

**KYASANUR FOREST DISEASE**

Animal Group(s) Affected	Transmission	Clinical Signs	Severity	Treatment	Prevention and Control	Zoonotic
<p>Mammals: primarily, gray langurs (<i>Semnopithecus</i> sp.) and red-faced bonnet monkey (<i>Macaca radiata</i>), shrews (<i>Suncus murinus</i>), rats, squirrels, porcupine and bats.</p> <p>Domestic cattle, sheep, and goats can be affected.</p>	<p>Vector: Hard ticks, primarily nymphal stages of <i>Haemaphysalis spinigera</i>. Other <i>Haemaphysalis</i> sp. and <i>Ixodes</i> sp. soft ticks of <i>Ornithodoros</i> sp. and <i>Argas</i> sp. Direct contact with an infected animal (rodent, monkey)</p>	<p>Biphasic: fever, tussis, dehydration, encephalitis, epistaxis, diarrhea, shock, death</p>	<p>Mild to fatal</p>	<p>No specific treatment. Supportive care especially for treatment of dehydration and hemorrhage</p>	<p>Vector control, including insect repellents and protective clothing</p>	<p>Yes, with mortality for humans living in enzootic areas.</p>

<b>Fact Sheet compiled by:</b> Owen Slater
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<b>Susceptible animal groups:</b> Mammals: Gray langur, red-faced bonnet macaque, domestic cattle, sheep and goats, and humans. Hosts include white-tailed rat, white-bellied rat, shrew, and bats.
<b>Causative organism:</b> Kyasanur forest disease virus (KFDV) virus (Flaviviridae)
<b>Zoonotic potential:</b> Yes and can be fatal in humans
<b>Distribution:</b> Enzootic in Karnataka State, India, but also human seropositivity in Andaman and Nicobar islands. Debate exists as to whether viruses identified in Saudi Arabia and the People’s Republic of China are KFDV or closely related viruses.
<b>Incubation period:</b> In humans, this period is approximately 3-8 days.
<p><b>Clinical signs:</b></p> <p><u>Animals:</u> Natural infections of monkeys are commonly associated with substantial mortality and evidence of anal hemorrhage. Other clinical signs noted include epistaxis, diarrhea, encephalitis, shock and death.</p> <p><u>Humans:</u> Fever, headache, severe muscle pain, prostration, inflammation of conjunctiva, vesicular eruptions on the soft palate, tussis, vomiting, diarrhea, dehydration and bleeding. Decreased platelets, red blood cell and white blood cell counts are noted. Patients sometimes recover after 1-2 weeks but usually a biphasic illness with a second wave at three weeks with above clinical signs and, for some, encephalitis. Fatality rate of 3-10%.</p>
<b>Post mortem, gross, or histologic findings:</b> Gross: Anal hemorrhage, epistaxis, and diarrhea. Histologic: Focal liver necrosis with cytoplasmic inclusion bodies, sloughing of tubular epithelium in kidney (humans), small and large intestinal necrosis, pallor of the adrenal cortex, multi-organ hemorrhage (lung, kidney, brain,

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adrenal), non-purulent encephalitis with focal microgliosis and perivascular cuffing.
<b>Diagnosis:</b> Serology (Convalescent phase), RT-PCR, qRT-PCR, IgM capture ELISA
<b>Material required for laboratory analysis:</b> Serum, whole blood, tissue
<b>Relevant diagnostic laboratories:</b> Centers for Disease Control and Prevention 1600 Clifton Rd. Atlanta, GA 30333
<b>Treatment:</b> No specific treatment for the disease. Supportive care for dehydration and hemorrhage.
<b>Prevention and control:</b> No vaccine currently available in North America but high success with formalin inactivated virus vaccine was been reported for humans in India. Vector (tick and rodent) control in endemic areas is important. Level 3-4 biosecurity protocols in North America.
<b>Suggested disinfectant for housing facilities:</b> 1% sodium hypochlorite, 70% ethanol, 2% glutaraldehyde. Virus does not survive freezing
<b>Notification:</b> This is not a notifiable foreign animal disease
<b>Measures required under the Animal Disease Surveillance Plan:</b> None
<b>Measures required for introducing animals to infected animal:</b> If importing monkeys, rodents or bats from enzootic areas follow normal quarantine measures and strongly consider serologic testing for Kyasanur forest disease virus.
<b>Conditions for restoring disease-free status after an outbreak:</b> None
<b>Experts who may be consulted:</b> Dr. Stuart T. Nichol, Ph.D. Chief, Molecular Biology Laboratory, Special Pathogens Branch, Division of Viral and Rickettsial Diseases Centers for Disease Control and Prevention 600 Clifton Road, N.E. Atlanta, GA 30333 (404) 639-1122 snichol@cdc.gov
<b>References:</b> <ol style="list-style-type: none"> <li>1. CDC Factsheet: <a href="http://www.cdc.gov/ncidod/dvrd/spb/mnpages/dispages/Fact_Sheets/KyasanurForestDis.pdf">http://www.cdc.gov/ncidod/dvrd/spb/mnpages/dispages/Fact_Sheets/KyasanurForestDis.pdf</a>. Accessed 5 July 2013.</li> <li>2. EAZWV Transmissible Disease Fact Sheet: <a href="http://www.eaza.net/activities/tdfactsheets/036%20Kyasanur%20Forest%20Disease.doc.pdf">http://www.eaza.net/activities/tdfactsheets/036%20Kyasanur%20Forest%20Disease.doc.pdf</a>. Accessed 5 July 2013.</li> <li>3. Mehla, R. , S.R. Kumar, P. Yadav, P.V. Barde, P.N. Yergolkar, B.R. Erickson, S.A. Carroll, A.C. Mishra, S.T. Nichol, and D.T. Mourya. 2009. Recent ancestry of Kyasanur Forest disease virus. <i>Emerg. Infect. Dis.</i> 15: 1431-7.</li> <li>4. Mourya, D.T., P.D. Yadav, R. Mehla, P.V. Barde, P.N. Yergolkar, S.R. Kumar, J.P. Thakare, and A.C. Mishra. 2012. Diagnosis of Kyasanur forest disease by nested RT-PCR, real-time RT-PCR and IgM capture ELISA. <i>J. Virol. Meth.</i> 186: 49– 54.</li> <li>5. Pathogen Safety Data Sheet: Public Health Agency of Canada <a href="http://www.phac-aspc.gc.ca/lab-bio/res/psds-ftss/kyasanur-eng.php">http://www.phac-aspc.gc.ca/lab-bio/res/psds-ftss/kyasanur-eng.php</a>. Accessed 5 July 2013.</li> <li>6. Pattnaik, P. 2006. Kyasanur forest disease: an epidemiological view in India. <i>Rev. Med. Virol.</i> 16: 151-65.</li> <li>7. Pavri, K. 1989. Clinical, clinicopathologic, and hematologic features of Kyasanur forest disease. <i>Rev.</i></li> </ol>

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