



WEST VIRGINIA 2023 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), and rarely from organ transplants.

The rabies virus infects the central nervous system and ultimately causes disease in the brain. Once a person begins to exhibit 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 and may include 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 species of 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 rabies virus have been identified in raccoons, skunks, foxes, coyotes, and several species of insectivorous bats. In West Virginia, the most commonly found 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 United States Department of Agriculture (USDA) to prevent the geographic spread of rabies in the United States. Every August, vaccine baits are spread by plane to targeted areas where 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 2023.

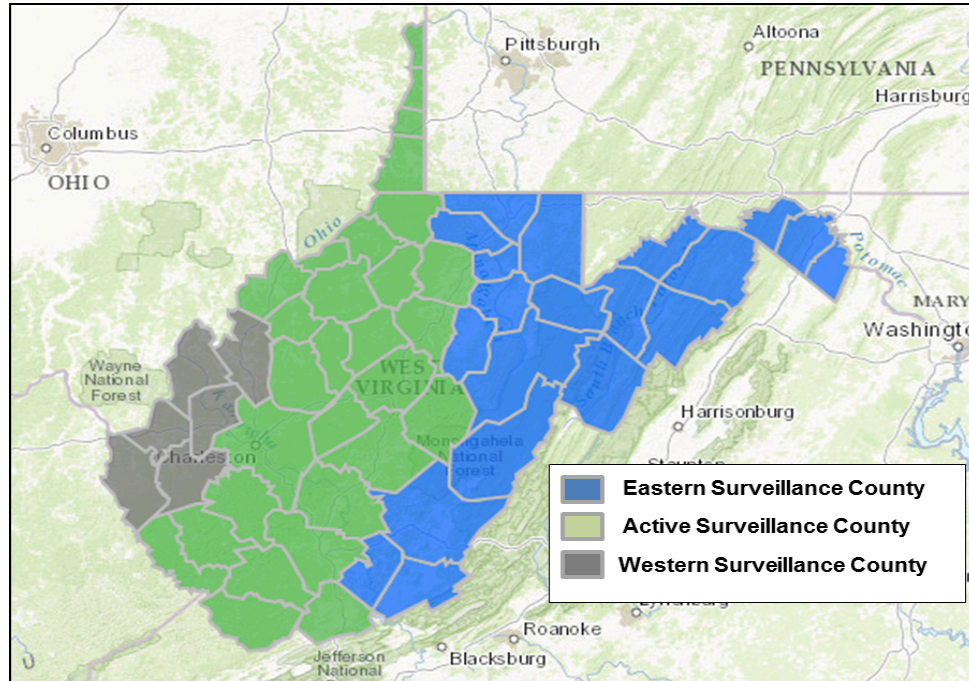


Figure 1. Rabies surveillance regions in West Virginia based on monitoring for raccoon strain rabies.

