EXTERNAL REFERENCES

ID SCREEN CCHF DOUBLE ANTIGEN MULTI-SPECIES

Last update: August 2023

Publications / References:

RUMINANTS

1)Atim S.A. *et al.* (2023). **Prevalence of Crimean-Congo haemorrhagic fever in livestock following a confirmed human case in Lyantonde district, Uganda**. Parasites & Vectors, 16(1), 1-10.	• Outbreak investigation in the animal population following the death from CCHF of a cattle trader: blood samples from 117 cattle and 93 goats were analyzed using the ID Screen CCHF Double Antigen Multi-species. • *Results*: CCHFV antibodies were detected in 110/117 (94.0%) cattle and 83/93 (89.3%) goats.			Epidemiological study		
2)Babaoglu A. R. *et al.* (2023). **Crimean-Congo Hemorrhagic Fever Virus Infection in Domestic Ruminants in Van Province, a Non-endemic Region in Turkey**. Indian Journal of Animal Research, 1, 6.	• 491 cattle, sheep, and goats sera were tested using the ID Screen CCHF Double Antigen Multi-species. • *Results*: The prevalence of CCHFV-specific antibodies in animals was found to be 36.4%. The seroprevalence values detected were 11.6%, 64.45%, and 81.63% in cattle, sheep, and goats.			Epidemiological study		
3)Matthews J. *et al*. (2023). **Serological Prevalence of Crimean–Congo Hemorrhagic Fever Virus Infection in Small Ruminants and Cattle in The Gambia**. Pathogens, 12, 749.	• 1413 sera from livestock (small ruminants and cattle) were tested in duplicate using the ID Screen CCHF Double Antigen Multi-species. • *Results*: In sheep, an overall anti-CCHFV antibody prevalence of 18.9, goats 9.0%, and cattle 59.9%) was detected. ***The significantly high level of seroprevalence detected in local cattle corroborates reports of cattle being good sentinels and important reservoirs for CCHFV infection transmission in endemic regions and presents a high occupational risk of zzonotic transmission to local herdsmen.* (sic)**			Epidemiological study		

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4)Simo Tchetgna H. *et al.* (2023) **Molecular and serological evidence of Crimean-Congo hemorrhagic fever orthonairovirus prevalence in livestock and ticks in Cameroon**. Front. Cell. Infect. Microbiol. 13:1132495.	• A cross-sectional study was carried out in two livestock markets to collect blood from cattle (n=441), sheep (147), and goats (n=168). CCHFV-specific antibodies were detected using the ID Screen CCHF Double Antigen Multi-species and confirmed using a modified seroneutralization test. • *Results*: The seroprevalence of CCHFV was 61.77% for all animals, with the highest rate found in cattle (98.18%) followed by sheep, 15.65%), and goats (6.55%). 87.5%, 80%, and 80% of the positive sera were confirmed in bovine, ovine, and caprine respectively, using seroneutralization assays.	Correlation with other techniques		Epidemiological study		
5)Bratuleanu B. *et al.* (2022). **Seroprevalence of Crimean-Congo Hemorrhagic Fever Among Small Ruminants from Southern Romania**. Vector-Borne and Zoonotic Diseases, 22(7), 397-401.	• Serological study in sheep (n=181) and goats (n=71) using the ID Screen CCHF Double Antigen Multi-species. In addition, 96 serum samples from sheep from France were used as a reference population, as there is no evidence of CCHFV circulation in continental France. • *Results*: Overall seroprevalence in small ruminants was 37.7%; estimated seroprevalence in sheep was 29.8% and 57.7% in goats. A significant difference was observed between Romanian sheep and the reference population from France.			Epidemiological study		
6)Duscher G. G. *et al.* (2022). ***Hyalomma spp*. in Austria—The Tick, the Climate, the Diseases and the Risk for Humans and Animals**. Microorganisms, 10(9), 1761.	• Serological investigation on 897 cattle sera tested using the ID Screen CCHF Double Antigen Multi-species in a CCHF-free area. • *Results*: None of the 897 sera delivered a positive result for CCHF antibodies. ***Although no positive cattle were identified in this study, the results are of great importance while observing the epidemiological situation. These data represent the baseline and can be compared to future monitoring studies.*** **(sic)**			Epidemiological study		Specificity data
7)Dzikwi-Emennaa A.A. *et al.* (2022). **Detection of Crimean-Congo Hemorrhagic Fever Virus Antibodies in Cattle in Plateau State, Nigeria**. Viruses 2022, 14, 2618.	• Samples from 184 pastoral cattle were screened using the ID Screen CCHF Double Antigen Multi-species. • *Results*: overall seropositivity of 30.4%.			Epidemiological study		

