



WEST VIRGINIA 2021 ANNUAL ANIMAL RABIES REPORT

INTRODUCTION

Rabies is a fatal but preventable disease of mammals caused by the rabies virus. The rabies virus is transmitted through saliva or brain/nervous system tissue and can be spread to people and pets if they are bitten or scratched by a rabid animal. While the virus is most commonly transmitted through the bite of a rabid animal, it can also be transmitted when fresh saliva from a rabid animal comes into contact with wounds or mucous membranes (i.e., eyes, nose, mouth).

The rabies virus infects the central nervous system and ultimately causes disease in the brain. Once a person exhibits signs of the disease, the result is nearly always death. Early symptoms of rabies include fever, headache, and general weakness or discomfort. As the disease progresses, more specific symptoms appear, including insomnia, anxiety, confusion, slight or partial paralysis, excitation, hallucinations, agitation, hypersalivation (increase in saliva), difficulty swallowing, and hydrophobia (fear of water). Death usually occurs within days of the onset of these symptoms.

All mammals are susceptible to rabies virus infection, but only a few species serve as important reservoirs and vectors for the disease. In the United States, distinct strains of the rabies virus have been identified in raccoons, skunks, foxes, coyotes, and several species of insectivorous bats. In West Virginia, the most common strain of rabies is raccoon strain; bat strain rabies is also found and is widespread across the state.

Reporting, Preventive Measures and Surveillance

Rabies is classified as a Category II infectious disease, and any case in a human or animal is required by state law to be reported to a local health department (LHD) within 24 hours to help prevent the spread of the disease.

For rabies surveillance, West Virginia is divided into three regions: the Eastern Surveillance Region, the Active Surveillance Region, and the Western Surveillance Region (Figure 1). Raccoon strain rabies is prevalent in the Eastern Surveillance Region, and counties within this region report the greatest number of animal rabies cases. The Active Surveillance Region serves as a buffer zone between the Eastern and Western Regions, and counties within this region report lower numbers of raccoon strain rabies. No cases of raccoon strain rabies have been reported in the Western Region.

Surveillance and preventative measures, including targeted vaccination, have been implemented to prevent the westward expansion of raccoon strain rabies. The Oral Rabies Vaccine (ORV) Project was initiated in 1997 by the U.S. Department of Agriculture (USDA) to prevent the geographic spread of rabies in the U.S. Every August, rabies vaccine baits are spread by plane to targeted areas where the expansion of rabies is a concern. Vaccine baits are also distributed in targeted areas by rotary wing and ground applications. In West Virginia, the bait zone includes counties in both the Active Surveillance and Eastern Regions. The hope is that uninfected raccoons and skunks eat the bait and become inoculated against the virus, thus preventing further spread of rabies among wildlife. Figure 2 shows the ORV bait zone for West Virginia in 2021.

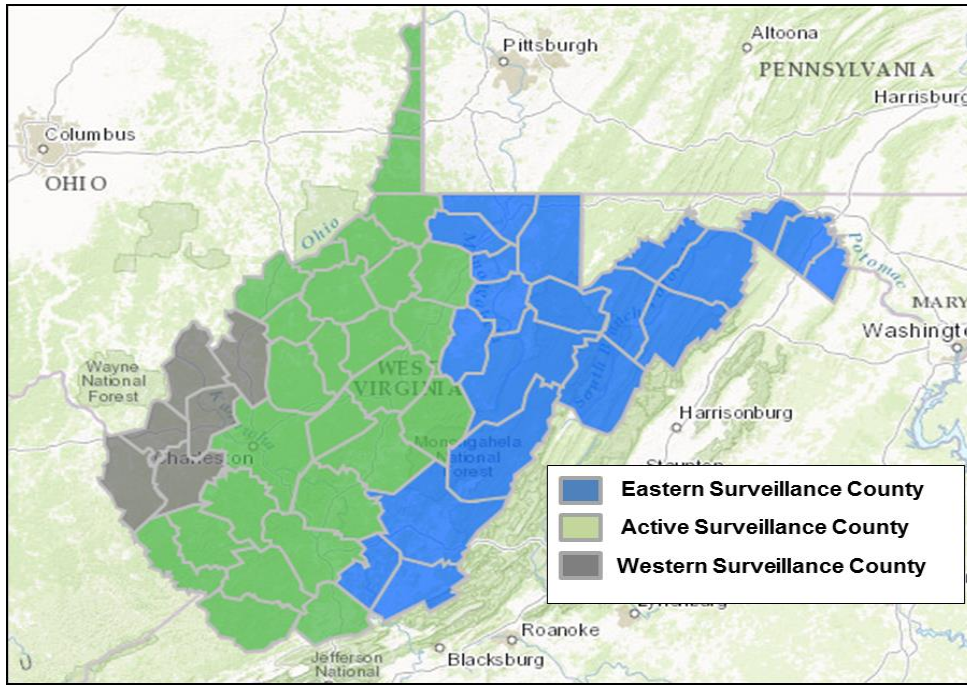


Figure 1. Rabies surveillance regions in West Virginia based on monitoring for raccoon strain rabies.

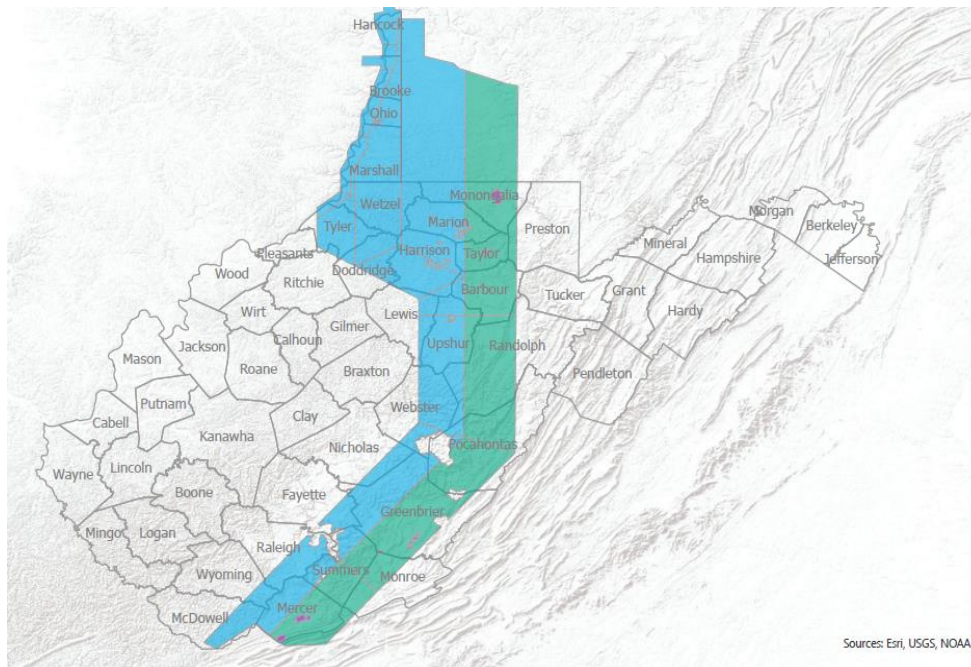


Figure 2. ORV Project distribution areas for 2021 (Courtesy of USDA).

Because the rabies virus affects the central nervous system of mammals, testing the brain of a suspected rabid animal is the best way to determine if an animal is actually rabid. In West Virginia, specimens are sent to the West Virginia Department of Health and Human Resources' (DHHR) Office of Laboratory Services (OLS) for testing. To monitor rabies activity in West Virginia, data are collected and analyzed each year. This information is compiled into a report detailing rabies surveillance activities and testing results for the year.

METHODS

Specimen Submission

Whole specimens from smaller animals (bats, small rodents) and heads from larger animals were shipped on ice to OLS from veterinary offices, animal control officers, and other sources for testing. If the specimen was too large for shipping, only the brain was sent.