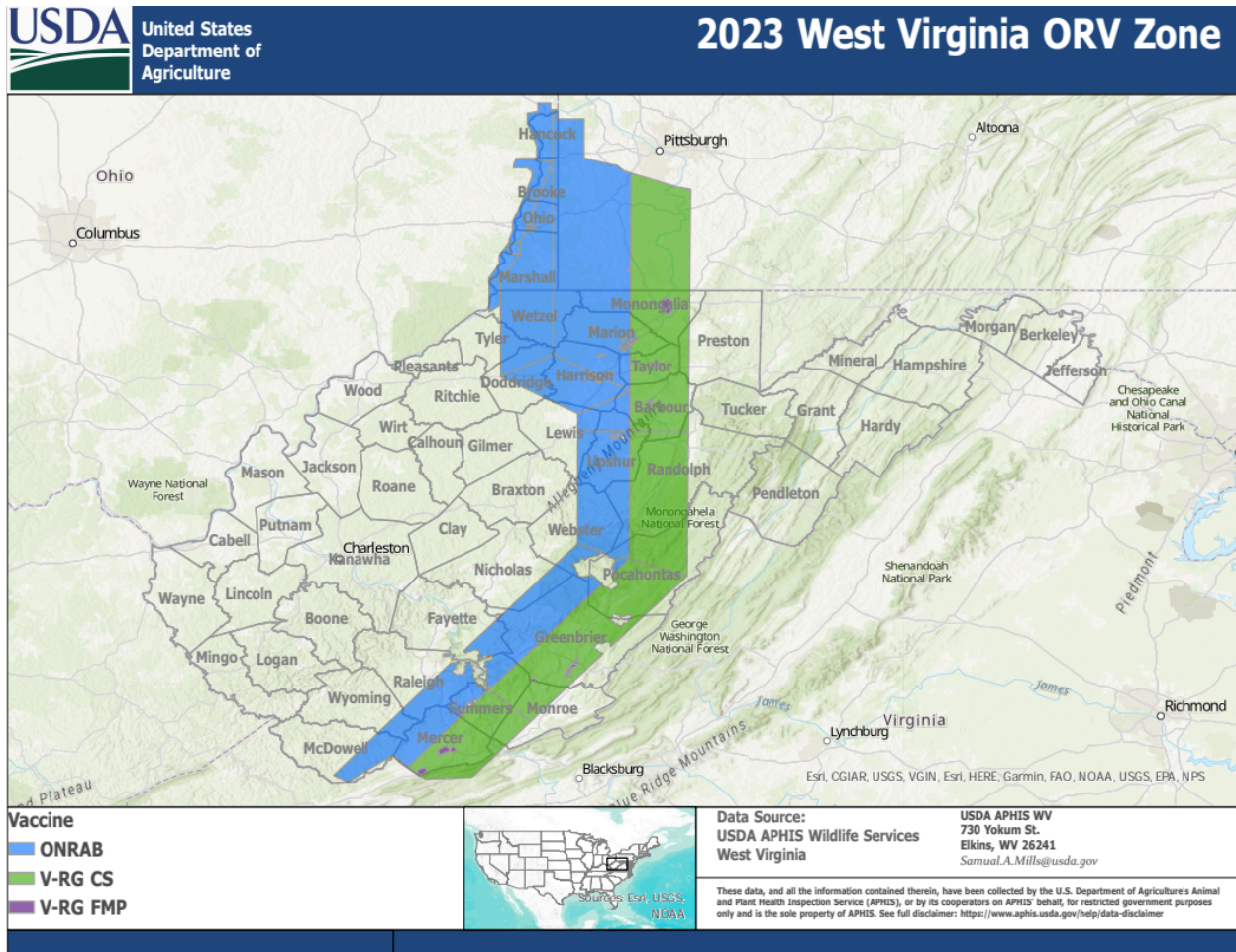


Figure 2. ORV Project distribution areas for 2023 (Courtesy of USDA).

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 rabid. In West Virginia, specimens are sent to the West Virginia Department of Health (DH) 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 and 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

Specimens were tested using the direct fluorescent antibody (DFA) test to detect the rabies virus in brain tissue. Only specimens that contained a brain specimen in 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. The USDA also tested animals for surveillance purposes using the direct rapid immunohistochemical test (dRIT).

Data collection

A specimen submission form, submitted with the specimen to OLS, was utilized to collect the following data: species, location (county, address, and 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 the DH's Division of Infectious Disease Epidemiology (DIDE).

RESULTS

During 2023, 509 specimens were tested for rabies by the OLS. Of these, 36 (7.1%) were rabies positive. Wild animals including raccoons, bats, foxes, and skunks accounted for 83.3% of all rabies positive animals (Figure 3); additional rabies positive animal specimens included five cats, and one dog. Other animal specimens submitted for testing included cows, a deer, goats, groundhogs, opossums, and squirrels.

The USDA tested 665 specimens for surveillance purposes in 2023. Of these, nine (1.4%) were rabies positive raccoons collected in the Eastern or Active Surveillance Regions. Raccoons accounted for the majority (82.4%) of specimens tested by the USDA; other animals tested included bobcats, coyotes, foxes, opossums, an otter, a rabbit, skunks, and groundhogs, all of which were negative for rabies.

We also received reports of two rabies positive deer from the West Virginia Department of Natural Resources (DNR). One, found in Hampshire County, was a GPS collared research animal found dead by the DNR. The other, found in Jefferson County, was exhibiting neurologic signs, reported by a resident, and dispatched and tested by the DNR. Neither case involved any human, livestock, or domestic animal exposure.

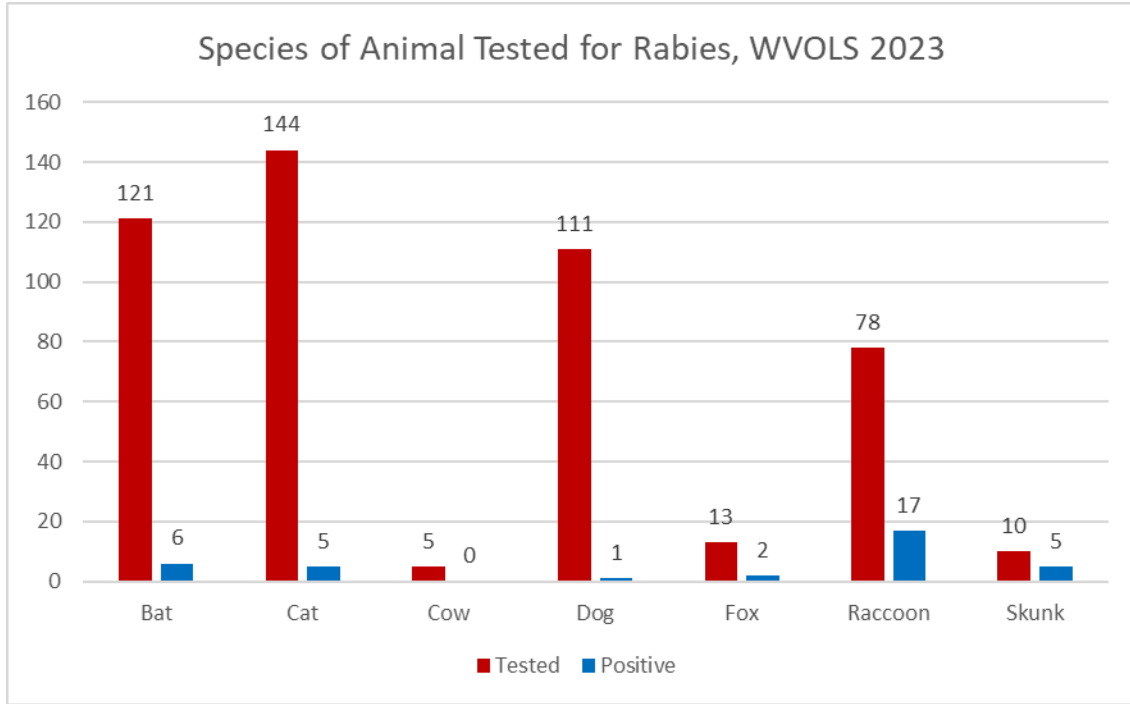


Figure 3. Species of animals tested for rabies by OLS during 2023.

In 2023, rabies positive animals were submitted to OLS from 17 counties (30.9%) (Figure 4). One (2.2%) of the rabies positive specimens was found in the Active Surveillance Region, a bat from Fayette County. The remaining 35 (97.2%) rabies positive animals were reported from the Eastern Surveillance Region. No rabies positive animals were found in the Western Surveillance Zone in 2023.

