# WEST VIRGINIA 2020 ANNUAL ANIMAL RABIES REPORT

WEST VIRGINIA Department of Health & Human Resources
BUREAU FOR PUBLIC HEALTH

Office of Epidemiology and Prevention Services
Division of Infectious Disease Epidemiology
350 Capitol Street, Room 125
Charleston, West Virginia 25301

Michael I. Abshire, BS
Kim A. Rhoton, MPH
Eric J. Dotseth, MS

## INTRODUCTION

Rabies is a fatal but preventable disease for mammals caused by the rabies virus. Rabies virus is transmitted through direct contact (such as through broken skin or mucous membranes in the eyes, nose, or mouth) with saliva or brain/nervous system tissue from an infected animal.

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 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 found strain of rabies is racoon 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 (see 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, 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 the rabies among wildlife. Figure 2 shows the ORV bait zone for West Virginia in 2020.

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

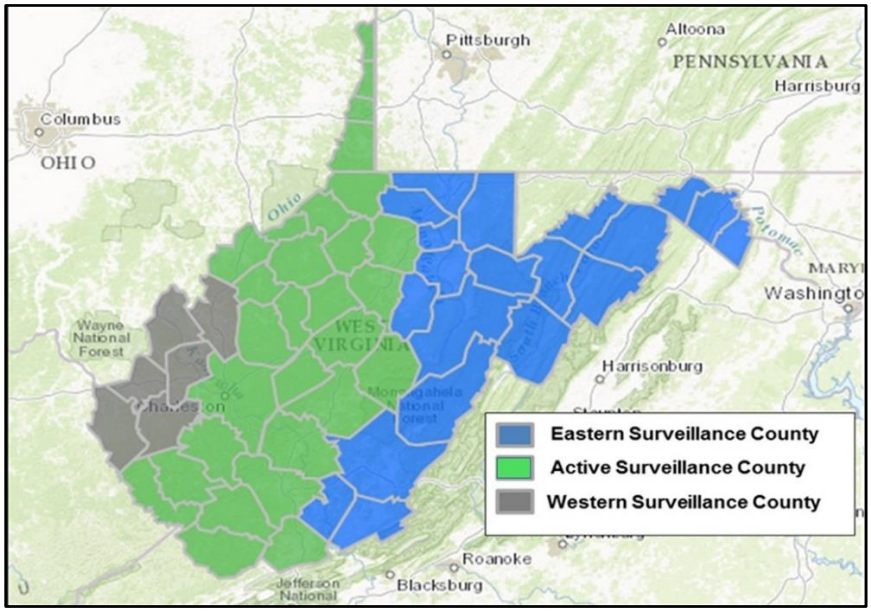
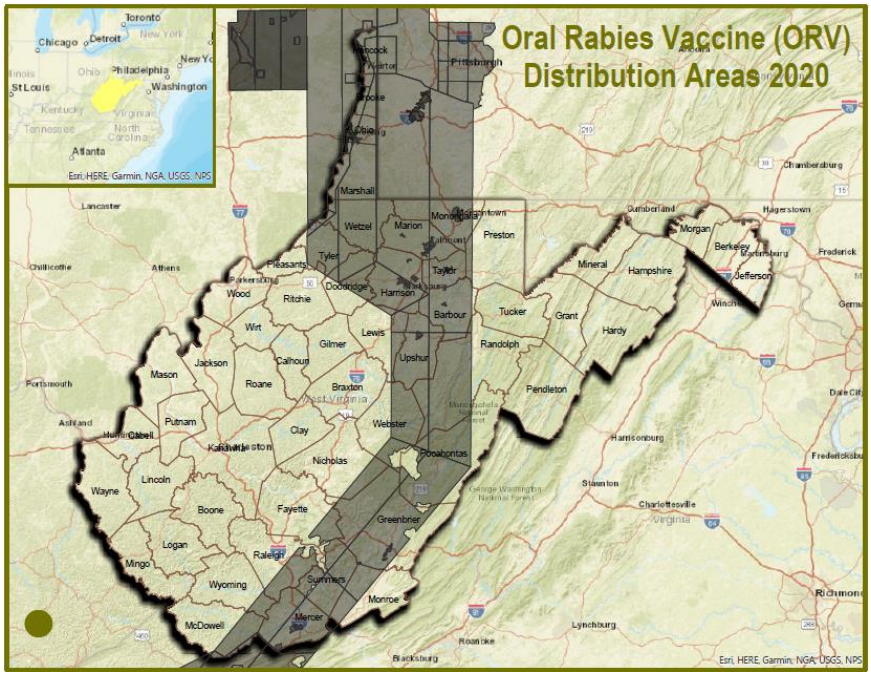



**Figure 2. ORV Project distribution areas for 2020 (courtesy of USDA).**




Because 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 and Human Resources' (DHHR) Office of Laboratory Services (OLS) for testing. To monitor rabies activity in West Virginia, data are collected and analyzed annually.

