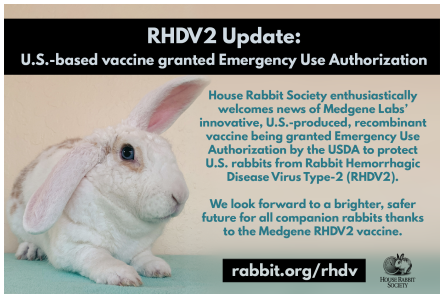
What is Rabbit Hemorrhagic Disease?



Rabbit Hemorrhagic Disease (RHD) is caused by a highly contagious and fatal calicivirus in the genus lagovirus (rabbit hemorrhagic disease virus or RHDV) that affects pet rabbits, wild rabbits like cottontails (*Sylvilagus* spp.), hares (*Lepus* spp.) and wild European rabbits (*Oryctolagus cuniculus*), from which our own domesticated rabbits originate. Until 2020, it had not been detected in North American native leporid species such as cottontails and jackrabbits. Beginning in 2020, RHD was detected in wild and domesticated lagomorphs in the United States and Mexico, resulting in the deaths of untold numbers.

Rabbit hemorrhagic disease was first identified in China in 1984. There have been confirmed cases in 40 countries throughout Europe, Africa, Asia, and North America, including Cuba, Australia, and New Zealand.[1]

RHDV2, a new strain of RHDV emerged in France in 2010, and quickly spread throughout Europe. It outcompeted the original strain in many countries. Experts first detected RHDV2 in Australia in 2015 – it spread throughout the continent in the feral European rabbit population over approximately 18 months and became the dominant strain replacing RHDV1.[2]

Symptoms of RHD in domesticated rabbits include, but are not limited to:

- Inappetence, or loss of appetite
- Lethargy, or lack of energy
- Fever of 104F or higher
- Seizures, weakness, wobbliness and other neurological signs
- Jaundice, or yellowing of the skin and mucosal membranes (most noticeably in the ears)
- Bleeding from nose, mouth, genital openings or rectum
- Difficulty breathing
- Sudden death

RHD kills quickly, giving little warning. Rabbits often die without showing any symptoms. **Any sudden death, *especially in an otherwise healthy rabbit*, is suspicious and should be reported to your veterinarian as a possible case of RHD.**

- **Incubation Period**: RHDV2 has a recorded incubation period of 3-5 days. Previous experiments infecting laboratory rabbits with RHDV2 showed an incubation of 3-9 days until onset of symptoms. Death occurred 3-5 days after symptoms appeared. [3]
- **Death Rate (Mortality)**: RHDV2 kills as few as 5% and up to and exceeding 80% depending on the affected population's natural resistance. In the 2020 Southwest US and Mexico RHDV2 outbreak, officials report a death rate of about 90% which has been attributed to the population's lack of previous exposure to RHDV2.
- **Survivors:** Rabbits who survive RHDV are carriers and shed the virus for at least 42 days, perhaps longer. [4]
- **Asymptomatic Carriers:** Some rabbits display little or no sign of RHD. This is referred to as subclinical or asymptomatic infection. These asymptomatic rabbits may "shed" virus for up to 2 months meaning those otherwise healthy rabbits may infect other rabbits because their bodies are producing live virus. [5]
- **Transmission Routes:** The virus is shed by infected animals through urine, feces, blood, milk, saliva and mucus from the nose and mouth. RHDV2 infects rabbits through the mucous membranes of the eyes, nose or mouth and digestive tract. Typically animals are infected when they come into contact with body fluids of infected animals, the corpses of deceased animals or through insect vectors who carry the virus on their bodies or through meals of infected blood. RHDV2 is also easily transmitted by "fomite" meaning objects like shoes or clothing and "vectors" like insects, indoor/outdoor pets and car tires that become contaminated with live virus.
- **Cause of Death:** Rabbits with RHD typically die from liver dysfunction with aberrant coagulation and hemorrhage contributing to death.
- **Durability of Virus**: RHDV2 remains viable in the environment outside a host for considerable lengths of time. The tissues of animals that die from RHD are particularly potent as sources of virus.
    - RHDV2 remains viable for 3.5 months at room temperature at 68F on fabric.
    - The virus that causes RHD persists for 7.5 months at near freezing temperatures
    - RHDV2 can survive temperatures of up to 122F for one hour.
    - The virus can also withstand cycles of freezing and thawing. [6]

- **Seasonal Outbreaks:** Where the virus has a "reservoir" meaning a naturally occurring host like wild native rabbits or feral and stray domestic rabbits, annual outbreaks occur seasonally. In Australia, outbreaks start in fall and winter, peak in spring, and dissipate in summer. Because flying insects are a significant vector for RHD, seasonal fluctuations in insect populations may be linked with seasonal outbreaks of RHD.
- **Treatment**:
    - RHD treatment is supportive and palliative care in isolation.
    - There are currently no known antiviral drugs or other treatments available that can prevent death from RHD.

- **Prevention**:
    - Currently there is one vaccine available in the USA that prevents RHD caused by RHDV2. Our FAQ regarding Medgene's vaccine is available here. The European Union has several vaccines for RHD that are readily available at most exotic veterinarians' practices.
    - Biosecurity is the next best thing for ensuring the health and safety of your companion rabbit. HRS has delineated extensive protocols for biosecurity in your home. We also recommend the writings of Frances Harcourt-Brown, BVSc FRCVS.

This article was adapted by Christie Taylor, PhD and edited by Anthony Pilny, DVM and Iris Klimczuk. Published October 29, 2021.

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