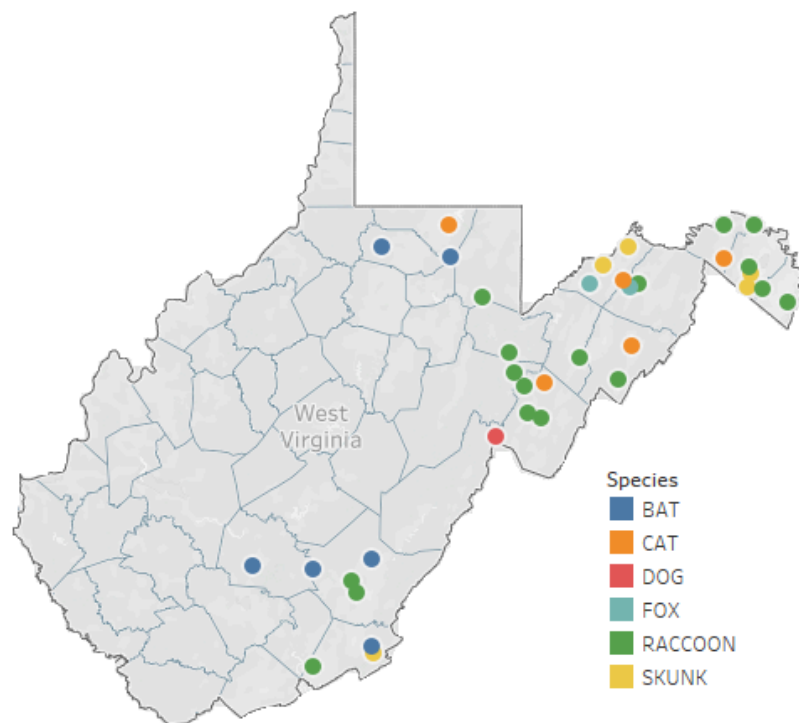


Figure 4. Rabies Positive Animals, West Virginia, 2023 OLS

The majority (n=334, 61.7%) 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=80, 14.8%) reported reasons for specimen submission followed by submissions marked “other” (n=65, 12.0%). A small portion of samples submitted to OLS (n=32, 5.9%) were unable to be tested due to being in poor condition upon arrival.

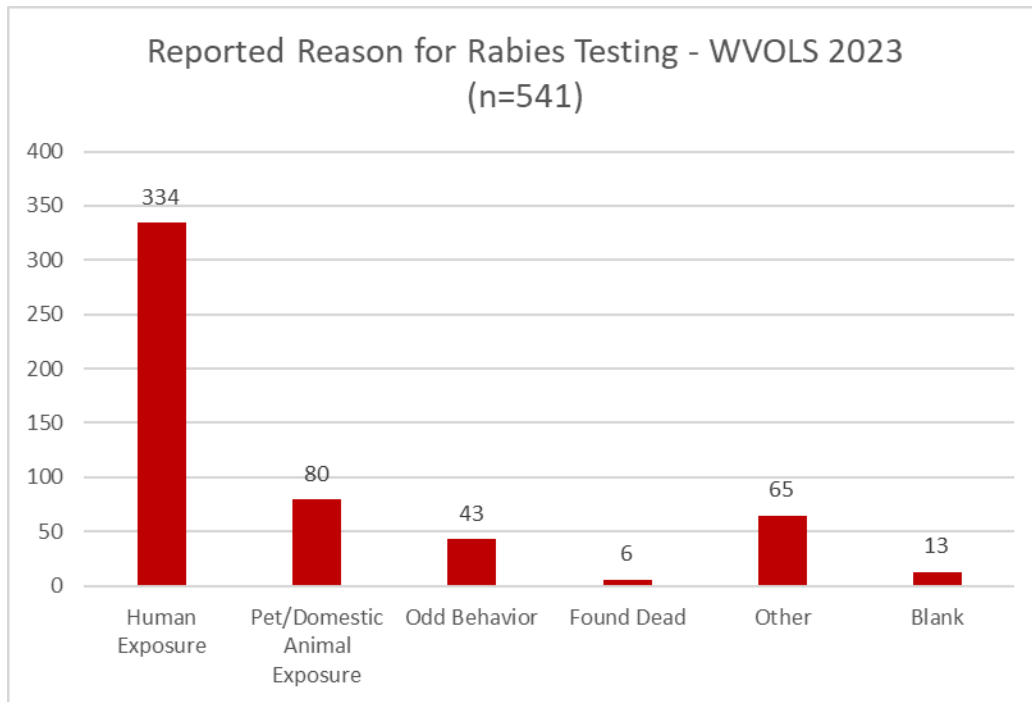


Figure 5. Reported reasons for rabies testing during 2023, OLS.

Veterinarians submitted the greatest percentage (29.0%) of specimens followed by county health officials (25.9%), private citizens (18.7%), and animal control officers (11.3%) (Figure 6).

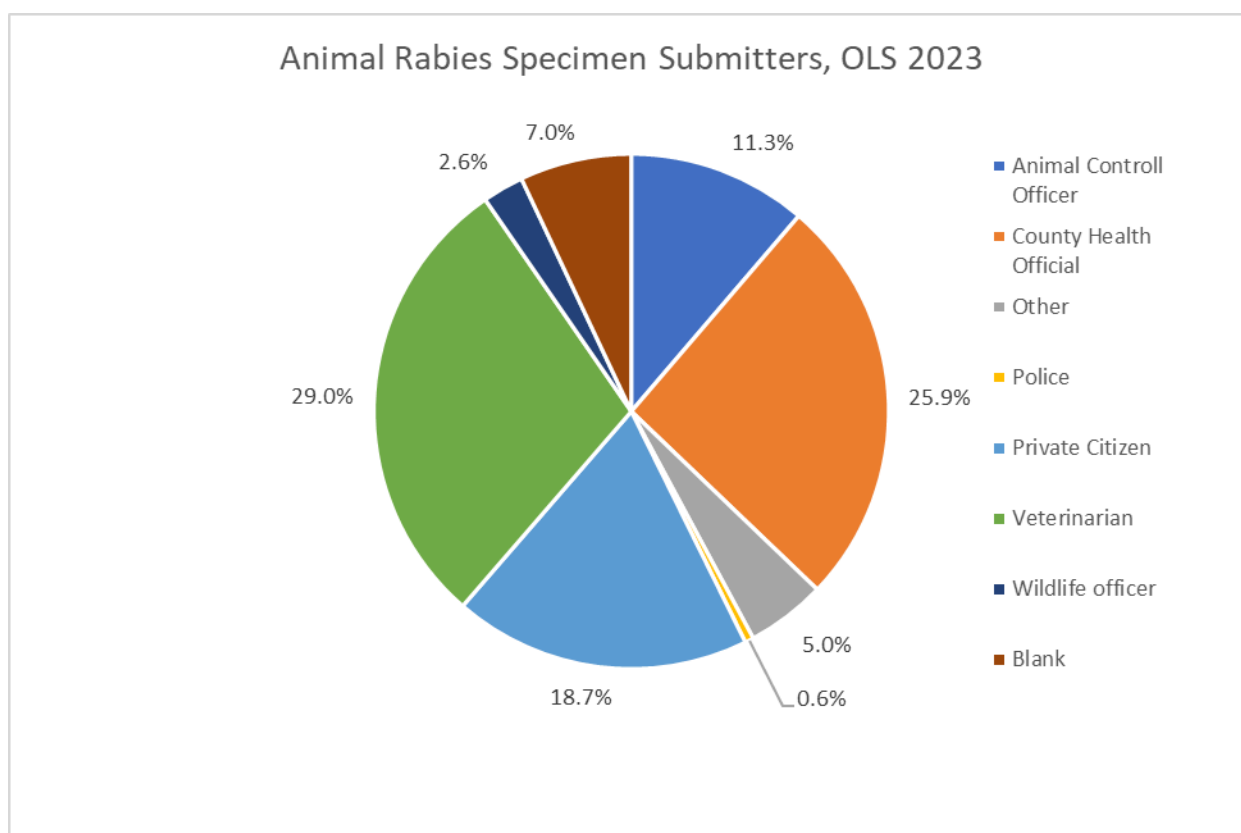


Figure 6. Percentage of animal rabies specimens by submitters during 2023.

DISCUSSION

Cases of rabies are reported each year in West Virginia, with the majority of those coming from the Eastern Surveillance Region. In 2023, most positive rabies cases came from wild animal specimens (86.6%), primarily bats, raccoons, and skunks. While almost half (47.1%) of animals tested by OLS were dogs or cats, these specimens accounted for only six (16.7%) of the rabies cases. Domestic animals, such as dogs or cats, who are not up to date on their 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 reasons for sending specimens for testing include human exposure, pet/domestic animal exposure, “other”, 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 virus.

In 2023, the number of specimens tested by OLS was higher than in 2022 (424 in 2022; 509 in 2023) (Figure 7). Bats and raccoons are still the animals with the highest number of positive cases in both 2022 and 2023. Dogs and cats are two of the domestic animals most commonly tested by OLS in both years and have a relatively small percentage of rabies positive cases when compared to the number tested (dogs: 1.1 % in 2022; 0.9% in 2023, cats: 1.6% in 2022; 3.5% in 2023). Vaccinating pets for rabies is the most effective way to reduce the number of domestic animals infected with rabies.