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8)Fanelli A. *et al*. (2022). **First serological evidence of Crimean–Congo haemorrhagic fever virus in transhumant bovines in Italy**. Transboundary and Emerging Diseases.	• Detection of anti-CCHFV antibodies in transhumant bovines: sera from 794 cattle were screened using the ID Screen CCHF Double Antigen Multi-species. • *Results*: Animal-level and herd-level seroprevalences detected were 1.89% and 29.63%, respectively.			Epidemiological study		
9)González Gordon L. *et al*. (2022), **Seroepidemiology of Crimean-Cong Haemorrhagic Fever among cattle in Cameroon: Implications from a One Health perspective**, PLoS Neglected Tropical Diseases, vol. 16, no. 3, e0010217.	• CCHFV serological survey in pastoral (n=1498) and dairy cattle (n=60) using the ID Screen CCHF Double Antigen Multi-species. • *Results*: Overall seroprevalence was 56.0% and 6.7% among pastoral and dairy cattle, respectively.			Epidemiological study		
10)Lule S. A. *et al*. (2022). **Widespread exposure to Crimean-Congo haemorrhagic fever in Uganda might be driven by transmission from *Rhipicephalus* ticks: Evidence from cross-sectional and modelling studies.** Journal of Infection, 85(6), 683-692.	• 419 sera from livestock were tested using the ID Screen CCHF Double Antigen Multi-species, while 478 human sera from abattoir workers were tested using 2 commercial assays (for detection of IgG and IgM antibodies, respectively). • *Results*: Cattle and humans had a seroprevalence of 69 ·7% and 10.3%, respectively. **Eco-epidemiology of CCHF is needed through testing sera from livestock, wild mammals, and ticks in pastoral and agricultural ecosystems including cattle markets, farms, and national parks in order to control CCHFV circulation in the human population.**			Epidemiological study		
11)Lysholm S. *et al*. (2022). **Seroepidemiology of selected transboundary animal diseases in goats in Zambia**. Preventive Veterinary Medicine, 206, 105708.	• 962 samples from goats were tested using the ID Screen CCHF Double Antigen Multi-species. • *Results*: Prevalence = 3.3%.			Epidemiological study		

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12)Satrovic L. *et al*. (2022). **First evidence of Crimean-Congo haemorrhagic fever virus circulation in Bosnia and Herzegovina. Veterinary Medicine and Science**, 8(3), 1271-1275.	• 176 sheep sera were tested using the ID Screen CCHF Double Antigen Multi-species. Reactive sera were further complementary tested by adapted commercial indirect immunofluorescence assay (IFA) using FITC-conjugated protein G instead of anti-human immunoglobulins. • *Results*: CCHFV-specific antibodies were detected in 17 (9.66%) animals. All negative sera were determined as negative by both tests, while 13 out of 17 ELISA-positive reactors were also determined as unambiguously positive by the IFA test.	Correlation with other techniques		Epidemiological study		
13)Zhabari Z. and Xhekaj B. (2022). **Serological data suggest the spread of Crimean-Congo hemorrhagic fever virus in domestic animals in Kosovo-a short communication**. Veterinarski arhiv, 92(2), 155-160.	• Blood sera from 385 animals (285 cattle, 87 sheep, and 13 goats) were tested using the ID Screen CCHF Double Antigen Multi-species. • *Results*: Overall seroprevalence was 17.14%.			Epidemiological study		
14)Altaliby M. A. S. *et al.* (2021). Seroprevalence **Of Crimean-Congo Haemorrhagic Fever In Sheep And Goats In Iraq.** Bulgarian Journal of Veterinary Medicine, ISSN 1311-1477.	• 120 sheep and 80 goat sera were tested using the ID Screen CCHF Double Antigen Multi-species. • *Results*: Serological evidence for CCHF infection was found in 28/200 samples (14%), which included 23/120 sheep samples (19.16%) and 5/ 80 goat samples (6.25%).			Epidemiological study		
15)Balinandi S. *et al*. (2021). **Serological and molecular study of Crimean-Congo Hemorrhagic Fever Virus in cattle from selected districts in Uganda**. Journal of Virological Methods 290-114075.	• 500 cattle sera samples were analyzed for CCHFV antibodies using an in-house Elisa and the ID Screen CCHF Double Antigen Multi-species, in parallel with IFA. • *Results*: CCHFV seropositivity was 12.6 % (n = 63) and 75.0 % (n = 375) with the in-house and IDVet ELISAs, respectively. The IFA results were more comparable to IDVet (K coefficient = 0.88, p = <0.01) than to in-house (K coefficient = 0.32, p = 0.02). **The ID Screen CCHF Double Antigen Multi-species is useful for detecting anti-CCHFV antibodies in cattle and is well correlated with IFA.**	Correlation with other techniques		Epidemiological study		

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16)Blanco-Penedo I. *et al.* (2021). **Seroepidemiology of Crimean-Congo Hemorrhagic Fever Virus (CCHFV) in Cattle across Three Livestock Pastoral Regions in Kenya**. Dairy 2, 425–434.	• seroepidemiological study of the sera of 148 cattle, 23 sheep, and 17 goats using the ID Screen CCHF Double Antigen Multi-species. • *Results*: Overall, 31.5% CCHFV seropositivity was observed.			Epidemiological study		
17)Esmaeel S.A. *et al.* (2021). **Seroprevalence of Crimean Congo Hemorrhagic Fever in cows by ELISA in Mosul city**. Iraqi Journal of Veterinary Sciences, Vol. 35, No. 4 (803-807)	• Seroprevalence study on cows (n=184) using the ID Screen CCHF Double Antigen Multi-species. • *Results*: 40 out of the 184 sampled animals revealed positive results indicating seroprevalence of 21.7%.			Epidemiological study		
18)Hartlaub J. *et al*. (2021). **Cross-Reaction or Co-Infection? Serological Discrimination of Antibodies Directed against Dugbe and Crimean-Congo Hemorrhagic Fever Orthonairovirus in Nigerian Cattle**. Viruses 13, 1398.	• 300 Nigerian cattle sera (150 CCHFV seropositive and 150 CCHV seronegative samples) with CCHF status validated using serological assays including the ID Screen CCHF Double Antigen Multi-species were screened for DUGV antibodies via N protein-based ELISAs, indirect immunofluorescence, and neutralization assays. • *Results*: no correlation between the ID Screen CCHF Double Antigen Multi-species and the DUGV ELISA results (cross-tabulation and comparative ROC analyses); statistics have not shown a significant association for DUGB Elisa and the ID Screen CCHF Double Antigen Multi-species while cross-reactions were observed when using IFA **The ID Screen CCHF Double Antigen Multi-species does not present cross-reactions with Dugbe virus antibodies.**	Correlation with other techniques		Epidemiological study		Exclusivity
19)Hartlaub J. *et al*. (2021). **Deciphering Antibody Responses to Orthonairoviruses in Ruminants.** Microorganisms 2021, 9, 1493	• Experimental infection studies involving sheep (n=13) and cattle (n=5) with Nairobi Sheep Disease Virus (NSDV); all the sera were seropositive in NSDV and were run in three different CCHFV ELISA systems including the ID Screen CCHF Double Antigen Multi-species and one indirect immunofluorescence test. • *Results:* All sera were negative with the ID Screen CCHF Double Antigen Multi-species with one exception, one hyperimmunized calf tested positive with all of the assays whereas significant cross-reactivities were observed in IFA. **The ID Screen CCHF Double Antigen Multi-species does not present cross-reactions with Nairobi Sheep Disease Virus.**	Correlation with other techniques		Epidemiological study		Exclusivity

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20)Khbou M.K. *et al.* (2021). **Presence of antibodies to Crimean Congo haemorrhagic fever virus in sheep in Tunisia, North Africa.** VetMed Sci. 1–7	• 270 sheep were screened using the ID Screen CCHF Double Antigen Multi-species in October 2019, after a peak activity of *Hyalomma* ticks; sera of the same animals taken at different periods between April 2018 and July 2019 were also used to obtain comparative results; positive sera were tested using a virus neutralization test (VNT). • *Results:* Three out of 270 tested sera were seropositive to CCHFV. The seropositive ewe no. 1 showed a high ELISA titer (115%). The seropositive ewes no. 2 and no. 3 showed ELISA titers of 33.60% and 34.15%, respectively. When testing sera collected prior to October 2019, only ewe no. 1 displayed high ELISA titers (>110%). The VNT demonstrated that the serum of ewe no. 1 had a distinct titer as ND50 (50% neutralizing dose) of 1:64. In contrast, the sera of ewes no. 2 and no. 3 showed no such neutralizing effect. **Because CCHFV viremia is short and of low intensity in livestock, the ID Screen CCHF Double Antigen Multi-species offers the best alternative to detect CCHFV antibodies in sheep and is easy to implement in laboratories with limited resources.**	Correlation with other techniques		Epidemiological study		
21)Obanda V. *et al.* (2021). **Livestock Presence Influences the Seroprevalence of Crimean Congo Hemorrhagic Fever Virus on Sympatric Wildlife in Kenya.** Vector-Borne And Zoonotic Diseases, Volume 21, Number 10	• Seroprevalence on 191 buffalo and 139 cattle using the ID Screen CCHF Double Antigen Multi-species. • *Results*: Seroprevalence for buffalo: 75.3%; seroprevalence for cattle: 28.1%.			Epidemiological study		
22)Phonera M. C. *et al.* (2021). **Seroprevalence and Risk Factors of Crimean-Congo Hemorrhagic Fever in Cattle of Smallholder Farmers in Central Malawi.** Pathogens 10, 1613.	• Seroprevalence study on cattle (n=416) using the ID Screen CCHF Double Antigen Multi-species. • *Results*: Seroprevalence = 46.9%.			Epidemiological study		

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23)Zouaghi K. *et al.* (2021). **First Serological Evidence of Crimean-Congo Hemorrhagic Fever Virus and Rift Valley Fever Virus in Ruminants in Tunisia.** Pathogens, 10, 769.	• 879 serum samples from cattle, sheep, and goats were tested for CCHFV antibodies with the ID Screen CCHFDA Multi-species and IFA. • *Results*: Among 97 sera detected positive by CCHFV ELISA, 76 samples were confirmed positive by IFA. In contrast, all inconclusive ELISA samples (n = 6) were tested negative by IFA. The overall seroprevalence of CCHFV antibodies was 8.6%. **The use of both the ID Screen CCHFDA Multi-species and IFA are suitable to confirm the presence of anti-CCHFV IgG antibodies (greatly reducing the likelihood of false positive results).**	**Correlation with other techniques**		Epidemiological study		
24)Grech-Angelini S. *et al*. (2020). **Crimean-Congo Hemorrhagic Fever Virus Antibodies among Livestock on Corsica, France, 2014–2016.** Emerging Infectious Diseases; 26(5):1041-1044	• Serologic survey for CCHFV antibodies in livestock (cattle, sheep, and goats; N = 3,890) with the ID Screen CCHF Double Antigen Multi-species. PPRNT was then applied on 35 positive and 5 negative sera to confirm the serological status and detect possible immune cross-reactions with the Hazara virus and Dugbe virus. • *Results:* Overall estimated seroprevalence was 9.1%. Of 35 ELISA-positive serum samples tested, none showed neutralizing antibodies against Hazara and Dugbe viruses, and no ELISA-negative serum sample showed neutralizing antibodies against CCHFV, Hazara virus, or Dugbe virus. Of 35 ELISA-positive serum samples, 23 had neutralizing antibodies against CCHFV. **The ID Screen CCHF Double Antigen Multi-species does not present cross-reactions with Hazara and Dugbe viruses.**	**Correlation with other techniques**		**Epidemiological study**		**Performance evaluation**
25)Hartlaub J. *et al*. (2020). **Sheep and Cattle Are Not Susceptible to Experimental Inoculation with Hazara Orthonairovirus, a Tick-Borne Arbovirus Closely Related to CCHFV.** Microorganisms 8, 1927.	• One calf and one sheep were hyper-immunized with inactivated Hazara virus, and antisera were tested using the ID Screen CCHF Double Antigen Multi-species and other serological methods. • *Results:* The ID Screen CCHF Double Antigen Multi-species was clearly able to discriminate between HAZV and CCHFV antibodies, while cross-reactivities between these viruses in iIFA and WB may occur **The ID Screen CCHF Double Antigen Multi-species does not present cross-reactions with Hazara virus.**	**Correlation with other techniques**		**Epidemiological study**	**Experimental infection**	**Performance evaluation**

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CAMELIDS

26)Lado S. *et al*. (2022). **Crimean–Congo Hemorrhagic Fever Virus Past Infections Are Associated with Two Innate Immune Response Candidate Genes in Dromedaries.** Cells, 11, 8.	• seroprevalence study on **dromedaries** (n=121) using the ID Screen CCHF Double Antigen Multi-species. • *Results*: prevalence = 70%.		Test of particular species	Epidemiological study		
27)Camp J.V. *et al*. (2021). **Association of Dromedary Camels and Camel Ticks with Reassortant Crimean-Congo Hemorrhagic Fever Virus, United Arab Emirates**. Emerging Infectious Diseases Vol. 27, No. 9.	• cross-sectional serologic survey of CCHFV in dromedary **camels**, cattle, goats, and sheep using the ID Screen CCHF Double Antigen Multi-species. • *Results*: antibodies to CCHFV were found in 72/90 camels, 7/51 cattle, 1/45 goats, and 4/55 sheep.		Test of particular species	Epidemiological study		
28)Bouaicha F. *et al*. (2020). **Epidemiological investigation of Crimean-Congo haemorrhagic fever virus infection among the one-humped camels (*Camelus dromedarius*) in southern Tunisia Ticks and Tick-borne Diseases.** Ticks and Tick-borne Diseases, Vol 12, Issue 1.	• 273 **dromedaries** were tested in parallel with the ID Screen CCHF Double Antigen Multi-species and a camel-specific indirect in-house CCHFV ELISA developed by the FLI. When the results of the two serological tests were concordant, the result was admitted. In cases of inconsistent or inconclusive findings, an indirect immune-fluorescence assay was used as a confirmatory test. • *Results:* Of 273 tested sera, 245 were positive for anti-CCHFV antibodies (seroprevalence 87%); the results for the in-house ELISA and the ID Screen CCHF Double Antigen Multi-species showed a substantial concordance (K = 0.74). **The ID Screen CCHF Double Antigen Multi-species is useful for detecting anti-CCHFV antibodies in camels.**	Correlation with other techniques	Test of particular species	Epidemiological study		
29)Zohaib A. *et al*. (2020). **Crimean-Congo Hemorrhagic Fever Virus in Humans and Livestock, Pakistan, 2015–2017.**Emerging Infectious Diseases 26 (4).	• 1838 sera from domestic animals (311 buffaloes, 480 **camels**, 183 cattle, 440 goats, and 424 sheep) were tested with the ID Screen CCHF Double Antigen Multi-species in parallel with 1872 human sera tested with an ELISA for human samples and IFA. • *Results*: Of the 1,838 animals, 666 (36.2%) were positive for CCHF. The prevalence of CCHFV antibodies was significantly higher among camels (56.7%). **Detection of the CCHF antibodies in domestic livestock species with the ID Screen CCHF Double Antigen Multi-species indicates a potential role of these animals in human infections.**		Test of particular species	Epidemiological study		

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DOGS AND HORSES

30)Vila M. *et al.* (2023). **Zoonotic findings of *Hyalomma marginatum* in northwestern Spain: horse serological response and human captures**. Poster presented at the EVPC meeting, 29-30 june 2023, Maison-Alfort, France.	• 182 **horse** sera were tested using the ID Screen CCHF Double Antigen Multi-species. • *Results*: Seroprevalence was 1.1%.		Test of particular species	Epidemiological study		
31)Atim S.A. *et al.* (2022). **Risk factors for Crimean-Congo Haemorrhagic Fever (CCHF) virus exposure in farming communities in Uganda**. Journal of Infection, 85(6), 693-701.	• blood samples from 666 cattle, 549 goats, and 32 **dogs** were tested using the ID Screen CCHF Double Antigen Multi-species. 800 human sera were tested using another commercial assay. • *Results*: CCHF seropositivity was 91.8 % in cattle, 75.2% in goats, and 56.22% in dogs. Overall seroprevalence in humans was 27.6%. **This study highlights the need for enhanced surveillance of CCHF in cattle across countries where living patients with febrile illness.**	Correlation with other techniques	Test of particular species	Epidemiological study		
32)Mangombi J.B. *et al.* (2020). **Seroprevalence of Crimean-Congo Hemorrhagic Fever in Domesticated Animals in Northwestern Senegal**. Vector-Borne And Zoonotic Diseases, DOI: 20. 10.1089/vbz.2019.2592.	• serologic survey for CCHFV antibodies. The ID Screen CCHF Double Antigen Multi-species was tested on different species (n= 283). • *Results:* The prevalence of (CCHFV) infection among **horses**, cattle, sheep, **dogs**, **donkeys**, and goats was 70.3%, 57.1%, 22.1%, 18.2%, 17.2%, and 6.9% respectively. **The ID Screen CCHF Double Antigen Multi-species is suitable for use in different species and highlighted high seroprevalence in horses and cattle.**		Test of particular species	Epidemiological study		

WILDLIFE

33)Cuadrado-Matias R. *et al.* (2021). **The spatiotemporal dynamics of Crimean-Congo haemorrhagic fever virus in enzootic Iberian scenarios**. Poster presented at the Virtual 69th WDA /14th EWDA 2021 Joint Conference Cuenca, Spain.	• 6178 sera from **red deer** screened with the ID Screen CCHF Double Antigen Multi-species in Spain. • *Results*: Seroprevalence was very high in the southern half of mainland Spain (72.0%-87.1%) whereas it was lower in central (43.6%) and northern (30.6%) areas of the country. **The ID Screen CCHF Double Antigen Multi-species is useful to detect anti-CCHFV antibodies in red deer.**		Test of particular species	Epidemiological study		

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34)Espunyes J. *et al.* (2021). **Hotspot of Crimean-Congo Hemorrhagic Fever Virus Seropositivity in Wildlife, Northeastern Spain.** Emerging Infectious Diseases Vol. 27, No. 9.	• serosurvey for Crimean-Congo hemorrhagic fever virus antibodies in **various wildlife species** (serum samples from 174 red deer, 84 Iberian ibexes, 79 roe deer, 35 European rabbits, 156 wild boars, and 4 fallow deer) using the ID Screen CCHF Double Antigen Multi-species. • *Results*: Of 532 samples tested, CCHFV antibodies were detected in 72 animals, including **Iberian ibexes** (66/84), **roe deer** (1/79), and **wild boar** (5/156); all 72 seropositive samples came from the same area.		Test of particular species	Epidemiological study		
35)Peralbo-Moreno A. *et al*. (2021). **Spatial modelling of *Hyalomma lusitanicum* ticks shape Crimean-Congo haemorrhagic fever virus exposure in Doñana National Park, Spain**. Oral presentation at CUENCA 2021, August 31 to September 2, Spain.	• Sera from 435 **red deer** were analyzed using the ID Screen CCHF Double Antigen Multi-species. • *Results*: Seroprevalence = 74.3%.		Test of particular species	Epidemiological study		