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*

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.

### *Data Collection*

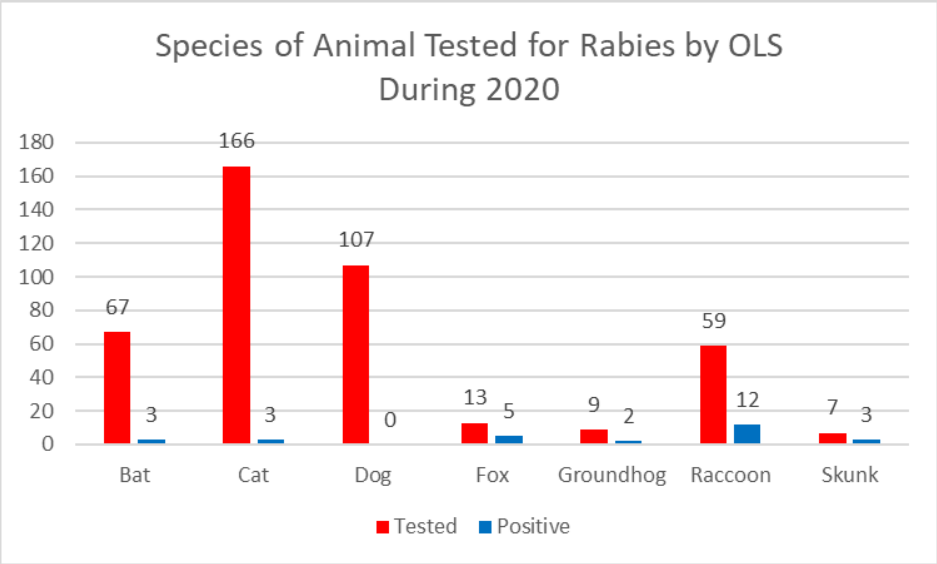
A specimen submission form, submitted with the specimen to OLS, was utilized to collect the following data: species, location (county, address, geographic coordinates), date of collection, specimen submitter (e.g., veterinarian, county official) and the reason for submission (e.g., human exposure, pet/domestic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

## RESULTS

During 2020, 459 specimens were tested for rabies by OLS. Of these, 28 (6.1%) were positive. Wild animals including raccoons, groundhogs, bats, foxes, and skunks accounted for 89.2% of all positive animals (Figure 3); all additional positive animal specimens were cats. Other animal specimens submitted for testing included cows, coyotes, deer, dogs, horses, goats, opossums, rabbits, and squirrels.

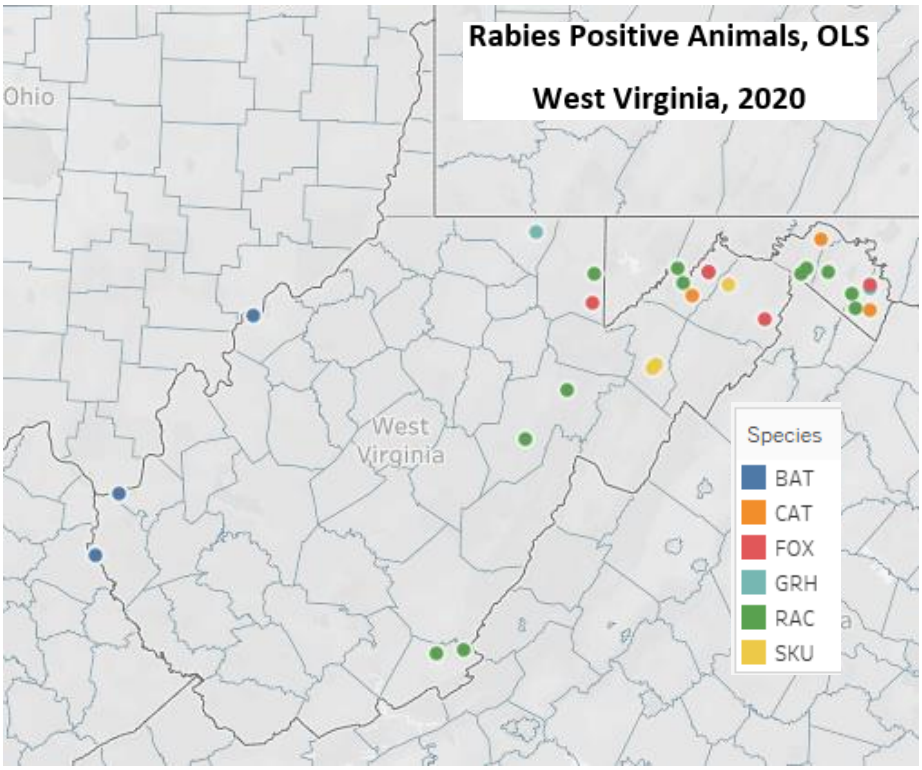
The USDA tested 831 specimens for surveillance purposes in 2020. Of these, 10 (1.2%) were positive raccoons collected in the Eastern or Active Surveillance Regions. Raccoons accounted for the majority (83.5%) of specimens tested by the USDA; other animals tested included beavers, bobcats, coyotes, foxes, opossums, skunks, and groundhogs, all of which were negative.