Testing

At OLS, specimens are tested using the direct fluorescent antibody (DFA) test to detect the rabies virus in brain tissue. Only specimens that contained a brain specimen in a satisfactory condition (had not been buried, did not show signs of decomposition, etc.) were tested for both the presence of virus as well as strain. OLS determined the rabies virus strain using monoclonal antibodies. For surveillance purposes, the USDA Animal and Plant Health Inspection Service also tested animals for rabies surveillance.

Data collection

A specimen submission form, submitted with the specimen to OLS, was utilized to collect the following data: species, location (county, address, geographic coordinates), date of collection, specimen submitter (e.g., veterinarian, county official), and the reason for submission (e.g., human exposure, pet/domestic animal exposure). Data on species and location was collected for specimens tested by the USDA and sent to DHHR's Division of Infectious Disease Epidemiology (DIDE).

RESULTS

In 2021, 295 specimens were tested for rabies by OLS. Of these, 15 (5.1%) were rabies positive. Wild animals, including raccoons, skunks, a bat, and a fox, accounted for 86.7% of all rabies-positive animals (Figure 3); all additional rabies-positive animals were cats. Other animal specimens submitted for testing included goats, squirrels, cows, a bear, a bobcat, a horse, a mule, and an opossum. OLS has also completed rabies strain typing for each infected animal found in the state. All except one rabies-positive animal had the raccoon strain. The only exception was a bat that tested positive for the bat rabies strain. No skunk strain rabies has been found in West Virginia.

The USDA tested 590 specimens for surveillance purposes in 2021. Of these, six (1.01%) were rabies-positive raccoons collected in either the Eastern or Active Surveillance Regions. Raccoons accounted for the majority (84.1%) of specimens tested by the USDA; other animals tested included bobcats, coyotes, foxes, opossums, skunks, squirrels, and groundhogs, all of which were negative.

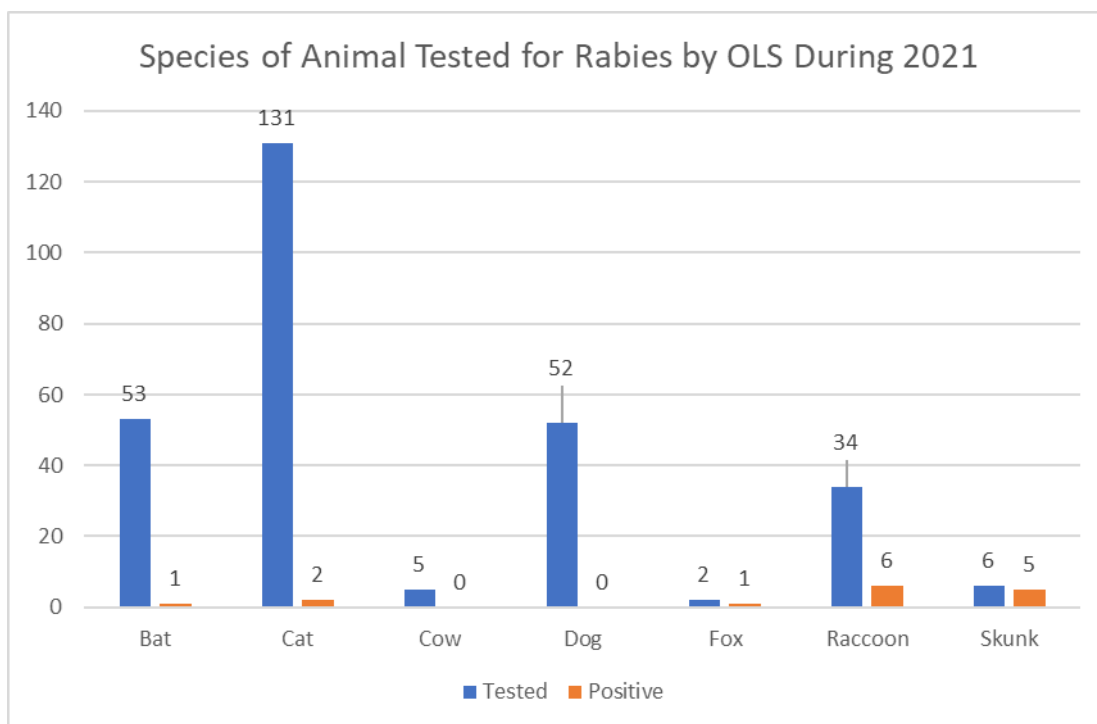


Figure 3. Species of animals tested for rabies by OLS during 2021.

In 2021, rabies-positive animals were submitted to OLS and USDA from 11 counties (20%). There were no rabies-positive animals submitted from the Western Surveillance Region in 2021. Two (13.3%) of the rabies-positive specimens were found in the Active Surveillance Region, including rabies-positive raccoon specimens from Hancock and Ohio counties in the northern panhandle. The remaining 13 (86.7%) rabies positive animals were reported from the Eastern Surveillance Region.

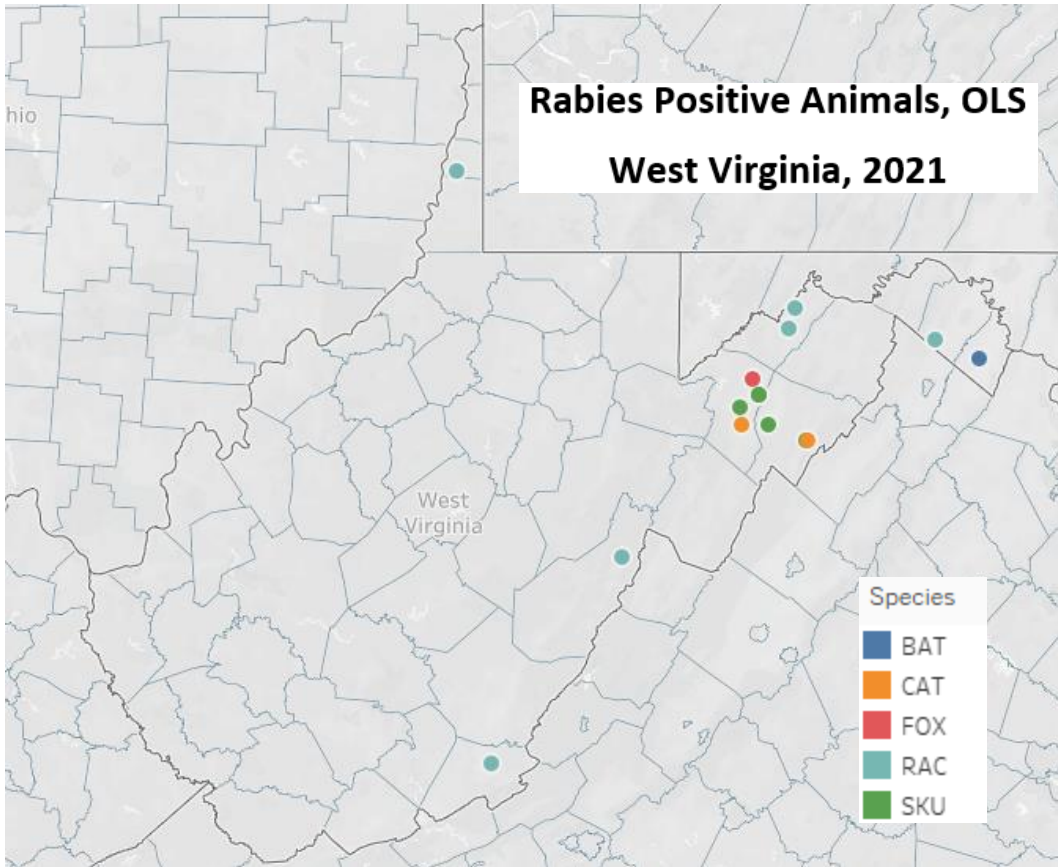


Figure 4. Rabies Positive Animals, OLS, West Virginia. 2021

The majority (n=217, 73.5%) of specimens were sent to OLS for testing because of human exposure to a potentially rabid animal (Figure 5). Pet and other domestic animal exposure were the next most frequently (n=32, 10.8%) reported reasons for specimen submission, followed by other (n=20, 6.8%).