HUMANS

36)Frías M. *et al*. (2022). **The spatial pattern of human exposure to Crimean–Congo haemorrhagic fever virus is not consistent with red deer-based risk predictions**. Transboundary and Emerging Diseases, 1–7.	• A cross-sectional study to test the exposure pattern of the **human population** to CCHFV: sera of 1384 donors from different risk gradients were analyzed using the ID Screen CCHF Double Antigen Multi-species. • *Results*: None of the samples reacted positively indicating a seroprevalence of 0%. **This study confirms the excellent specificity of the ID Screen CCHFDA Multi-species for human samples.**		Test of particular species	Epidemiological study		Data specificity
37)Malonga G.A. *et al*. (2022). **Seroprevalence of Crimean-Congo haemorrhagic fever virus among people living with HIV in Brazzaville, Congo and among blood donors in Bamako, Mali**. Poster presented at European Society for Clinical Virology, 7-10 September 2022, Manchester, England.	• **Retrospective serological survey conducted on 352 sera from people living with HIV (PLWH) and 229 sera from healthy blood donors using the ID Screen CCHF Double Antigen Multi-species.** • *Results*: Seroprevalence was 0.6% in PLWH and 1.75% in blood donors.		Test of particular species	Epidemiological study		
38)Matthews J. M. (2022). **Sero-epidemiological investigation of Crimean-Congo hemorrhagic fever virus infection in humans and livestock in West Africa.** (Doctoral dissertation).	• **486 sera from humans**, 544 sera from goats, 474 sera from sheep, and 399 sera from cattle were screened using the ID Screen CCHF Double Antigen Multi-species. • *Results*: Overall seroprevalence of 1.65% (8/486) in human populations. CCHF seroprevalence was observed at 13.6% (138/1,018) in small ruminants and 59.9% (239/399) in cattle; with the seroprevalence of sheep		Test of particular species	Epidemiological study		

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	18.8% (89/474) being almost twice that of goats 9.0% (49/544).					
39)Negredo A. *et al*. (2021). **Retrospective Identification of Early Autochthonous Case of Crimean-Congo Hemorrhagic Fever, Spain, 2013.** Emerging Infectious Diseases Vol. 27, No. 6.	• retrospective identification of a **human case** dating back to 2013. The case strongly suggested CCHF infection. In 2020, a new serum sample was collected and tested by the ID Screen CCHFDA Multi-species and a commercial indirect immunofluorescence test for CCHFV-GPC and CCHFV-N. Retrospectively, stored samples collected 10 days after symptom onset were tested by PCR and IFA. • *Results:* The serum sample collected in 2020 tested positive for antibodies to CCHFV with the ID Screen CCHFDA Multi-species further confirmed by IFA yielding positive results to both GPC and N antigens. In a sample collected in 2013, the CCHV genome was detected by PCR and IFA revealed CCHFV-N–specific IgG and IgM. **The ID Screen CCHFDA Multi-species is able to detect CCHFV antibodies in human samples, in correlation with commercial IFA for the detection of CCHFV antibodies in human samples.**	Correlation with other techniques	Test of particular species			
40)Sas M.A. *et al*. (2018). **A novel double-antigen sandwich ELISA for the species-independent detection of Crimean-Congo hemorrhagic fever virus-specific antibodies**. Antiviral Research 151, 24-26.	• development and validation of the ID Screen CCHF Double Antigen Multi-species for the detection of anti-CCHFV nucleoprotein antibodies; positive sera from 95 cattle and 176 small ruminants from CCHF-endemic regions (CCHF antibody status previously confirmed by two other serological assays) and negative sera from 402 cattle and 804 small ruminants from countries considered outside of the CCHFV endemic zone; suitability of the ID Screen CCHF Double Antigen Multi-species was tested on different species. • *Results*: specificity 100%; sensitivity 99.9%; suitability of the ID Screen CCHF Double Antigen Multi-species for cattle (50), goats (50), sheep (50), camels (4), rats (6), ferrets (4), dogs (5), raccoons (23), raccoon dogs (21), foxes (57), hares (21), pigs (50), **humans (30).** **The ID Screen CCHF Double Antigen Multi-species is a highly specific and sensitive novel assay suitable for use in different species including humans.**	Correlation with other techniques	Test of particular species			Performance evaluation

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