal hosts

### 4.1. Susceptible hosts

Based on epidemiological knowledge of host–pathogen–vector interactions and outbreak reports, the main hosts of EIAV are equids. Equids were the only susceptible hosts identified by the EFSA’s systematic literature review (SLR) (Table 1).

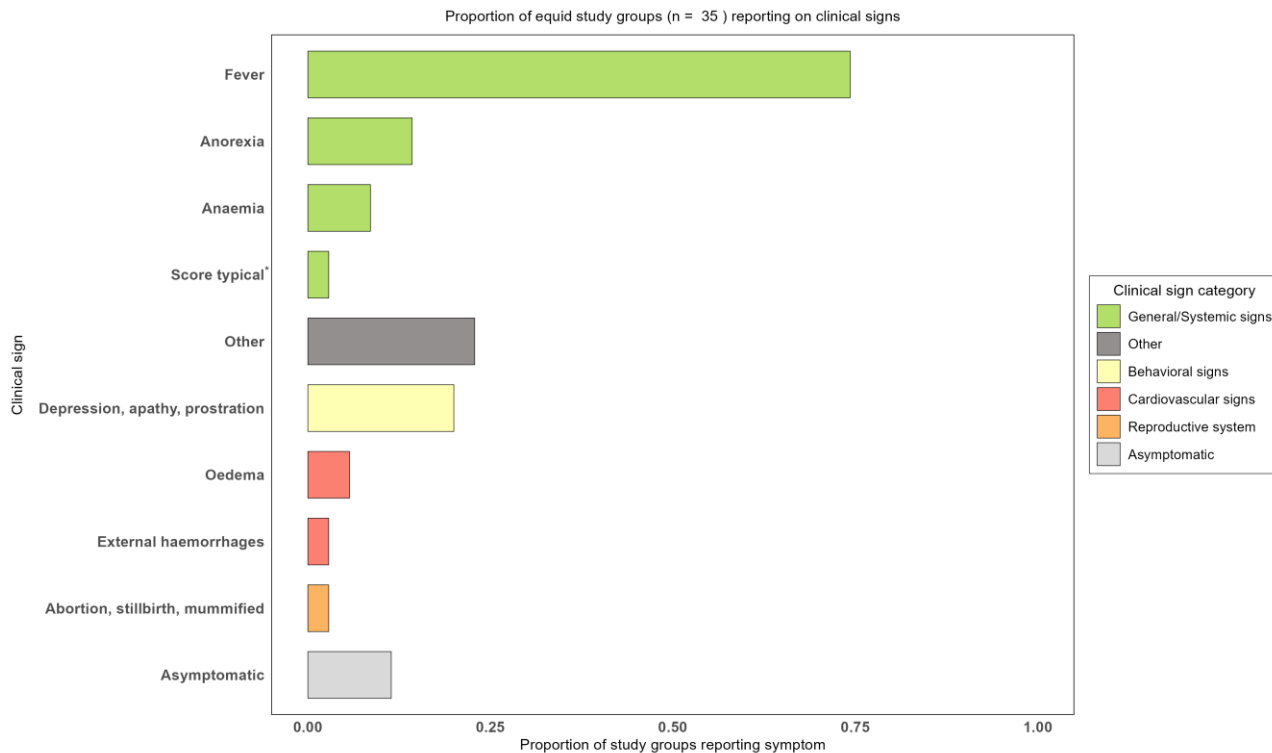
**Table 1.** Susceptible host species of Equine infectious anaemia virus.

The systematic literature review reported in the EIAV disease profile, identified the following susceptible species (updated until 31/12/2025, for references see online disease profile)	
<b>FIELD</b>	
Epidemiological studies carried out in the field	
<b>Pathogen was detected in the following animal species:</b>	
<ul style="list-style-type: none"> <li>No species specified</li> </ul>	
<b>Antibodies were detected in the following animal species:</b>	
<ul style="list-style-type: none"> <li>Equidae: <i>Equus caballus</i></li> </ul>	
<b>Outbreaks reported to WOA included the following species:</b>	
<ul style="list-style-type: none"> <li>Equidae: No species specified</li> </ul>	
<b>EXPERIMENTS</b>	
<b>Experimental studies demonstrated infection in:</b>	
<ul style="list-style-type: none"> <li>Equidae: <i>Equus caballus</i></li> </ul>	

### 4.2. Clinical Signs

All equids are susceptible to EIAV and can become lifelong carriers. Clinical disease is most frequently recognized in horses, while donkeys and mules often show milder or subclinical infection. Indeed, donkeys may remain largely asymptomatic despite infection, and mules may also carry the virus without overt signs (Spickler, 2022).