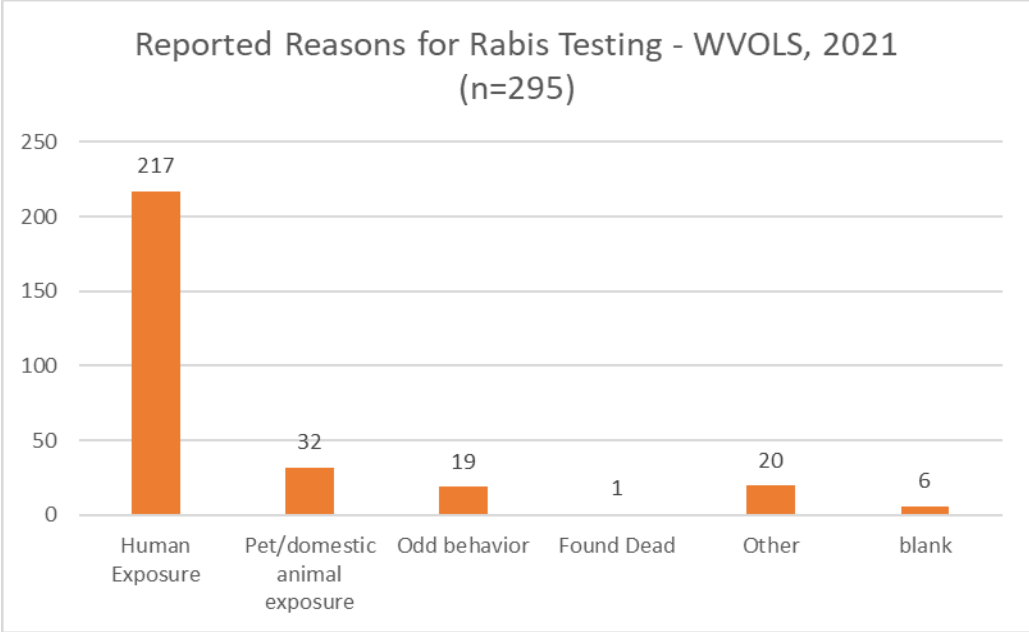


Figure 5. Reported reasons for rabies testing during 2021, OLS.

Veterinarians submitted the greatest percentage (45.5%) of specimens followed by county health officials (20.6%), private citizens (14.7%), and animal control officers (12.6%) (Figure 6).

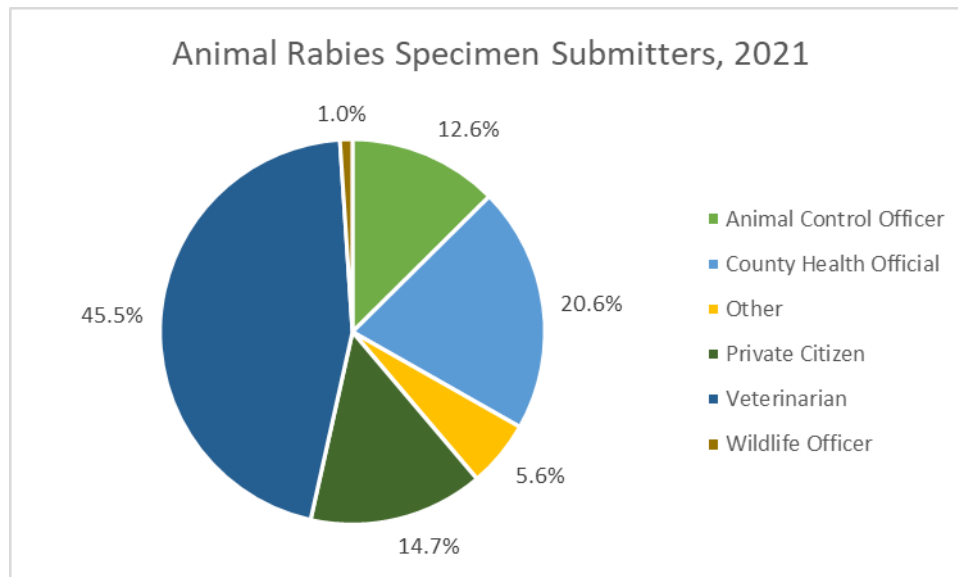


Figure 6. Percentage of animal rabies specimens by submitters during 2021.

DISCUSSION

Cases of rabies are reported each year in West Virginia, with the majority of those coming from the Eastern Surveillance Region. In 2021, the majority of positive rabies cases came from wild animal specimens (90.5%), most being raccoons and skunks. While over half (62.0%) of animals tested by OLS were dogs or cats, these specimens accounted for only two (9.1%) of the animal rabies cases. Domestic animals, such as dogs or cats, if not up-to-date on rabies vaccinations or have never been vaccinated, are considered for rabies testing.

Specimens are sent in for rabies testing by many different submitters for several reasons. Veterinarians, county health officials, animal control officers, and private citizens comprise most of the specimen submitters. The most common reasons for sending specimens for testing include human exposure, pet/domestic animal exposure, and odd animal behavior. All specimens are tested using the DFA test prescribed by the Centers for Disease Control and Prevention for positive identification of the rabies virus.

In 2021, the number of specimens tested in 2021 by OLS was lower than in 2020 (459 in 2020, 295 in 2021) (Figure 7). Skunks and raccoons are still the animals with the highest number of rabies-positive cases. Dogs and cats are the two animals tested most often in both years by OLS and have a relatively small percentage of rabies-positive cases when compared to the number tested (dogs: 0% in both years, cats: 1.8% in 2020, 1.5% in 2021). Vaccinating pets for rabies is the most effective way to reduce the number of rabies infections in domestic animals.

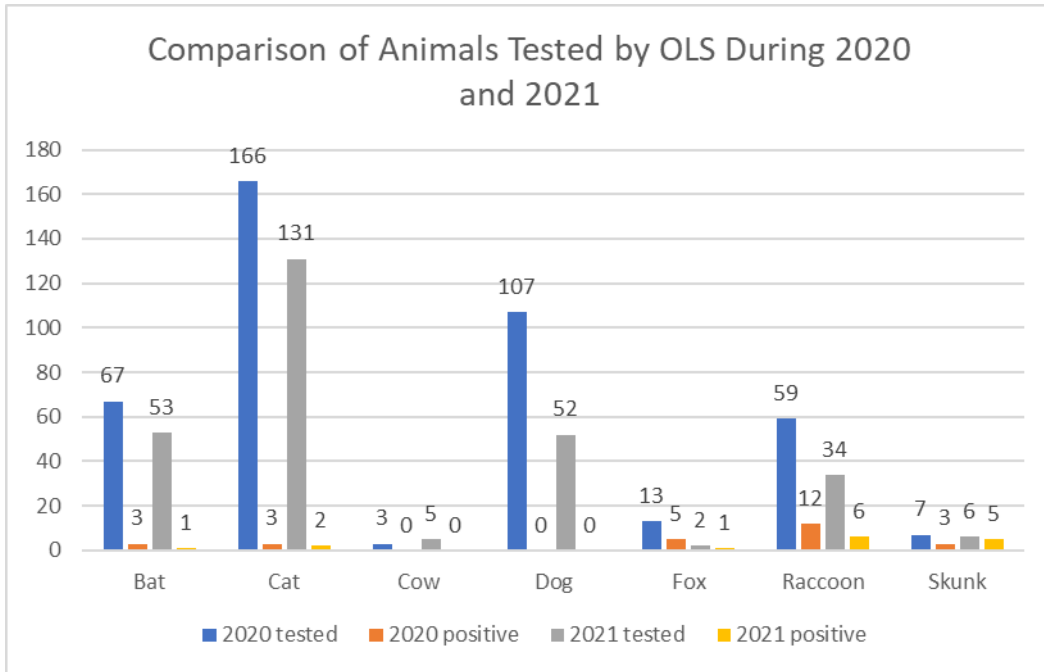


Figure 7. Number of animals tested and positive for rabies during 2020 and 2021.

