

## Rabies

Rabies is a disease caused by the rabies virus. **Rabies can affect all mammals**, including wild animals, domestic animals (like pets and livestock), and humans. All mammals, including humans, are susceptible to rabies. **If rabies exposure is left untreated, the virus can cause disease in the brain, resulting in death for the exposed animal or person.**

## Transmission

- Rabies is almost always contracted by **exposure to a rabid animal**
- The exposure is typically through a bite but can also be through **saliva or brain/nervous system tissue** from an infected animal coming in **contact with broken skin or mucous membranes** in the eyes, nose, or mouth
- Person to person transmission is extremely rare; however, precautions should be taken to prevent exposure to the saliva of a person with rabies
- Tissues from individuals with rabies **must not** be used in transplant procedures
- **Blood, urine, and feces** is not associated with risk for infection

## Symptoms

The time between exposure (usually a bite) and the onset of symptoms, which is called the incubation period, averages **one to three months** but ranges from days to years based on:

- **Location of the exposure site** (how far away it is from the brain)
- **Type** of rabies virus
- Any **existing immunity**

### Early symptoms include:

- Weakness
- Discomfort
- Headache
- Fever
- Itching or pain at the site of exposure

### Late symptoms include:

- Anxiety
- Confusion
- Agitation
- Delirium
- Abnormal behavior
- Hallucinations
- Hydrophobia (fear of water)
- Insomnia
- Death

**By the time any symptoms appear, rabies cannot be successfully treated.**

## Diagnosis

Consult a health care provider. **Several tests** are necessary to diagnose rabies **before death in humans**; no single test is sufficient. Tests are performed on samples of **saliva, serum, spinal fluid, and skin biopsies of hair follicles** at the nape of the neck.

In animals, rabies is diagnosed using a laboratory test that looks for rabies virus antigens in brain tissue.

## Treatment

- **Immediate** thorough **cleansing** of the animal bite or scratch wounds **with soap and water**
- Health care provider and/or state/local health department will decide if you need rabies vaccination
- Decision to vaccinate, known as **post exposure prophylaxis (PEP)**, is based on **type of exposure** and **animal** you were exposed to, as well as **laboratory** and **surveillance information**
- For those not previously vaccinated against rabies, treatment consists of **one shot of rabies immune globulin and four shots of rabies vaccine**
- **Shots are administered on:**
  - Day **zero** (the day you begin the shots): rabies immune globulin and rabies vaccine
  - Day **three**: rabies vaccine
  - Day **seven**: rabies vaccine
  - Day **14**: rabies vaccine
  - Day **28**: additional rabies vaccine shot if person is immune compromised

Rabies has an **almost 100% fatality rate** once a person starts showing symptoms. A person should be seen as soon as possible after the bite/exposure by a health care provider to determine the need for rabies PEP. If treatment is started quickly after a rabies exposure, **most cases of rabies will be prevented**. Untreated exposures will almost always result in death.

## Prevention

- **Do not have contact** with stray dogs and cats
- **Vaccinate** pet dogs, cats, and ferrets
- **Stay away from wild animals**, especially those behaving abnormally
- **Avoid** keeping exotic or wild animals as pets
- **Wear protective gloves** when working with sick livestock

For more information about the treatment of rabies visit [www.hhs.nd.gov/rabies](http://www.hhs.nd.gov/rabies) or [www.cdc.gov/rabies/index.html](http://www.cdc.gov/rabies/index.html). If you have further questions about the treatment of your bite or scratch, contact your health care provider.

## Exclusion Guidance

Individuals with rabies will likely not be able to attend work, school or child care, [general exclusions apply](#). For additional information about rabies, contact North Dakota Health and Human Services' Public Health Division at 800.472.2180.

### Resources:

1. Center for Disease Control and Prevention. (2022, December 8). Rabies. Center for Disease Control and Prevention. Retrieved June 9<sup>th</sup>, 2023, <https://www.cdc.gov/rabies/index.html>.
2. Centers for Disease Control and Prevention. Human Rabies Prevention – United States, 2008. Recommendations of the Advisory Committee on Immunization Practices. MMWR 2008;57(Vol. 57/RR-3) pg.1-21.
3. Centers for Disease Control and Prevention. Use of a Reduced (4-Dose) Vaccine Schedule for Postexposure Prophylaxis to Prevent Human Rabies. Recommendations of the Advisory Committee on Immunization Practices. MMWR 2019;59(Vol. 59/RR-2) pg 1-7.
4. Heymann, D.L. (2022). Control of Communicable Diseases Manual, 21<sup>st</sup> Edition. Rabies. American Public Health Association, 2022: 526-536.

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