Outcomes of a systematic literature review on clinical signs in 35 study groups of equids are displayed in Figure 2. Predominantly general clinical signs were reported.



\*Score typical: recurrent fever. Study group count per equid species: Horse n = 33; Ass n = 2. The SLR was updated until 31/12/2025, for references see the online disease profile.

**Figure 2.** Clinical signs reported in the main hosts of EIAV.

Equine infectious anaemia occurs in several clinical patterns, influenced by virus strain, equid species and immune status. In horses there are three recognised clinical forms:

- Acute form: typically brief, lasting 1–3 days, and marked by sudden fever, depression, and severe thrombocytopenia; some horses may develop jaundice, petechiae, or epistaxis (Spickler, 2022). Although often mild and easily overlooked, rare peracute cases exhibit high fever, profound weakness, and uncontrolled viral replication leading to circulatory collapse and death (Timoney, 2020).
- Chronic form (recurrent): characterized by intermittent febrile episodes accompanied by depression, thrombocytopenia, anaemia, jaundice, petechiae on mucous membranes, dependent oedema, increased heart and respiratory rates, muscle weakness, and progressive weight loss (Timoney, 2020; Spickler, 2022). Episodes may be triggered by intercurrent disease, stress, heavy work, or immunosuppression (Spickler, 2022), with intervals ranging from days to months and severity varying widely among individuals (Timoney, 2020).
- Subclinical form (inapparent carrier state): the most common long-term outcome, in which horses remain clinically normal or exhibit only subtle signs such as transient fever or mild inappetence. These animals serve as reservoirs of infection despite the absence of overt disease (Timoney, 2020).

Donkeys and mules are generally less severely affected, often showing minimal or no clinical abnormalities unless infected with highly adapted strains (Spickler, 2022).

#### 4.2.1. Incubation Period

The incubation period of equine infectious anaemia is variable, typically ranging from 1 week to 45 days, with many naturally infected horses developing signs between 15 and 45 days (Timoney, 2020). In some cases, the period may extend beyond this range, and clinical onset can be delayed until animals' experience stress or concurrent illness that precipitates detectable disease (Spickler, 2022). Because early signs are often mild and transient, the true incubation period can be difficult to determine precisely.

Donkeys and mules, which frequently develop subclinical infections, may seroconvert without showing observable clinical signs, making their incubation period particularly challenging to define (Spickler, 2022).

#### 4.2.2. Morbidity and case fatality

Horses are highly susceptible to EIAV. In endemic areas, herd-level seroprevalence has been reported to reach up to 70% on some farms (Spickler, 2022). Experimental infections demonstrate the impact of virulence and dose: highly virulent strains or high-dose inoculation have produced mortality rates approaching 80%, whereas low-virulence strains or low-dose exposure may result in predominantly inapparent infection (Cook et al, 2013). In natural settings, fatality is generally low, with deaths occurring mainly in acute or peracute cases, while the majority of infected horses survive and transition into a lifelong inapparent carrier state (Cook et al, 2013; Timoney, 2020).

Mules and donkeys show lower morbidity and very low case fatality, with most infections remaining subclinical unless caused by highly adapted strains (Cook et al, 2013; Spickler, 2022; and references in the online version).

#### 4.2.3. Zoonotic Potential

EIAV is not known to infect humans under natural conditions.

## 5. Transmission

EIAV is primarily transmitted via biting flies which mechanically transfer the virus from infected to susceptible equids (Timoney, 2020; CFSPH, 2022; Cook et al., 2013). For more information on vector distribution, visit the *Vector* section in the online disease profile.

Direct transmission between horses through casual contact is considered rare, but iatrogenic transmission can occur through contaminated needles, surgical instruments, or blood transfusions (Timoney, 2020; CFSPH, 2022). Movement of infected animals can facilitate long-distance spread of the virus. Seasonal and environmental factors influence vector abundance and activity, contributing to the episodic occurrence of outbreaks (Cook et al., 2013). Adult vectors can survive in favourable conditions, allowing EIAV to persist within populations even outside peak transmission seasons (Spickler, 2022).

## 6. Diagnostic tests

WOAH-recommended test (WOAH, 2025b) for agent detection is virus isolation, although isolation from the blood of infected animals is only successful during the short periods of viraemia. Molecular assays such as RT-PCR can also detect viral RNA or proviral DNA and are considered complementary tools, particularly in animals with low or intermittent viraemia.

For immune response detection, the recommended tests are Agar Gel Immunodiffusion (AGID, Coggins test) and ELISA. The AGID test remains the reference method for confirming exposure and detecting antibodies, while ELISA is widely used for large-scale screening and surveillance. Because most infections in adult equids are subclinical, serology is the primary tool for identifying past infection at the herd level. Detection of antibodies in pre-colostral foetal fluids or tissues from stillborn or aborted fetuses provides strong evidence of in utero infection (WOAH, 2025b).

Table 2 presents data on the sensitivity and specificity of diagnostic tests collected through [EFSA's systematic literature review](#); reported values correspond to the median sensitivity and specificity when multiple study groups investigated the same test and are only included when explicitly stated in the publications.

**Table 1.** Median sensitivity and specificity of tests to detect EIAV/EIAV antibodies reported in literature included in the systematic literature review.

Target	Test	Species	Sensitivity	N animal groups	Specificity	N animal groups	References
<b>Antigen</b>	AGID	Equines	97.5%	2	-	-	Oliveira et al. 2013
<b>Antigen</b>	AGID	Horse	100%	1	100%	1	Piza et al. 2007
<b>Antigen</b>	ELISA	Horse	96.1%	3	96.4%	3	Du et al. 2018; Reis et al. 2012; Piza et al. 2007
<b>Nucleic Acid</b>	Real-time PCR	Horse	43.8%	1	99.1%	1	Cook et al. 2019
<b>Nucleic Acid</b>	Reverse transcription-insulated isothermal PCR	Horse	80.8%	2	99.1%	1	Cook et al. 2019
<b>Antibody</b>	ELISA	Donkey	94.6%	2	96.1%	2	Villa-Mancera et al. 2024; Naves et al. 2019
<b>Antibody</b>	ELISA	Horse	99.6%	13	97.6%	13	Ostuni et al. 2025; Odio et al. 2025; Villa-Mancera et al. 2024; Russi et al. 2023; Rodríguez-Domínguez et al. 2021; Naves et al. 2019; Fontes et al. 2018; Alvarez et al. 2015
<b>Antibody</b>	ELISA	Mule	100%	1	91%	1	Naves et al. 2019
<b>Antibody</b>	B-ELISA	Horse	100%	1	97.0%	1	Hu et al., 2023
<b>Antibody</b>	C-ELISA	Horse	98%	5	100%	5	Espasandin et al. 2021; Nardini et al. 2017; Nardini et al. 2016
<b>Antibody</b>	I-ELISA	Equines	98%	2	99.9%	2	Ostuni et al. 2023; Scicluna et al. 2018
<b>Antibody</b>	I-ELISA	Horse	98%	3	100%	3	Nardini et al. 2017
<b>Antibody</b>	Fluorescence polarization	Horse	93.7%	2	99%	2	Espasandin et al. 2021; Tencza et al. 2000

## 7. Prevention and control

### 7.1. Vaccination

No effective, globally accepted vaccines against EIAV are currently available. An attenuated live vaccine was developed and used in China from the 1970s through the 1980s, but this vaccine is no longer in use and has been discontinued worldwide (WOAH, 2025; Thieulent et al., 2025).

In the European Union, as elsewhere, there are no licensed or authorized EIAV vaccines, and control strategies focus on serological surveillance (e.g. via the Coggins/AGID test) and biosecurity to prevent infection (WOAH, 2025).

### 7.2. Treatment

There is currently no specific antiviral treatment or cure for equine infectious anaemia. Management of infected equids focuses on supportive care, including rest, stress reduction, and treatment of secondary infections or complications such as anaemia or oedema (Spickler, 2022; Cook et al., 2013).

## 8. References

- Alvarez, I., Cipolini, F., Wigdorovitz, A., Trono, K., Barrandeguy, M.E. (2015). The efficacy of ELISA commercial kits for the screening of equine infectious anemia virus infection *Revista Argentina de Microbiología*, 47(1), 25
- Cook RF, Leroux C, Issel CJ (2013). Equine infectious anemia and equine infectious anemia virus in 2013: a review. *Veterinary microbiology*. 2013 Nov 29;167(1-2):181-204. <https://doi.org/10.1016/j.vetmic.2013.09.031>
- Cook, R.F., Barrandeguy, M., Lee, P.Y.A., Tsai, C.-F., Shen, Y.-H., Tsai, Y.-L., Chang, H.F.G., Wang, H.T.T., Balasuriya, U.B.R. (2019). Rapid detection of equine infectious anaemia virus nucleic acid by insulated isothermal RT-PCR assay to aid diagnosis under field conditions *Equine Veterinary Journal*, 51(4), 489
- Du, C., Hu, Z., Hu, S.-D., Lin, Y.-Z., Wang, X., Li, Y.-J. (2018). Development and Application of an Indirect ELISA for the Detection of gp45 Antibodies to Equine Infectious Anemia Virus *Journal of Equine Veterinary Science*, 62, 76
- Espasandin, A.G., Cipolini, M.F., Forletti, A., Díaz, S., Soto, J., Martínez, D.E., Storani, C.A., Monzón, N.M., Beltrame, J.I., Lucchesi, E. (2021). Comparison of serological techniques for the diagnosis of equine infectious anemia in an endemic area of Argentina *Journal of Virological Methods*, 291
- Fontes, K.F.L.P., Silva Júnior, L.C., Nascimento, S.A., Chaves, D.P., Pinheiro Junior, J.W., Freitas, A.C., Castro, R.S., Jesus, A.L.S. (2018). Enzyme-linked immunosorbent assay and agar gel immunodiffusion assay for diagnosis of equine infectious anemia employing p26 protein fused to the maltose-binding protein *Archives of Virology*, 163(10), 2871
- Hu, Z., Guo, K., Du, C., Sun, J., Naletoski, I., Chu, X., Lin, Y., Wang, X., Barrandeguy, M., Miño, M. (2023). Development and evaluation of a blocking ELISA for serological diagnosis of equine infectious anemia *Applied Microbiology and Biotechnology*, 107(10), 3305
- Naves, J.H.F.F., Oliveira, F.G., Bicalho, J.M., Santos, P.S., Machado-De-Ávila, R.A., Chavéz-Olórtegui, C., Leite, R.C., Reis, J.K.P. (2019). Serological diagnosis of equine infectious anemia in horses, donkeys and mules using an ELISA with a gp45 synthetic peptide as antigen *Journal of Virological Methods*, 266, 49
- Nardini, R., Autorino, G.L., Ricci, I., Frontoso, R., Rosone, F., Simula, M., Scicluna, M.T. (2016). Validation according to OIE criteria of a monoclonal, recombinant p26-based, serologic competitive enzyme-linked immunosorbent assay as screening method in surveillance programs for the detection of Equine infectious anemia virus antibodies *Journal of Veterinary Diagnostic Investigation*, 28(2), 88
- Nardini, R., Autorino, G.L., Issel, C.J., Cook, R.F., Ricci, I., Frontoso, R., Rosone, F., Scicluna, M.T. (2017). Evaluation of six serological ELISA kits available in Italy as screening tests for equine infectious anaemia surveillance *BMC Veterinary Research*, 13(1)
- Odio, A., González, L.I.C., Alfonso, D.M., Guevara-Hernández, F., la O-Arias, M.A., Zayas, M.P., Ríos, M.Á.B. (2025). Serodiagnosis of equine infectious anemia by indirect ELISA based on a novel synthetic peptide derived from gp45 glycoprotein *Veterinary Research Communications*, 49(3)
- Oliveira, F.G., Diniz, R.S., Camargos, M.F., de Oliveira, A.M., Rajao, D.D.S., Braz, G.F., Leite, R.C., Reis, J.K.P. (2013). Comparative study of agar gel immunodiffusion (AGID) protocols for the diagnosis of equine infectious anemia in Brazil *Semina: Ciências Agrárias*, 34(6 SUPPL. 2), 3909