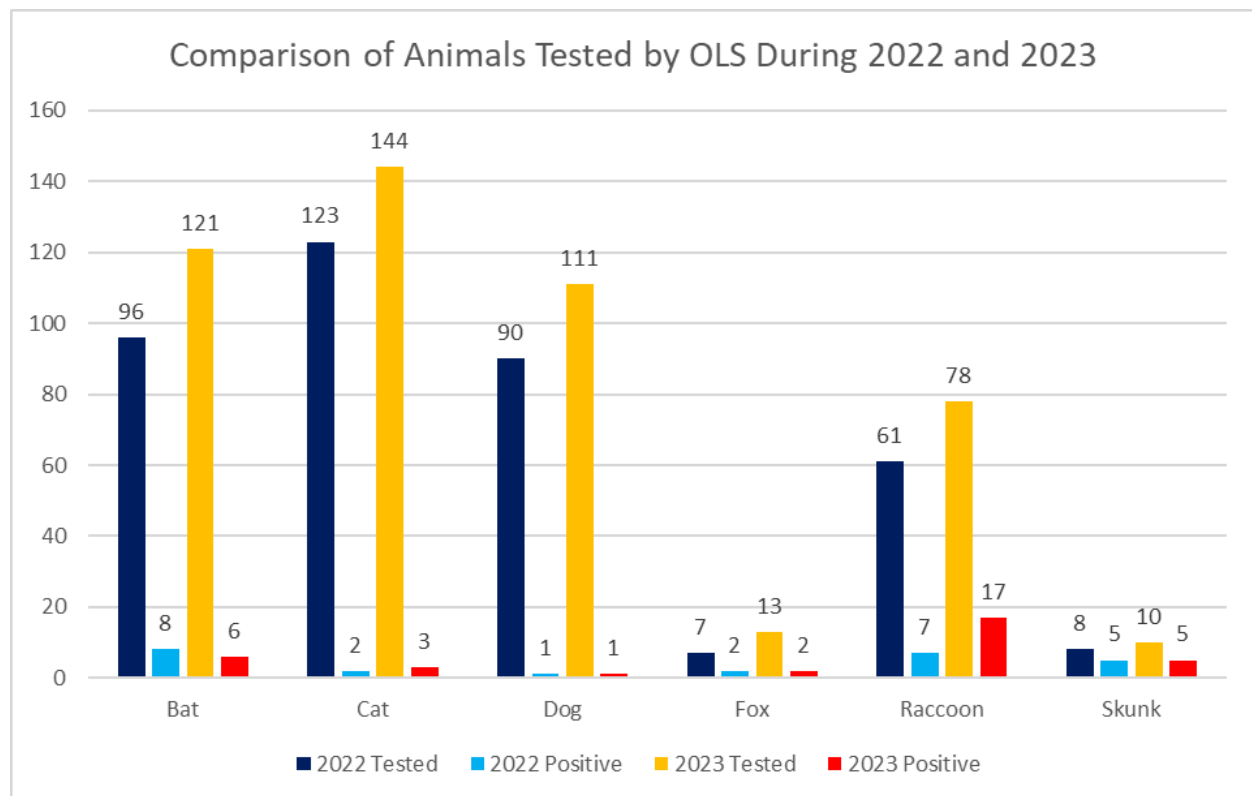


Figure 7. Number of animals tested positive for rabies during 2022 and 2023.

Morgan, Pendleton, and Randolph counties tied for the highest percentage of animals tested positive (50%), followed closely by Mineral (33.3%), and a three-way tie between Hardy, Monroe, and Tucker Counties (25%). All other counties had a less than 25% positivity rate (Figure 8).

