

IN THIS ISSUE: ANIMAL BITES AND RABIES

Animal Bites and Rabies

Introduction

Rabies is an encephalitic disease caused by lyssaviruses that, if left untreated prior to symptom onset, is almost always fatal.^{1, 2, 3} Rabies poses a serious public health threat due to its high (near 100%) death rate in infected individuals.¹ Due to rabies control measures in the United States (U.S.) reducing the threat of rabies, more than 90% of reported cases of rabies in animals occur in wildlife. Rabies control measures include vaccination of domestic animals, distribution of oral vaccines to wildlife, and the efforts of animal control and public health officials.¹

Epidemiology

Rabies infects the central nervous system of mammals and exposure occurs through contact between broken skin and the saliva, mucus, or brain matter of an infected animal, usually from a bite, scratch, or open wound.^{2, 4} The virus travels through the central nervous system to the brain causing severe brain disease. **Immediate medical attention to receive post-exposure prophylaxis (PEP) following a suspected exposure is critical because if PEP is not received prior to the start of symptoms, infection results in death.**^{1, 2, 5} The time between exposure and the appearance of symptoms can range from weeks to months, dependent on the location and severity of the bite, but can be anywhere from days to years.⁶

Annually, there are more than 10 million human exposures and an estimated 55,000 rabies deaths worldwide. Most of these deaths occur in developing countries, particularly in Africa and Asia. This is largely due to the inaccessibility of PEP in these regions and lack of vaccination in domesticated animals.^{5, 6}

In the U.S., approximately 4,000 animal rabies cases are reported annually with wild animals such as

bats, raccoons, skunks, and foxes accounting for >90% of these cases. Nationally, there has been a decrease from over 100 human deaths annually in the early 1900s to fewer than 10 human deaths reported each year due to control and prevention measures, such as vaccination, tracking and testing, and availability of PEP.⁷

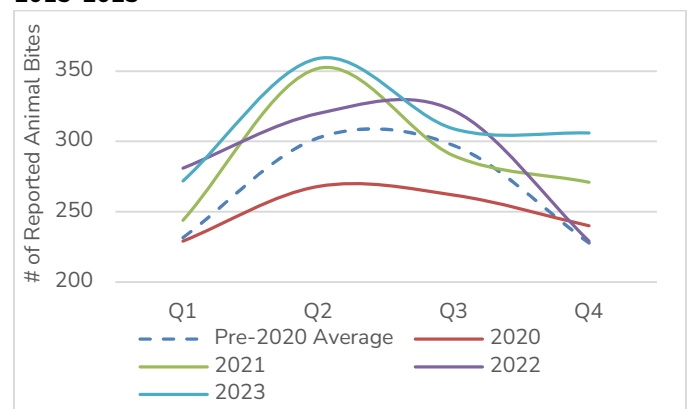
Figure 1: Animals Most Likely to Carry Rabies



Source: <https://www.cdc.gov/rabies/animals/images/rabies-vectors.jpg>

Locally, there has been an average of approximately 1,100 animal bites reported annually in Washoe County from 2015 through 2023. The second and third quarters of the year (the warmer months) routinely account for more animal bites than the first and fourth quarters (the colder months).

Figure 2: Reported Animal Bites per Quarter, Washoe County, 2015-2023



Source: <https://www.nnph.org/files/ephp/communicable-diseases/weekly/washoecounty.html>

Note: The Pre-2020 Average is the quarterly average of 2015-2019.

Though there have not been any known human cases of rabies in Washoe County, there have been

109 animals positive for rabies reported since 2000, ranging from 1 to 10 per year.

Risk Factors & Prevention

All mammals are susceptible to rabies in varying degrees and certain populations are at higher risk of being exposed to rabies. Individuals who travel to regions of the world where rabies is more prevalent should research the risk of exposure and keep their distance from wild or unfamiliar animals. Individuals who participate in outdoor activities are also at higher risk of being exposed, as they may be more likely to encounter wildlife. Additionally, individuals whose occupations involve frequent animal contact, either wild or domestic, are at higher risk of rabies exposure.^{1,6}

Rabies prevention includes, but is not limited to: keeping all pets and livestock up to date on rabies vaccines; staying away from and not handling wildlife, especially bats, raccoons, and foxes; contacting animal control to remove stray animals or any animals that appear to be injured, sickly or acting strange; cooperating with local programs designed to minimize the prevalence of rabies; seeking pre-exposure vaccination if in a high-risk occupation; seeking medical attention and PEP after an exposure (contact with saliva or brain matter) to a suspected rabid animal.^{1,6}

Signs & Symptoms

Initial signs and symptoms of rabies infection can mirror flu, including weakness, discomfort, fever, or headache. These symptoms may also be accompanied by additional discomfort, tingling, prickling, itching, or burning at the wound site.

As the virus progresses along the central nervous system towards the brain, more severe symptoms affecting the brain and spinal cord develop. These include anxiety, insomnia, hyperactivity, confusion, agitation, delirium, hallucinations, difficulty swallowing, fear of water, excessive salivation, seizures, and partial paralysis. Within 1-2 weeks, illness progresses to coma and death.^{5,6,8,9}

It is important to note, administering PEP once symptoms begin is ineffective and will not stop progression of the virus or symptoms and is not known to reverse or prevent death.^{10,11} Avoid potential exposures, and if suspected exposure occurs - seek PEP as soon as possible.

Diagnosis & Testing

Diagnosis is primarily done through evaluating the circumstances and likelihood of possible exposure, as well as symptomology if illness has already begun. Current diagnostic testing tools are not suitable for rabies detection in humans prior to the onset of illness. Viral shedding in infected individuals is intermittent and therefore poses difficulty in testing of a live suspect case.^{5,6} Live suspected case testing is extremely invasive and cannot be conducted without known clear epidemiologic exposure and explicit permission from the CDC.⁸

Due to these factors, recommendation to receive treatment/PEP is based on assessing the patient for likelihood of suspected rabies exposure. Ideally the animal that exposed a human or other animal is available for a 10-day observation or can be euthanized, with an intact brain, for testing to confirm rabies infection. However, if the exposing animal is not available for either observation or testing, initial assessments for risk of rabies exposure can be conducted by the Epidemiology Program at Northern Nevada Public Health or your local provider. Additional risk assessments include geographic location and the behavior of the animal at the time of the encounter through 10 days after the encounter.^{2,4,12}

If an individual presents with rabies-like symptoms, they should be evaluated for other, more common causes of encephalitis prior to suspecting rabies diagnosis, as rabies is rare in the U.S.⁸

Treatment

Since rabies is fatal and non-reversible once symptoms are present, treatment is usually supportive. However, PEP may be recommended after a bite or encounter with a confirmed or possibly rabid animal if bite victim is not previously vaccinated for rabies.²

PEP needs to be started as soon as possible and consists of a single dose of human rabies immune globulin (HRIG) and a series of rabies vaccinations. The HRIG dose is fast-acting, helps prevent infection, and is injected near the site of the bite. This is followed by a four-dose series of rabies vaccination over the first 14 days.^{13, 14} Immunocompromised individuals may require a fifth dose.¹⁴

Reporting

The list of reportable communicable diseases and reporting forms can be found at:

<http://tinyurl.com/WashoeDiseaseReporting>

Report communicable diseases to Northern Nevada Public Health. To report a communicable disease, please call 775-328-2447 or fax your report to the NNPH at 775-328-3764.

Acknowledgement

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