**Figure 3. Animal species tested for rabies by OLS – West Virginia, 2020.**



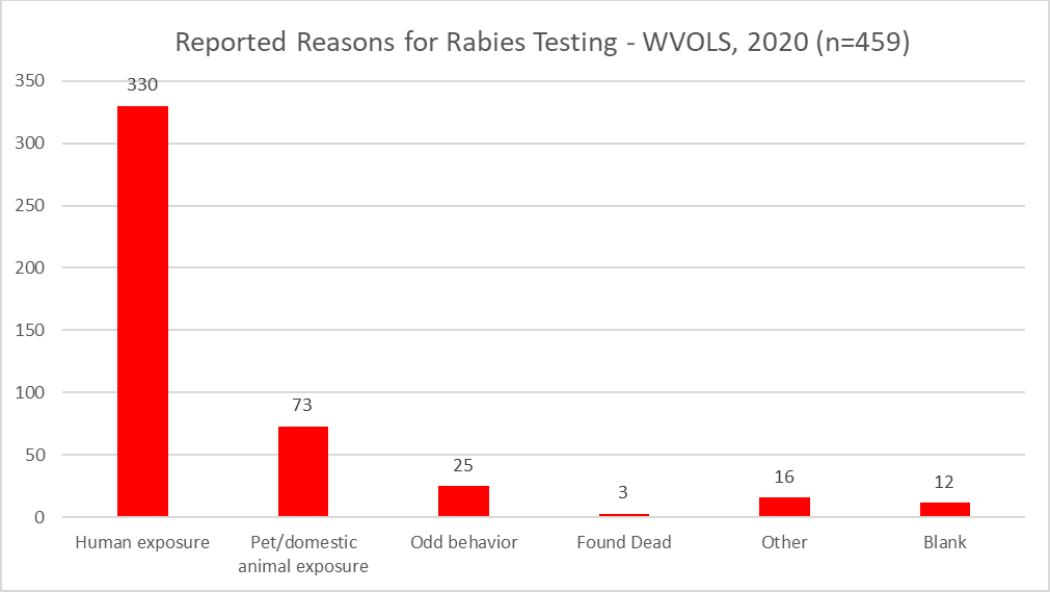

In 2020, rabies positive animals were submitted to OLS and USDA from 15 counties (27.2%). Two positive animals were submitted from the Western Surveillance Region, both bats found in Cabell and Wayne counties. Three (7.9%) of the positive specimens were found in the Active Surveillance Region and these included two positive specimens from Ohio County (raccoons), and one positive specimen from Wood County (bat). The remaining 33 (86.8%) rabies positive animals were reported from the Eastern Surveillance Region.

**Figure 4. Rabies positive animals tested by OLS - West Virginia, 2020.**



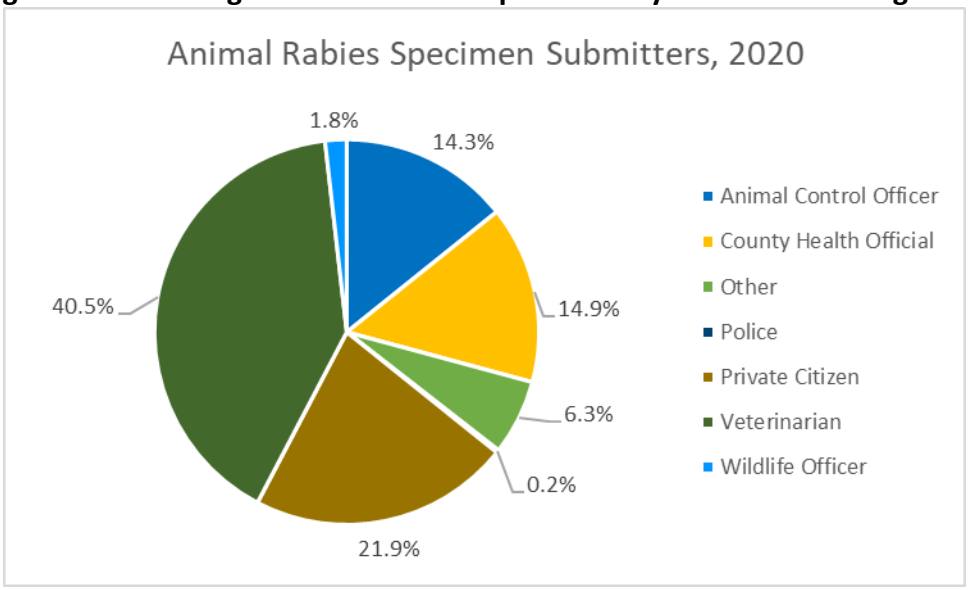
Most specimens (n=300, 65.4%) were sent to OLS for testing because of human exposure to a potentially rabid animal (Figure 5). Pet and other domestic animal exposure were the next most frequently reported reasons (n=73, 15.9%) for specimen submission followed by an animal exhibiting odd behavior (n=25, 5.4%).

**Figure 5. Reported reasons for rabies testing during 2020.**




Veterinarians submitted the greatest percentage of specimens (40.5%), followed by private citizens (21.9%), county health officials (14.9%) and animal control officers (14.3%) (Figure 6).

**Figure 6. Percentage of animal rabies specimens by submitters during 2020.**



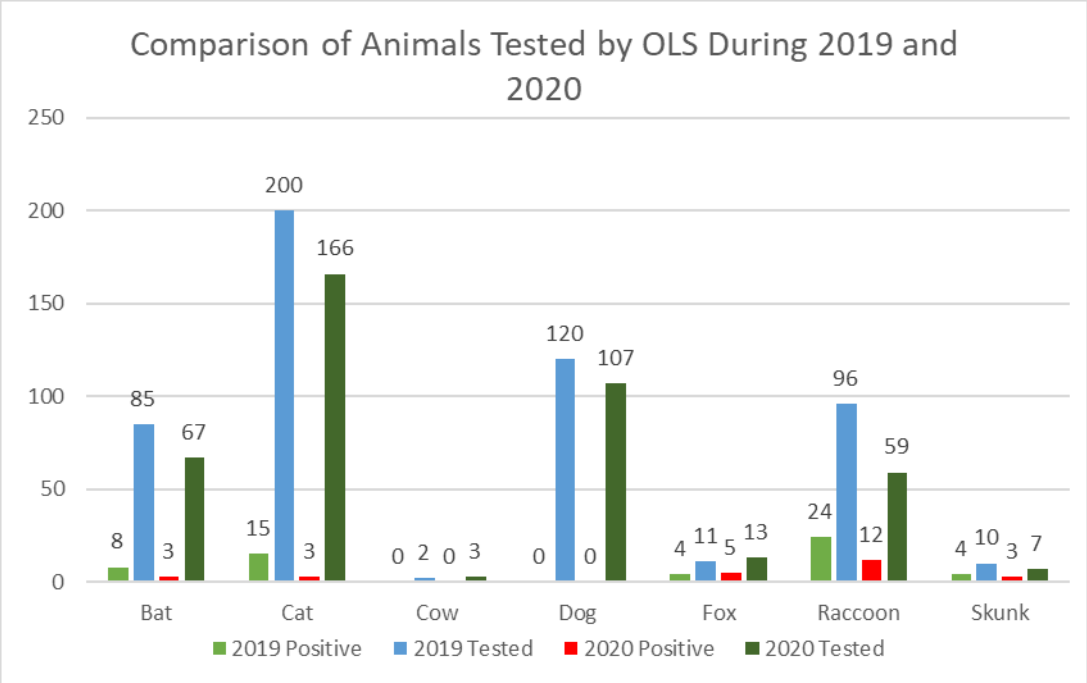
**DISCUSSION**

Cases of rabies are reported each year in West Virginia, with the majority of those coming from the Eastern Surveillance Region. In 2020, most positive rabies cases came from wild animal specimens (91.4%). While over half (60.1%) of animals tested by OLS were dogs or cats, these specimens accounted for only three (10.7%) of animal 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.

Veterinarians, county health officials, animal control officers, and private citizens comprise most of the specimen submitters for rabies testing. 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 virus.

