

EBOLA (SUBTYPE RESTON) VIRUS

Animal Group(s) Affected	Transmission	Clinical Signs	Severity	Treatment	Prevention and Control	Zoonotic
Macaque, swine. Fruit bats are a possible reservoir.	Direct contact with infected animals, secretions or droplets. Recent study suggested possible airborne transmission.	Anorexia, lethargy, diarrhea or melena with frank blood, bleeding from external orifices, petechial to suffusive hemorrhage.	Macaque: Fatal Swine: Can vary from subclinical to severe.	Isolation of unaffected animals. No successful clinical treatment.	Quarantine of imported primates in country of origin and in import facilities in the US.	Yes

Fact Sheet compiled by: Thomas P. Meehan; updated by Dawn Zimmerman

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Fact Sheet Reviewed by: Pierre E. Rollin; Owen Slater

Susceptible animal groups: Cynomolgus monkeys (*Macaca fascicularis*) were identified in the index case in 1989 and subsequent outbreaks among animals imported from the Philippines in 1990, 1992 and 1996. Ebola (subtype Reston) virus has also been isolated from swine in the Philippines (2008) which were co-infected with porcine reproductive and respiratory syndrome virus (PRRSV). It is unclear if swine are an incidental host or part of the virus' transmission cycle.

Causative organism: Reston virus (EBO-R) species *Reston ebolavirus*, family *Filovirus*.

Zoonotic potential: Humans exposed to the disease in primates and swine have become seropositive but have no apparent or clinically mild infection. It is not known how infection would affect immune-compromised people, pregnant women, or children.

Distribution: Philippines (and animals recently imported from Philippines). Geographic distribution may be larger depending of the reservoir distribution.

Incubation period: 7-14 days.

Clinical signs: In primates: Anorexia, lethargy or sudden death may be the only signs. Fever, cough, nasal exudates, swollen eyelids, splenomegaly, and renomegaly can occur. Animals may also show signs of hemorrhagic fever with diarrhea or melena with frank blood, bleeding from external orifices, petechial to suffusive hemorrhage.

Post mortem, gross, or histologic findings: Maculopapular rash, splenomegaly, widespread petechial hemorrhages, hemorrhage in proximal duodenum, and interstitial pneumonia are observed grossly. Lymphoid necrosis, massive fibrin deposition in spleen, hepatic necrosis, necrosis of adrenal cortex and pulmonary bronchiolar and alveolar epithelium, interstitial nephritis, and amphophilic cytoplasmic inclusion bodies in many tissues including liver, adrenal gland, and spleen are observed histologically. Extensive viral replication in tissue macrophages and interstitial fibroblasts.

Diagnosis: In blood during acute phase: ELISA, RT-PCR (rapid, more sensitive than antigen detection ELISA, and allows identification of the virus species), virus isolation (requires a BSL-4 lab), immunohistochemical staining and histopathology on post-mortem or collected tissues to localize viral antigen. Biosafety concerns during the collection and processing of the specimens.

Material required for laboratory analysis: Testing liver samples by ELISA antigen capture is the mandatory

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<p>test for confirmation or ruling-out the diagnosis in suspected dead primates during quarantine (http://www.cdc.gov/ncezid/dhcpp/vspb/pdf/PrimateTestingForm.pdf).</p>
<p>Relevant diagnostic laboratories: Viral Special Pathogens Branch Centers for disease Control and Prevention 1600 Clifton Rd Atlanta, Georgia 30333 Phone: 404-639-1115</p>
<p>Treatment: Based on epidemiology from prior outbreaks it appears that virus spread through group-housed animals is unavoidable. Since asymptomatic animals may be present in groups during the incubation period, strict depopulation is likely the best course of action.</p>
<p>Prevention and control: Pre-shipment quarantine of primates to be shipped from Philippines. CDC licensed primate import quarantine facility with special permit required for <i>Cynomolgus</i> monkeys, rhesus, and African green monkeys. Diagnostic testing of potentially affected animals, personal protective equipment to prevent exposure of personnel and close coordination with importer and CDC. Strict isolation of groups of imported animals.</p>
<p>Suggested disinfectant for housing facilities: Hypochlorite or phenolic disinfectants are generally recommended for disinfection. Ebola virus is susceptible to 2% sodium hypochlorite, 2% glutaraldehyde, 5% peracetic acid, 1% formalin.</p>
<p>Notification: CDC</p>
<p>Measures required under the Animal Disease Surveillance Plan: Currently none.</p>
<p>Measures required for introducing animals to infected animal: Not recommended.</p>
<p>Conditions for restoring disease-free status after an outbreak: Depopulation of affected group and premise disinfection.</p>
<p>Experts who may be consulted: Centers for Disease Control and Prevention (CDC) Viral Special Pathogens Branch or Division of Global Migration and Quarantine. May be contacted 24 hours/day through the CDC emergency operations center (770-488-7100).</p>
<p>References:</p> <ol style="list-style-type: none"> 1. http://www.cdc.gov/ncidod/dvrd/spb/outbreaks/qaEbolaRestonPhilippines.htm. Accessed 20 August 2013. 2. Barrette, R.W., S.A. Metwally, J.W. Rowland, X. Lizhe, S.R. Zaki, S.T. Nichol, P.E. Rollin, J.S. Towner, W.J. Shieh, B. Batten, T.K. Sealy, C. Carillo, K.E. Morgan, A.J. Bracht, G.A. Mayr, M. Sirios-Cruz, D.B. Catbagan, E.A. Lautner, T.G. Ksiazek, W.R. White, and M.T. McIntosh. 2009. Discovery of swine as a host for the Reston ebolavirus. <i>Sci.</i> 325: 204-206. 3. Cameron, K.W., and P.E. Reed. 2011 Ebola Hemorrhagic Fever. <i>In:</i> Miller, R.E., and M.E. Fowler (eds.). <i>Fowler's Zoo & Wild Animal Medicine</i>, 7th ed. Elsevier, Saunders Co., St. Louis Missouri. Pp. 416-421. 4. Marsh, G.A., J. Haining, R. Robinson, A. Foord, M. Yamada, J.A. Barr, J. Payne, J. White, M. Yu, J. Bingham, P.E. Rollin, S.T. Nichol, L. Wang, and D. Middleton. 2011. Ebola reston virus infection of pigs: clinical significance and transmission potential. <i>J. Infect. Dis.</i> 204 (suppl 3): S804-S809. 5. Miranda, M.E., T.G. Ksiazek, T.J. Retuya, A.S. Khan, A. Sanchez, C.F. Fulhorst, P.E. Rollin, A.B. Calaor, D.L. Manalo, M.C. Roces, M.M. Dayrit, and C.J. Peters. 1999. Epidemiology of Ebola (subtype Reston) virus in the Philippines, 1996. <i>J. Inf. Dis.</i> 179(Suppl.1): S115-119. 6. Rollin, P.E., R.J. Williams, D.S. Bressler, S. Pearson, M. Cottingham, G. Pucak, A. Sanchez, S.G.

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