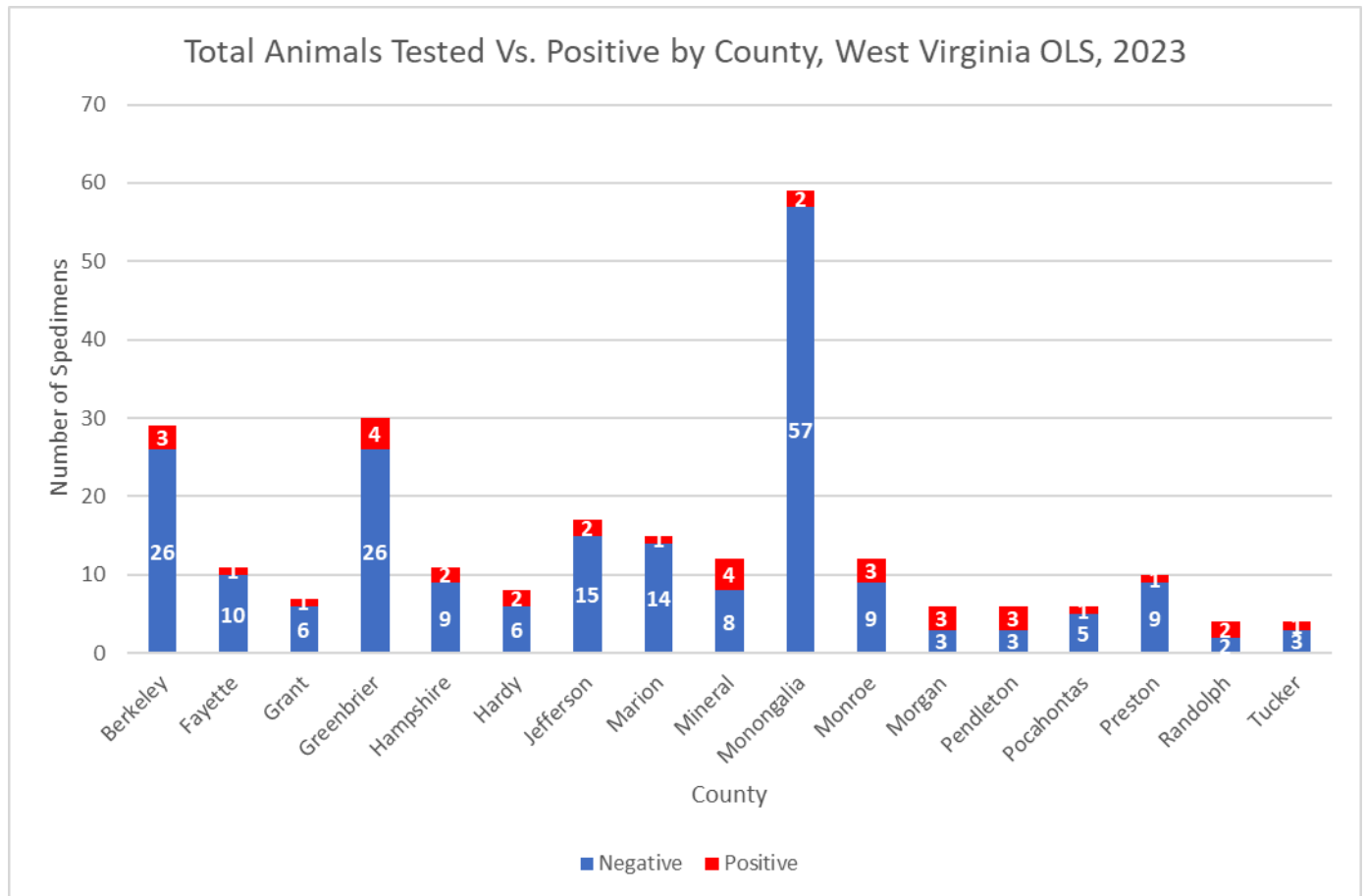


Figure 8. Number of animals tested vs. positive, OLS, 2023

Reported animal rabies cases hit a peak in 2019 but have been much lower than in past years. 2022 and 2023 started to have case counts climb. (Figure 9). This is especially noticeable in the Southeastern portion of West Virginia, which has seen a massive increase in cases in 2023. Rabies vaccination in domestic animals and ORV Project rabies vaccination in wild animal populations have contributed to this decrease and stabilization in the number of rabies cases. The goal is to lower the numbers in hotspot areas and eventually eradicate raccoon rabies in West Virginia.