Reported animal rabies cases declined rapidly after 2011, but leveled off after 2014. 2019 showed a massive spike in animal rabies cases, but cases in 2020 and 2021 were much more in-line with the decline in rabies (Figure 8). The success rate of the ORV Project in vaccinating wild animal populations may have contributed to this decrease and stabilization in the number of rabies cases. The goal is to eventually eradicate raccoon strain rabies in West Virginia.

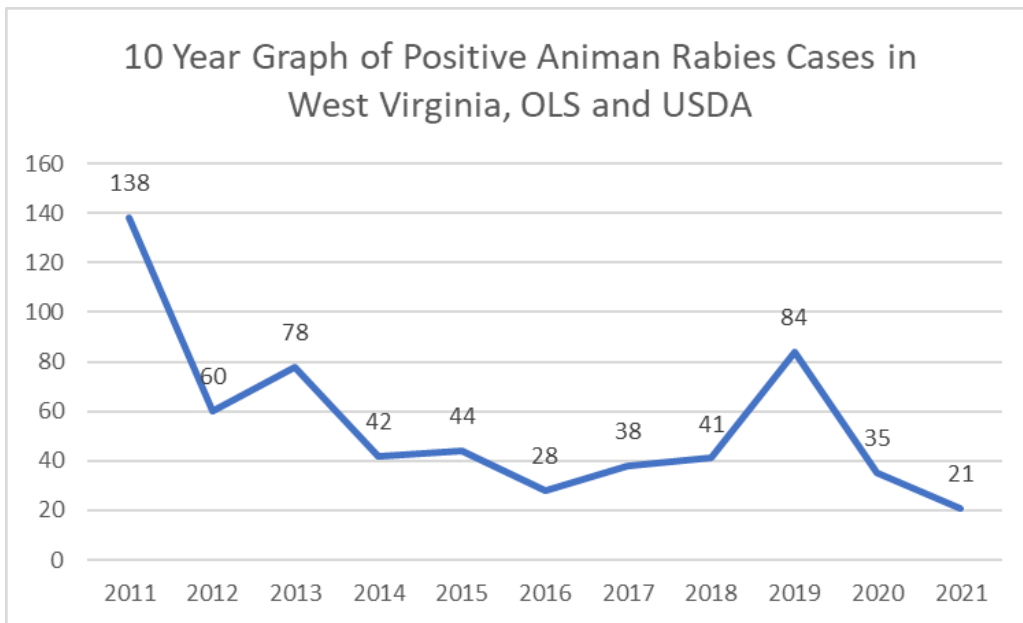


Figure 8. West Virginia rabies cases by year, 2011-2021.

A bite or scratch by any wild animal that could possibly carry the rabies virus (e.g., bat, skunk, raccoon, fox, etc.) is considered evidence for treatment in humans unless the animal can be found, and tests negative for rabies. Companion and domestic animal bites, while comprising a much smaller percentage of animals with rabies, can also be cause for concern and should be investigated further. There has not been a human case of rabies reported in the state of West Virginia since 1994; continued surveillance and management of rabies in wild animal populations is crucial to preventing human cases of rabies in West Virginia. To prevent exposure to the rabies virus:

- Keep garbage in a secured trash can.
- Feed pets indoors or remove food from bowls when feeding them outdoors.
- Teach children not to approach any wild animals or unfamiliar cats/dogs.
- Vaccinate pets against rabies.
- Do not keep wild animals, such as raccoons, as pets.
- Contact your local health department if you see an animal acting strangely or if you or your pet have been bitten by a wild or unfamiliar domestic animal.

DHHR's Zoonotic Disease Program in the Bureau for Public Health, Office of Epidemiology and Prevention Services, Division of Infectious Disease Epidemiology, would like to thank the many public health partners who have contributed the data provided in this report.

For additional information about rabies surveillance:

- DHHR's Division of Infectious Disease Epidemiology - Animal Bites and Rabies: oeps.wv.gov/rabies/pages/default.aspx
- Centers for Disease Control and Prevention - Rabies: www.cdc.gov/rabies/index.html
- USDA - Rabies: www.aphis.usda.gov/aphis/ourfocus/wildlifedamage/programs/nrmp/ct_rabies
- DHHR's OLS: dhr.wv.gov/ols/Pages/default.aspx