- Ostuni, A., Iovane, V., Monné, M., Crudele, M.A., Scicluna, M.T., Nardini, R., Raimondi, P., Frontoso, R., Boni, R., Bavoso, A. (2023). A double-strain TM (gp45) polypeptide antigen and its application in the serodiagnosis of equine infectious anemia *Journal of Virological Methods*, 315
- Piza, A.S.T., Pereira, A.R., Terreran, M.T., Mozzer, O., Tanuri, A., Brandão, P.E., Richtzenhain, L.J. (2007). Serodiagnosis of equine infectious anemia by agar gel immunodiffusion and ELISA using a recombinant p26 viral protein expressed in *Escherichia coli* as antigen *Preventive Veterinary Medicine*, 78(3-4), 239
- Reis, J.K.P., Diniz, R.S., Haddad, J.P.A., Ferraz, I.B.F., de Carvalho, A.F., Kroon, E.G., Ferreira, P.C.P., Leite, R.C. (2012). Recombinant envelope protein (rgp90) ELISA for equine infectious anemia virus provides comparable results to the agar gel immunodiffusion *Journal of Virological Methods*, 180(1-2), 62
- Rodríguez-Domínguez, M.C., Montes-De-Oca-Jiménez, R., Vázquez-Chagoyán, J.C., Pliego, A.B., Varela-Guerrero, J.A., Coroas-González, L.I., Bernabé, S.L. (2021). Evaluation of Equine Infectious Anemia Virus by the Indirect Enzyme-linked Immunosorbent Assay EIA-LAB as Screening Tools in Mexico *Journal of Equine Veterinary Science*, 98
- Scicluna, M.T., Autorino, G.L., Nogarol, C., Ricci, I., Frontoso, R., Rosone, F., Nardini, R. (2018). Validation of an indirect ELISA employing a chimeric recombinant gag and env peptide for the serological diagnosis of equine infectious anemia *Journal of Virological Methods*, 251, 111
- Spickler, Anna Rovid. 2022. Equine Infectious Anemia. Retrieved from. [https://www.cfsph.iastate.edu/Factsheets/pdfs/equine\\_infectious\\_anemia.pdf](https://www.cfsph.iastate.edu/Factsheets/pdfs/equine_infectious_anemia.pdf)
- Tencza, S.B., Islam, K.R., Kalia, V., Nasir, M.S., Jolley, M.E., Montelaro, R.C. (2000). Development of a fluorescence polarization-based diagnostic assay for equine infectious anemia virus *Journal of Clinical Microbiology*, 38(5), 1854
- Thieulent CJ, Carossino M, Reis JK, Vissani MA, Barrandeguy ME, Valle-Casuso JC, Balasuriya UB (2025). Equine infectious anemia virus worldwide prevalence: A 24-year retrospective review of a global equine health concern with far-reaching implications. *Veterinary Microbiology*. 2025 May 8:110548. DOI: [10.1016/j.vetmic.2025.110548](https://doi.org/10.1016/j.vetmic.2025.110548)
- Timoney PJ. (2020) Equine Infectious Anemia in Merck Veterinary Manual. <https://www.msdsvetmanual.com/generalized-conditions/equine-infectious-anemia/equine-infectious-anemia>
- Villa-Mancera, A., Villegas-Bello, L., Campos-García, H., Ortega-Vargas, S., Cruz-Aviña, J., Patricio-Martínez, F., Olivares-Pérez, J., Utrera-Quintana, F. (2024). Prevalence of equine infectious anemia virus in horses and donkeys determined by comparison of ELISA and AGID in Mexico *Arquivo Brasileiro de Medicina Veterinária e Zootecnia*, 76(2), 180
- WOAH (World Organisation for Animal Health), 2025. Manual of Diagnostic Tests and Vaccines for Terrestrial Animals. Available at <https://www.woah.org/en/what-we-do/standards/codes-and-manuals/>. Accessed on November 22, 2025