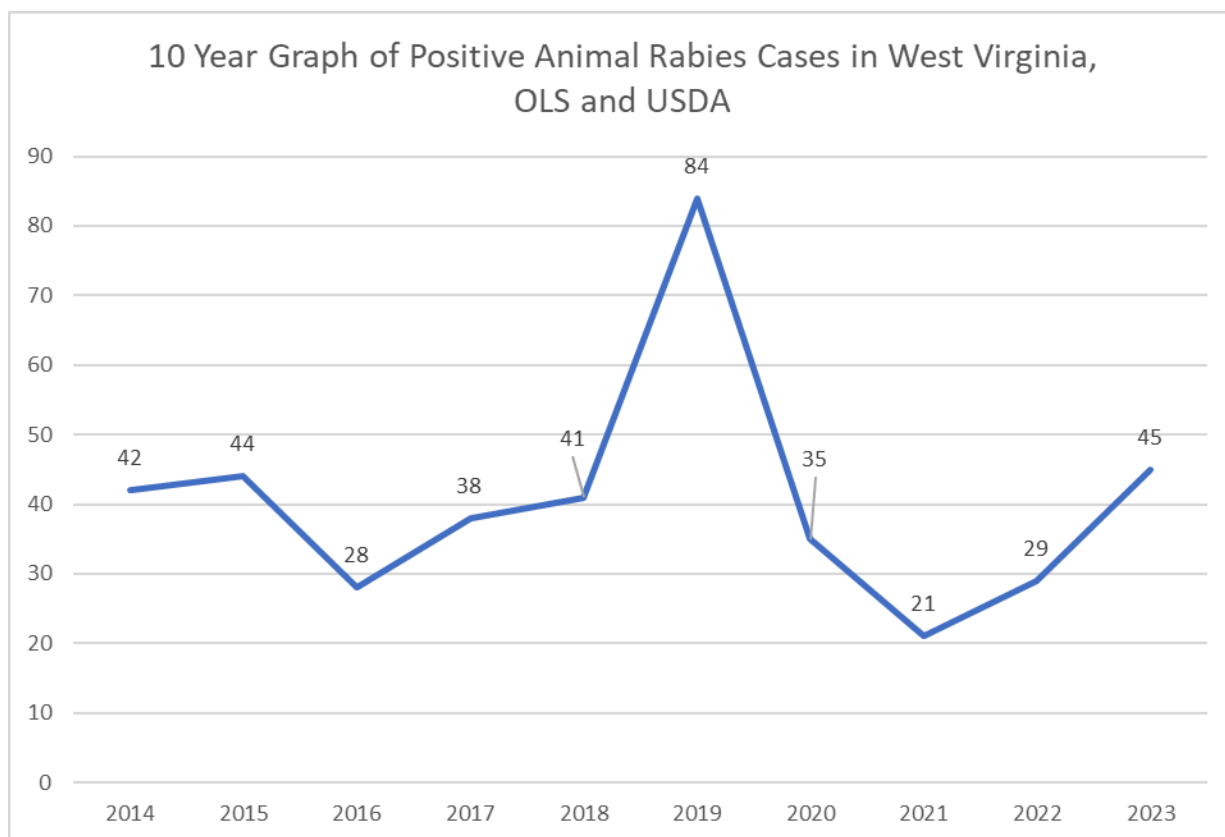


Figure 9. West Virginia rabies cases by year, 2014-2023.

A bite or scratch by any wild animal that could possibly carry the rabies virus (e.g., bat, skunk, raccoon, fox) is considered evidence for treatment in humans, unless the animal can be found and tested 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 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 LHD if you see an animal acting strangely or if you or your pet have been bitten by a wild or unfamiliar domestic animal.

The West Virginia 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, visit:

- Division of Infectious Disease Epidemiology Animal Bites and Rabies Webpage:
oepe.wv.gov/rabies/pages/default.aspx
- Centers for Disease Control and Prevention Rabies Webpage:
www.cdc.gov/rabies/index.html
- United States Department of Agriculture Rabies Webpage:
www.aphis.usda.gov/aphis/ourfocus/wildlifedamage/programs/nrmp/ct_rabies
- West Virginia Office of Laboratory Services Webpage:
dhhr.wv.gov/ols/Pages/default.aspx