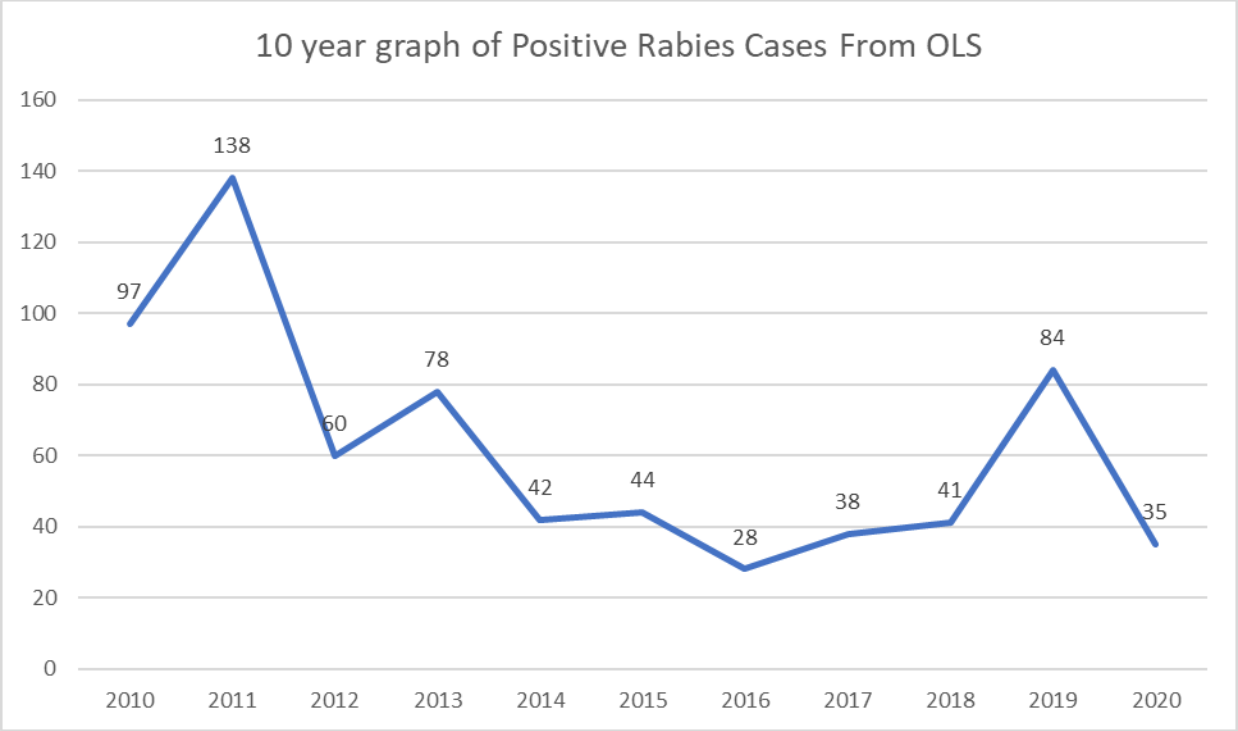
In 2020, the number of specimens tested by OLS were lower than in 2019 (562 in 2019; 459 in 2020) (Figure 7). Skunks and raccoons are still the animals with the highest number of positive cases. Dogs and cats are the two animals tested most often in both years by OLS and have a relatively small percentage of positive cases when compared to number tested (dogs: 0% in both years; cats: 7.5% in 2019; 10.7% in 2020). Vaccinating pets for rabies is the most effective way to reduce the number of domestic animals that are tested for rabies.

**Figure 7. Number of animals tested and positive for rabies during 2019 and 2020.**



Reported animal rabies cases declined rapidly after 2011 but have leveled off after 2014. There was a massive spike in animal rabies cases in 2019, but cases in 2020 were much more aligned with the decline in positives (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 rabies in the state of West Virginia.

**Figure 8. West Virginia rabies cases by year, 2010-2020.**




A bite or scratch by any wild animal that could possibly carry the virus (e.g., bat, skunk, raccoon, fox) is considered evidence enough for treatment in humans, unless the animal can be found and tests negative. 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 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 trashcan.
- 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 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 DHHR's Zoonotic Disease Program thanks 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 webpage: https://oeps.wv.gov/rabies/pages/default.aspx
- Centers for Disease Control and Prevention's Rabies webpage: https://www.cdc.gov/rabies/index.htm
- United States Department of Agriculture's Rabies webpage: https://www.aphis.usda.gov/aphis/ourfocus/wildlifedamage/programs/nrmp/ct_rabies
- West Virginia Office of Laboratory Services' webpage: https://dhhr.wv.gov/ols/Pages/default.aspx