### Susceptible animal groups:
- European rabbit (*Oryctolagus cuniculus*); typically affects animals > 2 months of age; animals that survive infection become immune

### Causative organism:
- Family: Caliciviridae
- Genus: Lagovirus
- Species: Rabbit hemorrhagic disease virus; single serotype, two subtypes (RHDV, RHDVa)

### Zoonotic potential:
No

### Distribution:
Disease has been reported in > 40 countries and is endemic in Australia, New Zealand, Cuba, parts of Asia and Africa, and most of Europe. Sporadic reports in several countries including Mexico (now eradicated), Uruguay (2004), and the United States (Iowa 2000, Utah 2001, Illinois 2001, New York 2001, Indiana 2005, Minnesota 2010), although now thought to have been eradicated in the US. It also has been reported in China, Republic of Korea, India and the Middle East. It is more likely to be detected in large congregations than in single (e.g. individual pet) rabbits; disease spread exacerbated in crowded conditions.

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<th>Animal Group(s) Affected</th>
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<tr>
<td>European rabbit (<em>Oryctolagus cuniculus</em>)</td>
<td>Direct contact with infected rabbits, rabbit products or secretions; insect or animal vectors; fomites; fecal excretion of virus from predators or scavengers. Importation of infected rabbit meat or rabbits that survive infection as they can shed virus for at least 4 weeks. Climate may be important—many outbreaks occur in winter or spring.</td>
<td>Often sudden death with no obvious signs. In symptomatic animals: depression, coma, nervous signs (paddling, ataxia, convulsions, opisthotonos), reluctance to move, prostration; serosanguineous discharge from nostrils.</td>
<td>Often high morbidity (up to 100%) and high mortality (50-100%)</td>
<td>None</td>
<td>Avoid contact with infected or contaminated animals, animal products, fomites, or vectors. Perform disinfection, depopulation, surveillance, and quarantine under supervision of state and federal agencies. Vaccinate in countries where available and legal - not so in US</td>
<td>No</td>
</tr>
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</table>
**Incubation period:** Incubation 1-3 days; death often occurs within 12h-36 hours of fever onset

**Clinical signs:** Infection may present no apparent symptoms. In symptomatic animals, fever, depression, reluctance to move, neurologic signs, and bleeding from mouth or nostrils may be seen. In animals that survive infection, jaundice, weight loss and lethargy may be seen.

**Post mortem, gross, or histologic findings:**
Gross findings: most commonly seen is friable liver, splenomegaly; and pulmonary congestion, edema and/or petechiae; may also see multifocal petechiae in other organs or serosanguineous tracheal fluid

Histologic findings: More common lesions: mild to (more often) severe hepatic necrosis, disseminated intravascular coagulopathy (DIC), splenic congestion, multifocal lymphocytolysis. May also see multifocal acute pulmonary edema, congestion or hemorrhage and multifocal hemorrhage in other sites.

**Diagnosis:**
Serologic tests: hemagglutination inhibition (HI), indirect ELISA (I-ELISA), competitive ELISA (C-ELISA).
Pathogen identification: hemagglutination test (HA), electron microscopy (negative staining EM, immuno-EM, immunogold EM), virus detection ELISA, RT-PCR, Western blot, histology, immunostaining, inoculation study (RHDV never grown in cell cultures); in situ hybridization

**Material required for laboratory analysis:**
Serum: HI, I-ELISA, C-ELISA
Fresh liver (preferred sample), spleen or lung: HA, RT-PCR, inoculation study
10% neutral buffered formalin-fixed, paraffin embedded liver, spleen, lung: histology, immunostain
Fresh or fixed liver (depending on procedure): EM

**Relevant diagnostic laboratories:**
USDA-APHIS-VS-NVSL-FADDL
40550 Route 25 (for packages)
Orient Point, NY 11957
P.O. Box 848 (for letters)
Greenport, NY 11944-0848
(631) 323-3256
Fax: (631) 323-3366

**Treatment:** Currently there is no treatment for this disease.

**Prevention and control:** For prevention and control, biosecurity is highly important; avoid contact with imported rabbits and rabbit products; prevent contact between healthy and ill animals; quarantine new animals or animals that have been in contact with other rabbits. With input from State and Federal agencies, control will include disinfection, depopulation, surveillance, and quarantine; elimination of fomites (including insects, other animal vectors); incineration of dead animals, feedstuff, feces; limit or ban animal/animal derivative product movement in face of outbreak. Animals that survive infection are immune but can shed virus for at least 4 weeks.

Two vaccines are available in UK; no vaccine available in US. Vaccinated rabbits are protected from disease but due to low mucosal immunity can still develop intestinal infection and shed virus in the absence of clinical disease.

**Suggested disinfectant for housing facilities:** This process is to be performed in collaboration and under supervision of State and Federal Agencies. RHDV is inactivated by 1% sodium hydroxide (lye) or 1-2% formalin (OIE recommends 3% for disinfecting pelts). Recommended disinfectants are substituted phenolics (e.g. 2% One-stroke Environ®) and 0.5% sodium hypochlorite (bleach).

**Notification:** Reportable to State and Federal (USDA) agencies; OIE reportable disease
### Measures required under the Animal Disease Surveillance Plan:
None.

### Measures required for introducing animals to infected animal:
Due to highly infectious nature, significance of disease, and persistence in the environment, introduction to infected animals is not recommended and may not be permitted by State and Federal agencies.

### Conditions for restoring disease-free status after an outbreak:
State and Federal agencies will make recommendations that may include addition of sentinel animals on treated premises to monitor for persistent virus, minimum post depopulation, disinfection period prior to new animal addition.

### Experts who may be consulted:
U.S. Department of Agriculture
Animal and Plant Health Inspection Service
Veterinary Services, Emergency Management
4700 River Road, Unit 41
Riverdale, MD 20737–1231
Telephone: (301) 734–8073
Fax: (301) 734–7817

### References: