**RIFT VALLEY FEVER**

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<th>Animal Group(s) Affected</th>
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<td>Domestic ruminants, some wild ruminants, humans, some primates, gray squirrels, some newborn cats and dogs.</td>
<td>Vector-borne; direct contamination in humans. Virus harbored in mosquito eggs, remains dormant. Periodic heavy rains and flooding cause mosquito hatching and virus transmission and amplification in mammalian hosts.</td>
<td>Epizootic, abortion storms in pregnant ewes, high fever, weakness, gastrointestinal signs, mortality.</td>
<td>May be inapparent, mild or fatal. Abortions may reach 100%. High mortality in susceptible young and pregnant animals.</td>
<td>None, supportive care.</td>
<td>Animal movement, remove infected animals and vector control. Vaccination in endemic areas. Barrier protocols for exposed humans.</td>
<td>Yes</td>
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**Fact Sheet compiled by:** Thomas W deMaar; updated by Mark. W. Atkinson  
**Sheet completed on:** 21 January 2011; updated 26 August 2013  
**Fact Sheet Reviewed by:** John C. Morrill, Pierre Rollin

**Susceptible animal groups:** Sheep, cattle, goats, African buffalo, water buffalo, Asian monkeys and humans can be infected. Susceptibility of cervids is not known. Death in wild African ruminants is rare but there are recent reports of abortion and/or deaths with virus isolation in African buffalo, wildebeest, waterbuck, giraffe, sable, springbok and impala. Camels, African monkeys, baboons, equids, pigs and domestic carnivores are considered resistant experiencing only asymptomatic viremia. Gray squirrels, mice, hamsters and newborn dogs and cats can be experimentally infected but don’t usually play a role in the transmission.

**Causative organism:** RVF virus is an RNA *Phlebovirus* of the family Bunyaviridae. Only one serotype is recognized but strains of variable virulence exist. Virus circulates in endemic areas among wild ruminants and hematophagus mosquitoes; certain *Aedes* species act as reservoirs during inter-epizootic periods and increased precipitation in dry areas leads to an explosive hatching of eggs. Precipitation cycles of 5-25 years produce RVF-immuno naïve animal populations, and introduction of virus can lead to explosive outbreaks. Virus can be transmitted by many species of mosquitoes and other biting insects during viremic phase in mammalian hosts.

**Zoonotic potential:** Humans infected via contact with nasal discharge and blood from viremic animals as well as aborted fetuses and vaginal secretions following abortion in animals, mosquitoes, and by aerosols and possibly, though unproven, by consumption of raw milk. It is possible that humans can act as amplifying hosts. Generally, raw meat is not a source although it can contain viremic blood, and for humans, it is usually cooked.

**Distribution:** Serologic or virologic evidence over most of Africa. Considered endemic in sub-Saharan Africa but recently it has made incursions into some Middle Eastern countries and Madagascar.

**Incubation period:** 1-6 days; 12-36 hrs in lambs.

**Clinical signs:** Abortion storms occur in domestic livestock at any stage of pregnancy. Biphasic fever up to 106° F (up to 104° F in humans, to 107° F in sheep.) Young animals more severely affected showing high fever, listlessness and unwillingness to move; up to 90% mortality in newborn and young animals after very short incubation period. Affected animals die within 24-36 hours and are often just found dead without exhibiting clinical signs. Older susceptible animals (> 2 weeks of age) show high fever,
### RIFT VALLEY FEVER

Listlessness, anorexia and weakness and often develop a high titered viremia. Gastrointestinal signs are common: abdominal pain, regurgitation, foul smelling bloody diarrhea, and icterus. Abortion maybe the only sign (40-100% in sheep). Adults may have inapparent infections with abortion being the only sign. Mortality in adult sheep ranges from 20 to 70% and approximately 10% in adult cattle. Camels present either hyperacute form, with sudden death in <24 hours; or and an acute form with fever, ataxia, dyspnea, blood-tinged nasal discharge, icterus, severe conjunctivitis, hemorrhages of gums and tongue, foot lesions, nervous symptoms, and abortions. Humans experience a febrile disease that is usually mild and transient but in rare cases can be fatal with hemorrhagic fever, ocular disease (retinal vasculitis), liver disease and meningoencephalitis.

#### Post mortem, gross, or histologic findings:
Focal or generalized hepatic necrosis; enlarged, discolored, soft, friable liver with irregular congestion and white necrotic foci (~1 mm diameter). Lesions are most severe in aborted fetus and young animals. Widespread cutaneous hemorrhages, petechiae and ecchymoses on serosal membranes. Gall bladder wall edematous with possible hemorrhage. Spleen and lymph nodes are edematous, enlarged and may show petechiae. Hemorrhagic enteritis, intestinal contents dark chocolate-brown.

#### Diagnosis:
It is suspected in endemic areas when presented with abortions and relevant signs combined with febrile disease in humans after heavy rains and/or flooding. Histopathology of liver is relevant. Most tissues will contain virus and can be used for detection (virus isolation, PCR, ELISA antigen detection) and numerous serologic tests exist: VN, ELISA, IgG and IgM.

#### Material required for laboratory analysis:
Blood, liver, spleen, brain and aborted fetuses are tissues of choice.

#### Relevant diagnostic laboratories:
- Centers for Disease Control and Prevention
- Viral Special Pathogens Branch
  1600 Clifton Road NE
  Atlanta, GA 30333
  Phone: (404) 639-1115 or (404) 639-1510
  Contact prior to specimen submission

#### Treatment:
No specific treatment is available but supportive care can be provided.

#### Prevention and control:
Vector control and prevent movement of livestock are important measures for managing this disease. General barrier measures (gloves, masks, goggles, etc) should be used when handling suspected materials. Attenuated (Smithburn strain) and inactivated virus vaccines available for use in Africa. No licensed vaccine for use in US but several live-attenuated mutant vaccines are undergoing experimental analysis. The Smithburn vaccine strain is known to cause abortion and birth defects so immunization of pregnant animals is not advised.

#### Suggested disinfectant for housing facilities:
While this is not usually performed, virus is susceptible to acidic solutions, lipid solvents and hypochlorite solutions.

#### Notification:
Reportable to USDA National Animal Health Reporting System (A080)

#### Measures required under the Animal Disease Surveillance Plan:
None described but response would be massive.

#### Measures required for introducing animals to infected animal:
Unadvised

#### Conditions for restoring disease-free status after an outbreak:
A disease free period with active surveillance longer than 4 years. Recovery probably confers lifelong immunity.

#### Experts who may be consulted:
- John C. Morrill DVM, Ph.D.
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RIFT VALLEY FEVER

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References: