



Arkansas
State Public Health

Veterinarian
Surveillance
Summary
2021–2022

Zoonotic Diseases

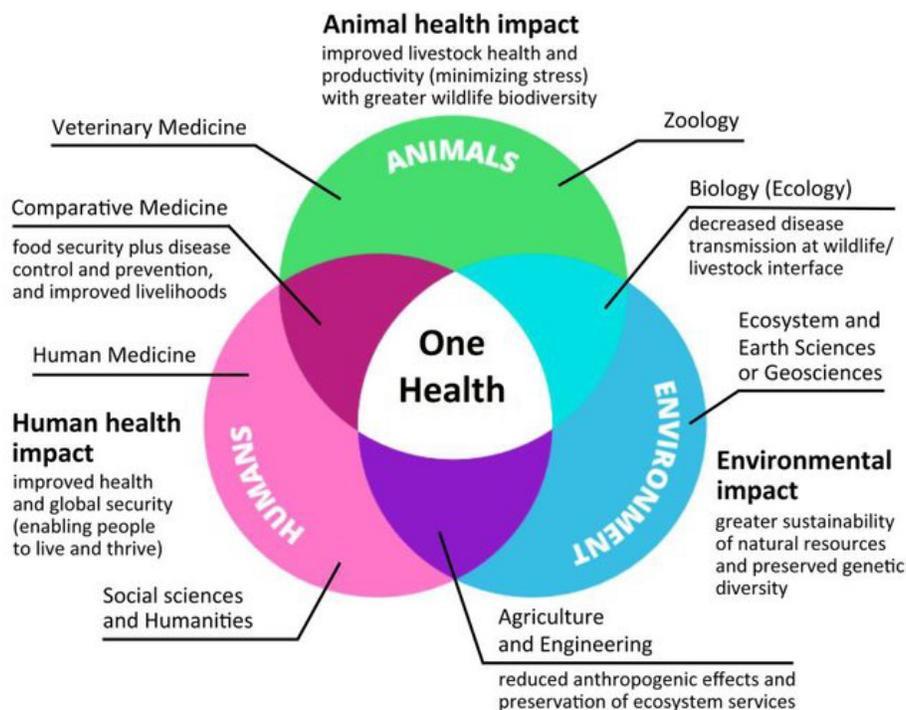


Zoonotic diseases are diseases that can be transmitted between animals and humans either directly or indirectly through a vector such as a tick, mosquito, or other organism. They can be caused by viruses, bacteria, parasites, and fungi. Scientists estimate that more than 6 out of every 10 known infectious diseases in people can be spread from animals, and 3 out of every 4 new or emerging infectious diseases in people come from animals.¹

Zoonotic diseases develop and are spread within complex cycles involving people, animals, vectors, and the environment. Thus, it is essential for healthcare providers, veterinarians, public health officials, and environmental scientists to work together in the identification, prevention, treatment, and control of zoonotic diseases.

This collaborative initiative is known as **One Health**.

The following report provides a summary of epidemiologic information for select Zoonotic, Vector-Borne, and Fungal diseases in Arkansas.



¹CDC Zoonotic Disease: <https://www.cdc.gov/onehealth/basics/zoonotic-diseases.html>

²Figure: Barcaccia, Gianni & D'Agostino, Vincenzo & Zotti, Alessandro & Cozzi, Bruno. (2020). Impact of the SARS-CoV-2 on the Italian Agri-food Sector: An Analysis of the Quarter of Pandemic Lockdown and Clues for a Socio-Economic and Territorial Restart. 10.20944/preprints202007.0095.v1.

One Health and COVID-19



SARS-CoV-2 in animals

While the main driver of community and international spread in the current pandemic is human to human transmission, animal cases of infection with SARS-CoV-2 (SCV-2), though still only occasional occurrences, continue to rise. Currently, **699 outbreaks** in animals have been reported globally, affecting **26 species** in **36 countries**. Some countries have experienced a high prevalence of outbreaks in mink farms, and variant strains have now been identified in mustelids.¹

In Arkansas, four domestic animals (two cats and two dogs) have tested positive for SCV-2 infection. Starting in November 2021, USDA-APHIS Wildlife Services began sampling wild white-tailed deer for active infection of SCV-2 virus and the presence of antibodies indicative of prior infection. During the first year of this study, over 11,000 samples were taken from deer in over 27 states, including Arkansas, with a national prevalence of 12.3%. Year 2 surveillance is ongoing to determine the presence and significance of persistent variants including expansion of surveillance to other deer species.²



Key Messages

- It appears that in some situations, animals can spread the virus to humans.
- **At this time, there is no evidence that companion animals play a significant role in spreading SARS-CoV-2, and routine testing is not recommended.**
- For more updated information, please go to the following websites:
 - <https://www.cdc.gov/coronavirus/2019-ncov/daily-life-coping/animals.html>
 - <https://www.aphis.usda.gov/aphis/dashboards/tableau/sars- dashboard>

¹<https://www.woah.org/app/uploads/2023/01/sars-cov-2-situation-report-20.pdf>

²https://www.aphis.usda.gov/animal_health/one_health/downloads/qa-covid-white-tailed-deer-study.pdf

One Health and Mpox (Monkeypox)



2022 Outbreak – How is it different?

Mpox, formerly called Monkeypox, is an orthopoxvirus, similar to smallpox, that is endemic to parts of central and western Africa. Its name was recently changed to avoid confusion and stigma since the wildlife reservoir of this virus is still unknown. Previously, almost all mpox cases in people outside of Africa were linked to international travel to countries where the disease commonly occurs or through imported animals. However, in 2022, the largest worldwide outbreak of mpox occurred, affecting over **85,000 people** in over **110 countries**, with a high proportion of cases reported from countries without previously documented mpox transmission, and no obvious travel link to endemic countries. In addition, the following differences were identified:

- Many cases – but not all – in gay, bisexual, or other men who have sex with men
- Symptoms are different
 - Rash still common but often starting in genital/anal areas; sometimes no rash on other parts of body
 - Symptoms mild/non-existent before rash appears
 - Not clear why unusual presentation at this time

Key Messages

- Although mpox started as a zoonotic disease and previous outbreaks clearly demonstrated infection from animals to humans, this outbreak is currently defined by sustained transmission from person-to-person only.
- Infected animals can spread mpox virus to people, and it is possible that people who are infected can spread mpox virus to animals through close contact, although this has not yet been officially documented.



- For more updated information, please go to the following websites:
 - <https://www.cdc.gov/poxvirus/monkeypox/index.html>
 - <https://www.cdc.gov/poxvirus/monkeypox/veterinarian/index.html>

One Health and Avian Influenza



Highly Pathogenic Avian Influenza (HPAI)

In early January 2022, U.S. infectious disease surveillance systems detected a highly pathogenic avian influenza virus (HPAI) strain A(H5N1) leading to a record number of “bird flu” outbreaks in wild birds, poultry, and backyard flocks, affecting nearly 60 million birds in all 50 states, making it the largest outbreak of avian influenza in the U.S. In contrast, the last outbreak of HPAI in the U.S. occurred in 2016 and affected 50 million poultry birds but there were very few limited reports of sick wild birds. This strain of H5N1 is not only affecting birds as infections have also been detected in over 100 mammals, with at least half of these infections reported in red foxes.

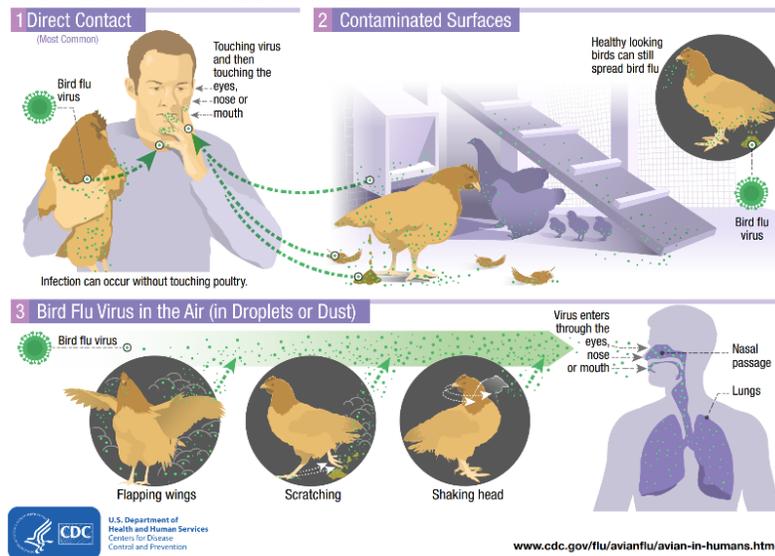
HPAI outbreaks have devastating effects including significant economic damages, high mortality rates, and increased risk of viral mutations that can lead to better adaptations for human-to-human transmission and risk for pandemic potential impacts.

Key Messages:

- Human-to-human transmission of avian influenza viruses is rare.
- Current risk to the general public is low. Public health has monitored thousands of exposed people and have identified one infected person with mild, self-limiting disease at this time.

How Infected Backyard Poultry Could Spread Bird Flu to People

Human Infections with Bird Flu Viruses Rare But Possible



- For more updated information, please go to the following websites:
 - <https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/animal-disease-information/avian/avian-influenza/2022-hpai>
 - <https://www.cdc.gov/flu/avianflu/index.htm>

Selected Images of Birds that Can be Infected with Bird Flu



Ducks



Swans



Geese



Chickens



Turkeys

AR Reporting Summary

Cases in people, unless specified



Tick Related Illness	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Anaplasmosis	8	8	7	15	16	15	4	8	9	12	12
Babesiosis	0	0	0	0	0	1	0	2	1	1	2
Bourbon Virus	n/a	n/a	n/a	n/a	n/a	n/a	0	0	1	0	0
Ehrlichiosis	53	84	165	237	194	203	207	141	232	160	118
Heartland Virus	n/a	n/a	n/a	n/a	n/a	n/a	2	1	1	0	0
Lyme disease	n/a	n/a	n/a	n/a	1	7	7	4	19	12	11
Spotted Fever Rickettsiosis	558	835	488	826	891	821	1218	1066	1085	215*	169
Tularemia	39	26	41	43	24	24	32	57	95	36	21
Year Total	658	953	701	1121	1126	1071	1470	1279	1443	221*	334
Mosquito Related Illness - Locally Acquired	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Eastern equine Encephalitis (EEE)	0	0	1	0	0	0	0	0	0	0	0
St. Louis Encephalitis (SLE)	3	0	0	0	0	0	0	0	0	0	0
California Serogroup Encephalitis	0	1	0	0	0	0	0	0	0	0	0
West Nile virus (WNV)	1	64	18	11	18	9	18	8	9	1	9
Year Total	4	65	19	11	18	9	18	8	9	1	9
Mosquito Illness in Animals - Horses	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
EEE (horses)	0	1	3	0	0	1	2	0	7	0	5
WNV (horses)	0	9	8	1	3	10	1	2	1	0	0
Year Total	0	10	11	1	3	11	3	2	8	0	5
Mosquito Travel Associated	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Malaria	6	4	2	7	9	6	5	2	0	3	2
Chikungunya Virus	0	0	0	7	4	1	0	0	0	0	0
Dengue	0	1	2	4	1	3	0	2	3	1	0
Zika	0	0	0	0	3	16	2	0	0	0	0
Year Total	6	5	4	18	17	26	7	4	3	4	2
Other One Health Related Illness	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Animal Rabies	60	131	152	151	73	23	42	31	26	33	24
Blastomycosis	6	9	9	6	21	8	12	4	25	23	27
Brucellosis	3	1	3	0	1	3	1	2	3	2	2
Chagas Disease	0	0	0	1	0	2	0	0	2	1	2
Coccidioidomycosis	1	0	0	0	7	1	7	6	11	8	8
Histoplasmosis	66	51	56	67	60	73	159	40	88	69	87
Q-Fever	5	1	3	5	3	5	4	3	2	0	2
Toxoplasmosis	1	1	4	9	2	11	12	15	20	26	82
Typhus fever-fleaborne, murine	1	2	2	3	2	2	1	0	9	2	0

*The case definition for Spotted Fever Rickettsiosis was revised in 2020 to increase specificity, resulting in fewer reports meeting confirmed or probable case definition for surveillance purposes.

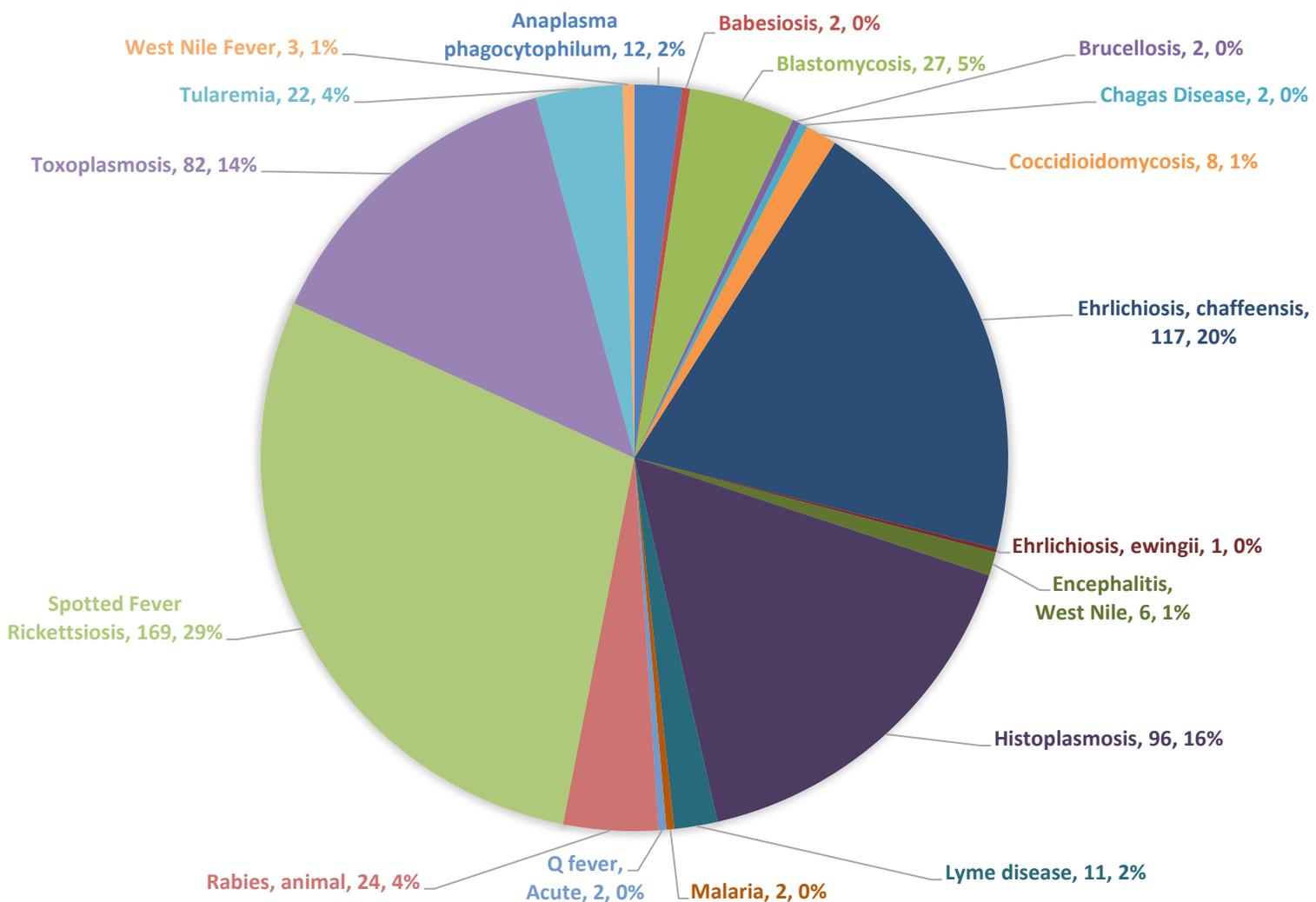
Zoonoses Overview in Arkansas



Zoonotic diseases are very common, both in the United States and around the world. Scientists estimate that more than 6 out of every 10 known infectious diseases in people and 3 out of every 4 new or emerging infectious diseases in people come from animals.

Spotted fever rickettsiosis is the most prevalent zoonotic disease in Arkansas, followed by ehrlichiosis and histoplasmosis.

Cases of zoonotic/fungal disease reported to ADH in 2021



Tick-borne Diseases

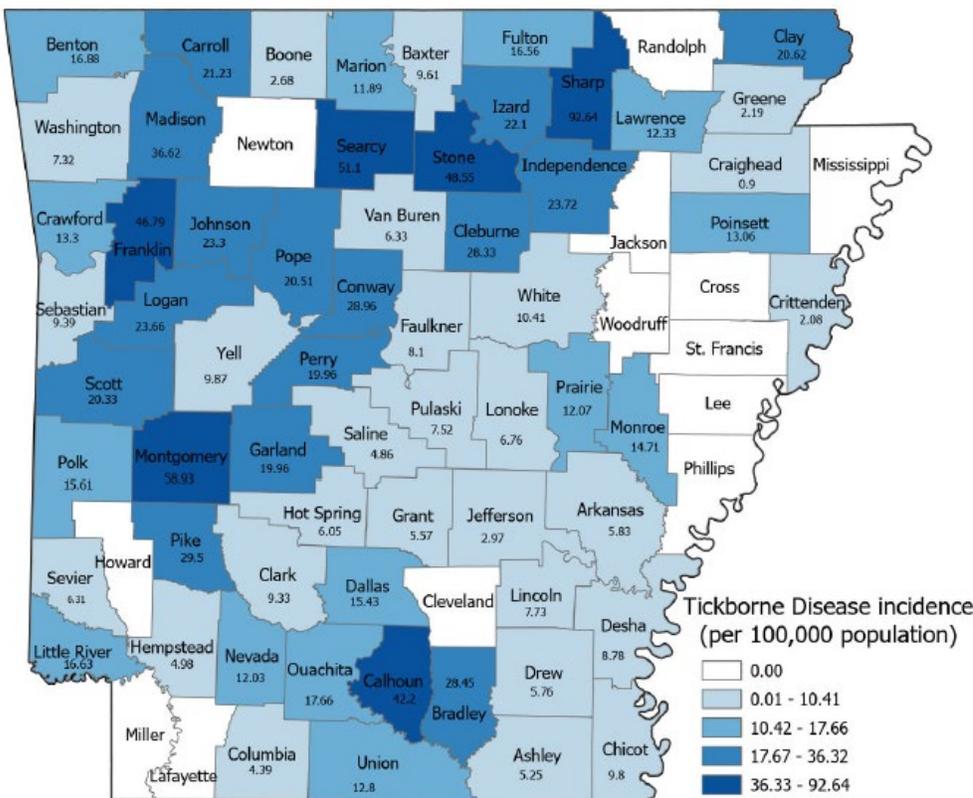


All tickborne disease

Tickborne Disease (TBD) is a type of zoonotic disease (an infectious disease transmitted between animals and humans) that is transmitted by ticks, a member of the arachnid family. In Arkansas, ticks are responsible for more human disease than any other arthropod vector, but not all ticks transmit disease. Of the many different tick species found in Arkansas, only a select few bite and can transmit disease to humans and animals.

The tickborne rickettsial diseases (TBRD), including Rocky Mountain Spotted Fever (RMSF), Ehrlichiosis (HME), and Anaplasmosis (HGA) are caused by *Rickettsia rickettsii*, *Ehrlichia chaffeensis* (or *ewingii*), and *Anaplasma phagocytophilum*, in humans, respectively. Different species of these rickettsial agents are responsible for diseases in animals. Other tick-borne pathogens include babesia parasites, *Francisella tularensis* (tularemia), and emerging viruses, such as Powassan, Heartland, and Bourbon virus.

TBD pathogens are maintained in nature by interactions of wild mammals with hard-bodied (ixodid) ticks and are the most frequently reported zoonotic diseases found in Arkansas. Some other TBD pathogens are transmitted by soft-bodied ticks, which are not found here at this time.



334 cases of tickborne disease in 2021

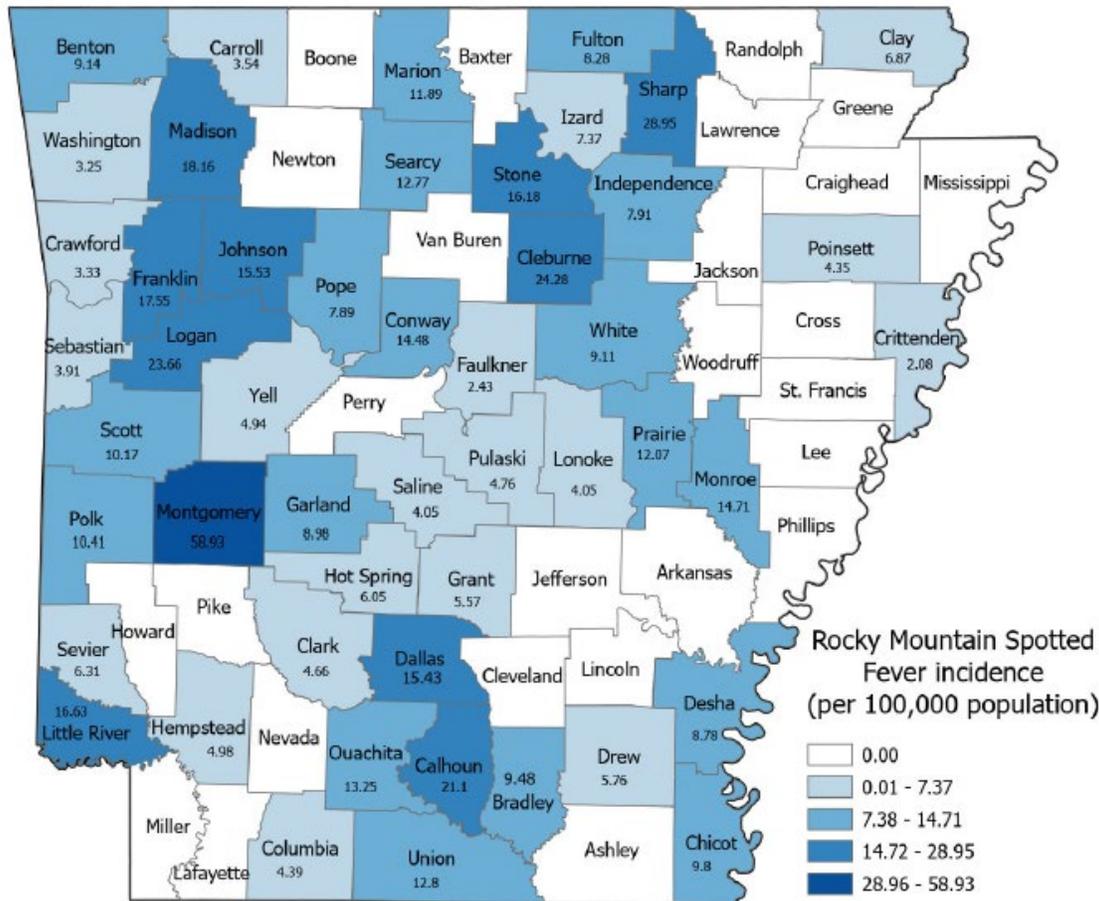
Tick-borne Diseases



Spotted Fever Group Rickettsia

Rocky Mountain spotted fever (RMSF) is the most common tickborne disease in Arkansas. RMSF is caused by the bacterium *Rickettsia rickettsii*. This bacterium is carried mostly by the American dog tick, *Dermacentor variabilis*, but also by the brown dog tick, *Rhipicephalus sanguineus*. In addition to *Rickettsia rickettsii*, several other tick-borne species of Rickettsia have been shown to cause similar human infections and may be transmitted by other tick species such as the Lone star tick, *Amblyomma americanum*. For this reason, these organisms are now being broadly grouped under the heading "Spotted Fever group Rickettsia (SFGR)". Dogs can also be infected and become ill with many of these rickettsial pathogens.

ADH investigated 392 reports of RMSF in 2021, resulting in 169 confirmed or probable cases.



169 cases of RMSF in 2021

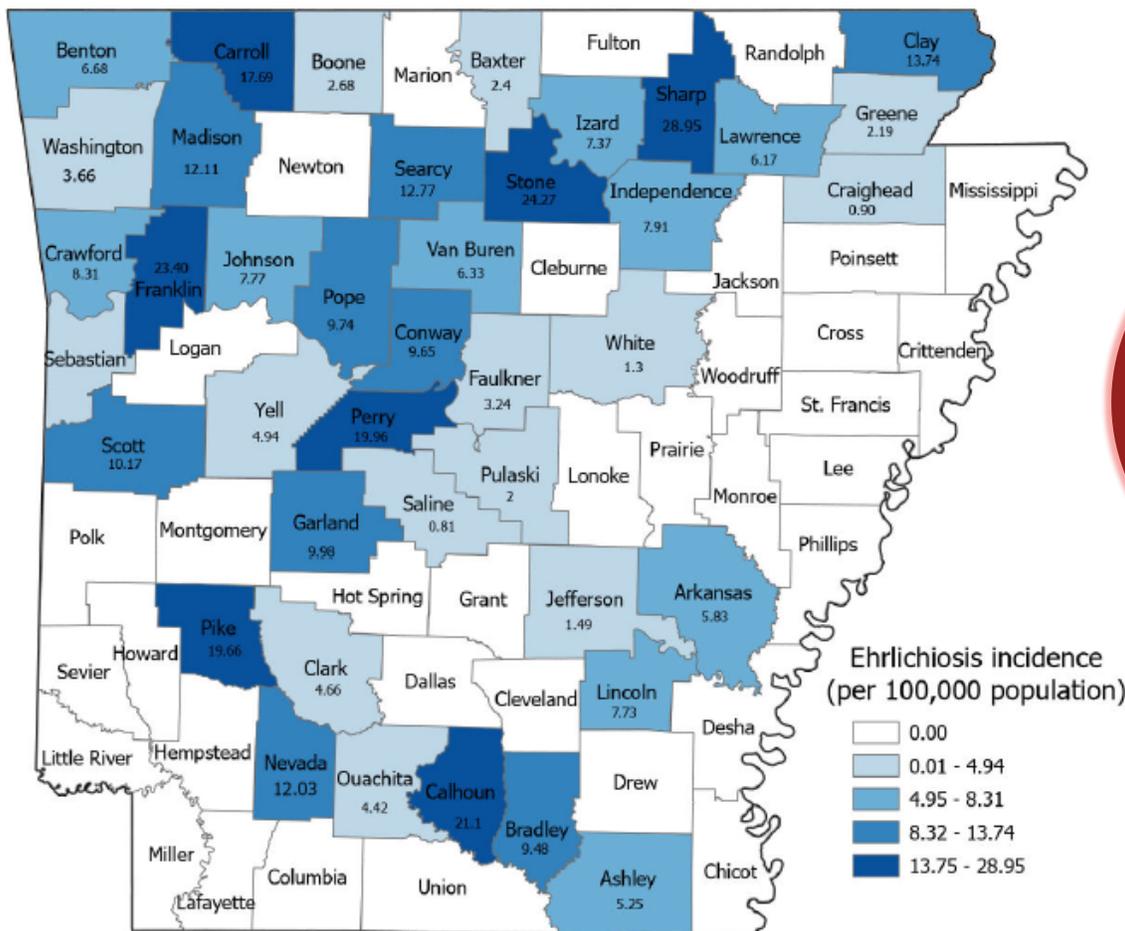
Tick-borne Diseases



Ehrlichiosis

Ehrlichiosis is the general name used to describe several bacterial diseases that affect animals and humans. Human ehrlichiosis is a disease caused by at least three different ehrlichial species in the United States: *Ehrlichia chaffeensis*, *Ehrlichia ewingii*, and *Ehrlichia muris euclairensis*. Dogs are infected by a different species, *Ehrlichia canis*, which causes a similar disease as in humans.

ADH investigated 202 reports of Ehrlichiosis in 2021, resulting in 119 confirmed or probable cases (one case of *E. ewingii* and 118 cases of *E. chaffeensis*).



119 cases of Ehrlichiosis in 2021

Tick-borne Diseases

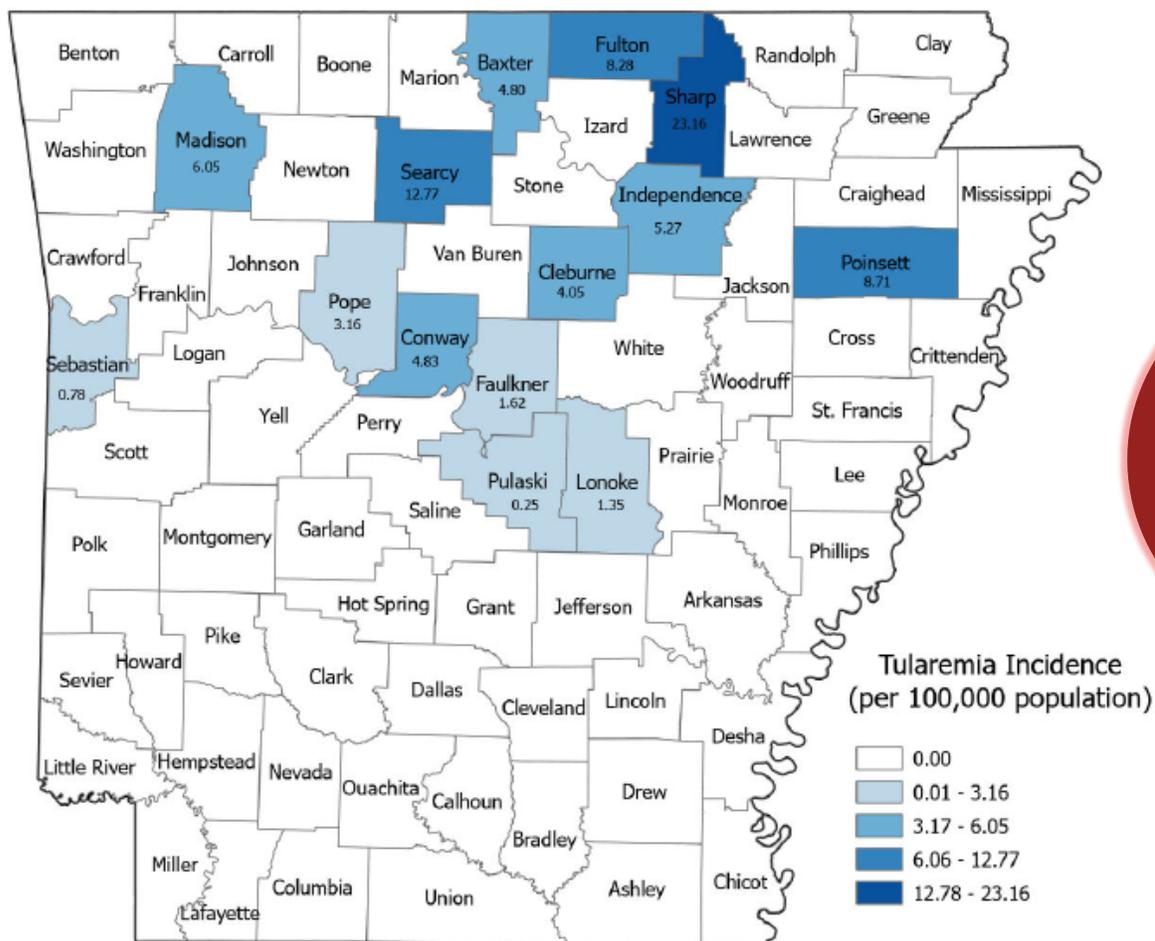


Tularemia

Tularemia is an uncommon but potentially serious bacterial zoonosis that has been reported from all

U.S. states, except Hawaii. The etiologic agent, *Francisella tularensis*, is highly infectious and can be transmitted through arthropod bites, direct contact with infected animal tissue, inhalation of contaminated aerosols, and ingestion of contaminated food or water. Because of the low infectious dose and severity of disease potential, tularemia is designated a Tier 1 select agent, indicating that it is considered one of the highest biological terrorist threats. Tularemia is endemic in ticks in Arkansas, which is the source of most human infections in the state.

ADH investigated 102 reports of Tularemia in 2021, resulting in 21 confirmed or probable cases.



21 cases of Tularemia in 2021

Mosquito-borne Diseases

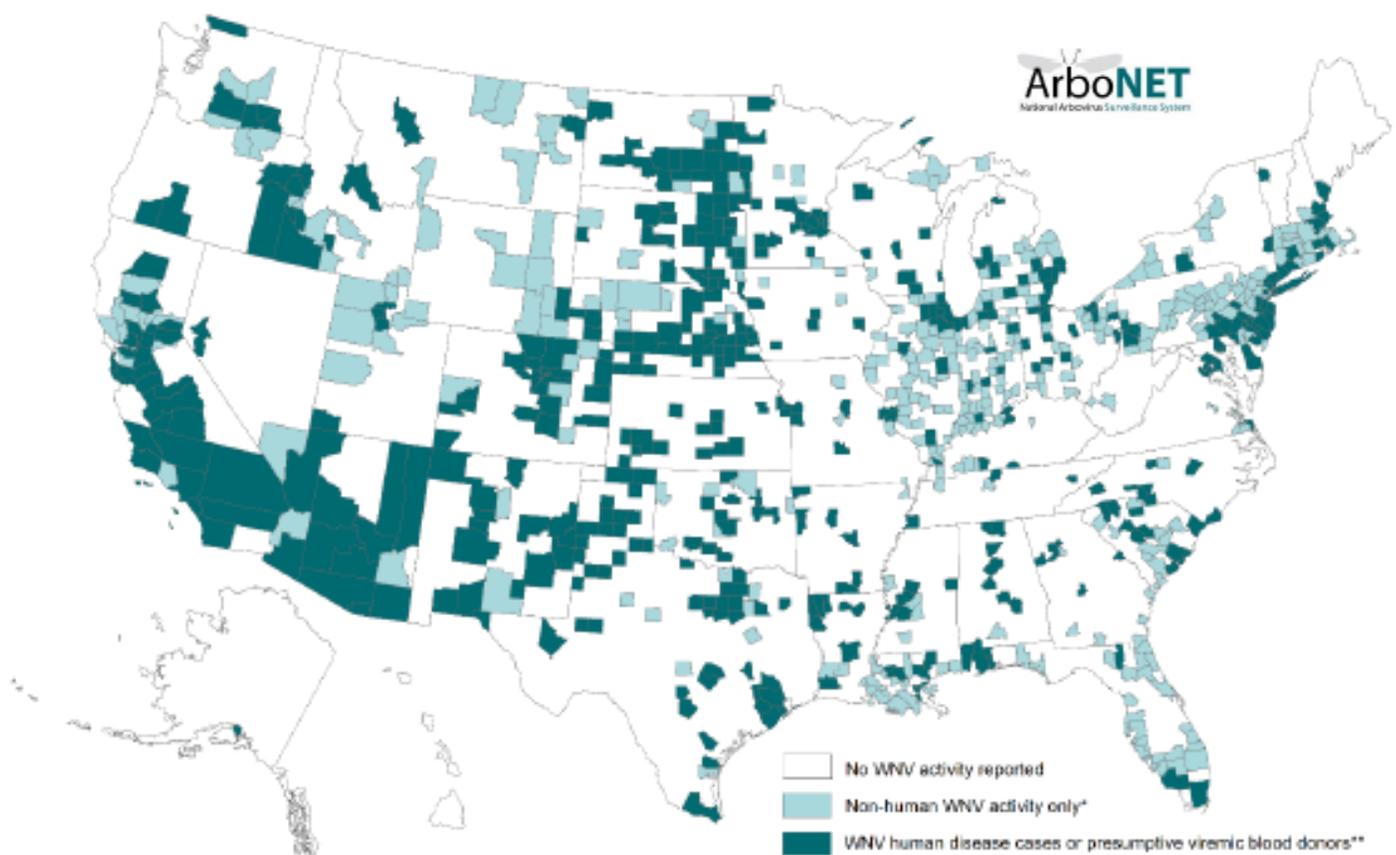


West Nile Virus

Arkansas reports cases of West Nile Virus (WNV) infections in both humans and horses to the National Arbovirus Surveillance System, or ArboNET, which is managed by the Centers for Disease Control and Prevention (CDC). In 2021, Arkansas reported eight cases of WNV in humans, six of which were neuroinvasive, two were non-neuroinvasive, including four deaths. There were no reported cases of WNV in horses during 2021.

There are currently no active surveillance activities testing mosquito pools for viral pathogens; instead, public health messaging focuses on communicating that the risk of infection from mosquitoes is always possible when mosquitoes are active in Arkansas.

Figure 1. West Nile virus activity reported to ArboNET, by county — United States, 2021



*WNV veterinary disease cases, or infections in mosquitoes, birds, or sentinel animals

**WNV human disease cases or presumptive viremic blood donors. Presumptive viremic blood donors have a positive screening test which has not necessarily been confirmed.

Mosquito-borne Diseases

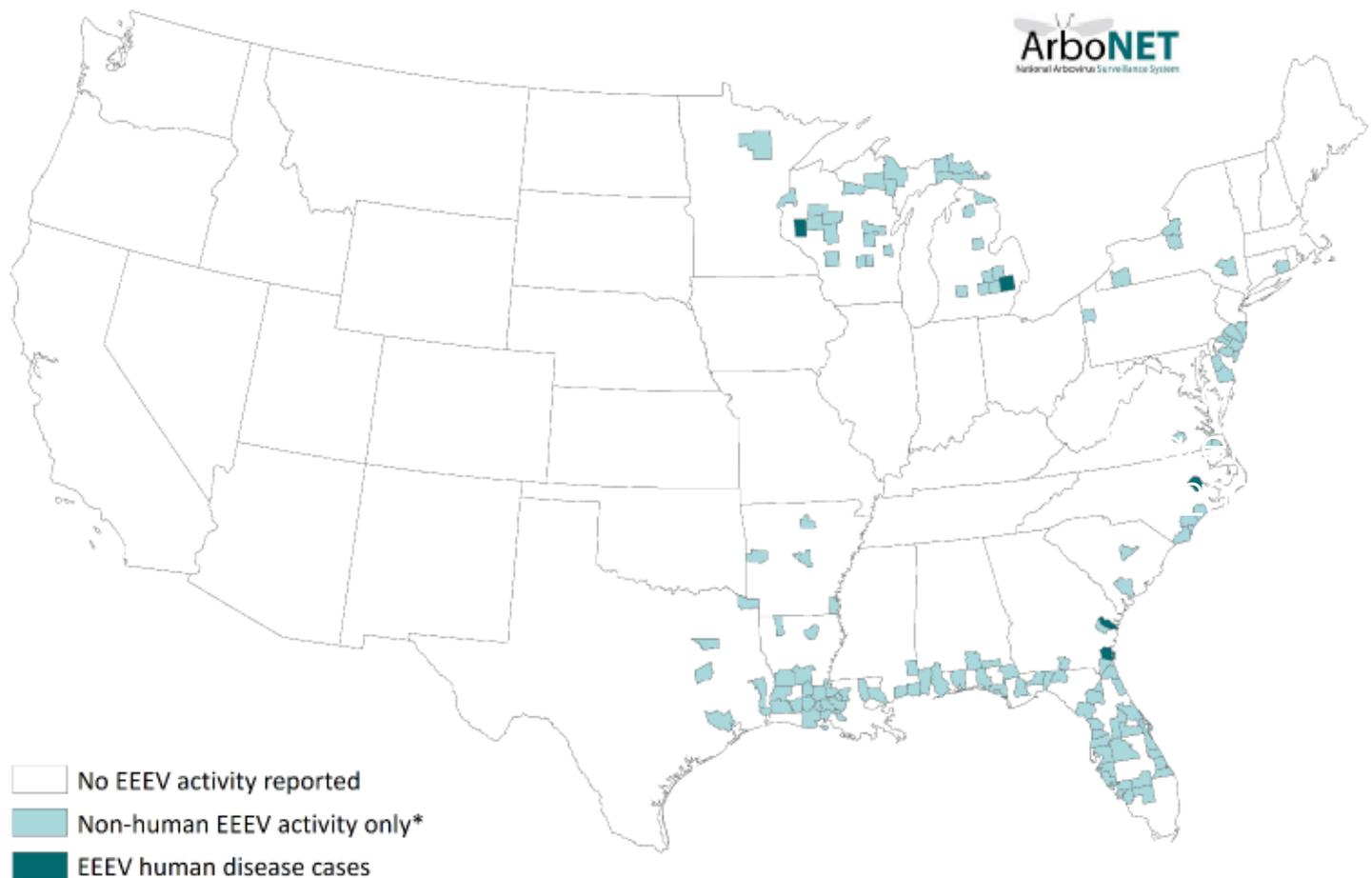


Eastern Equine Encephalitis

Arkansas reports cases of Eastern Equine encephalitis virus (EEEV) infections in both humans and horses to the National Arbovirus Surveillance System, or ArboNET, which is managed by the Centers for Disease Control and Prevention (CDC). In 2021, Arkansas reported no cases of EEEV in humans, but there were five cases of Eastern Equine Encephalitis (EEEV) reported in horses.

Other non-endemic mosquito-borne diseases are occasionally reported in Arkansas when residents return from travel and become ill. This includes Dengue virus, Jamestown Canyon virus, La Crosse encephalitis virus, St. Louis encephalitis virus, Chikungunya virus, and Zika virus.

Figure 4. Eastern equine encephalitis virus activity reported to ArboNET, by county — United States, 2021



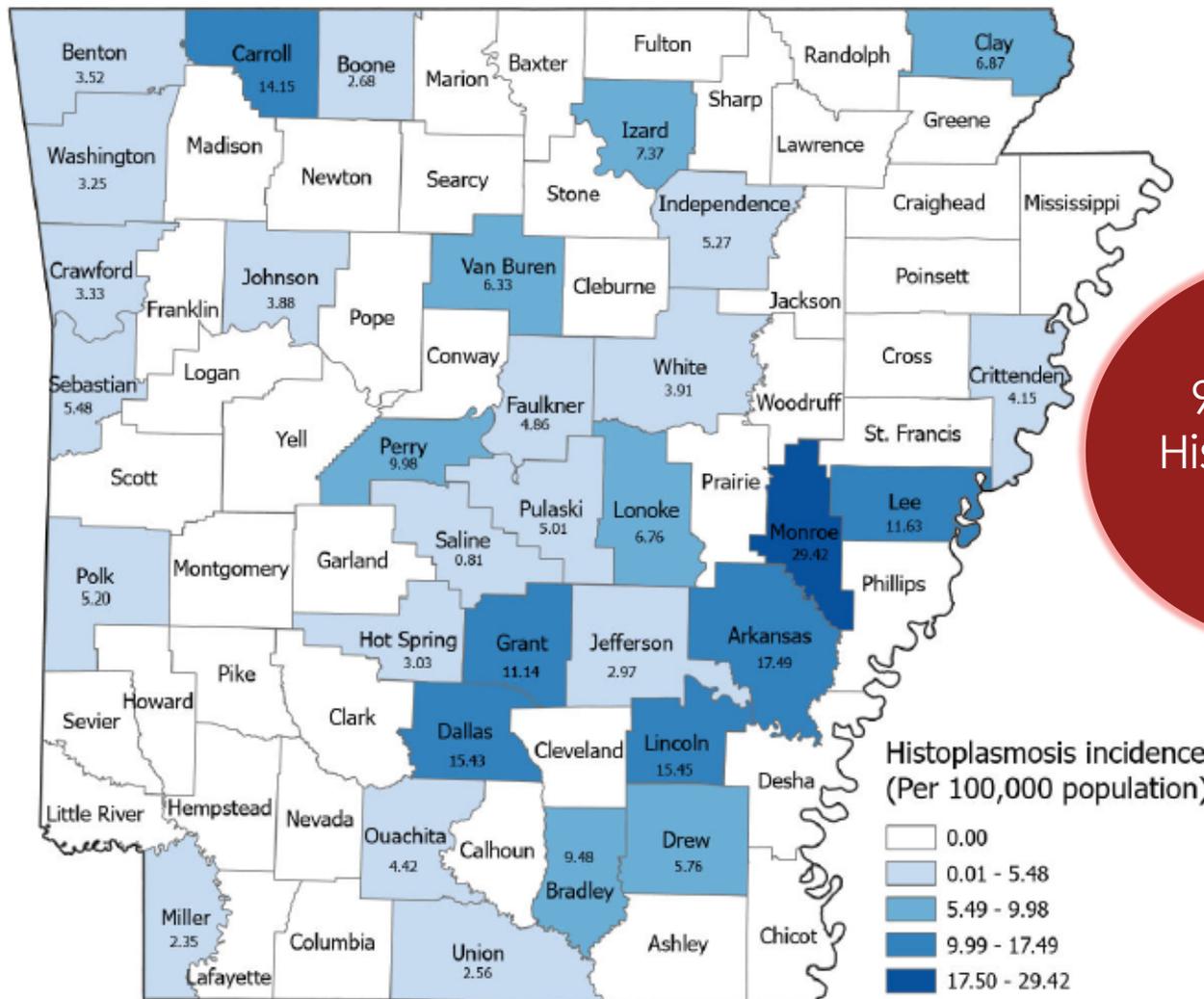
* EEEV veterinary disease cases, or infections in mosquitoes, birds, or sentinel animals

Fungal Diseases



Histoplasmosis and blastomycosis are the two most common endemic fungal diseases in Arkansas and are on Arkansas's reportable disease list. Coccidioidomycosis (Valley Fever), while not known to be endemic in Arkansas, is also on Arkansas's reportable disease list, but almost all cases are travel-associated. All three of these fungal diseases can infect animals as well as humans.

ADH investigated 168 reports of histoplasmosis in 2021, resulting in 96 confirmed or probable cases. Many cases reflected more severe disease progression and had evidence of delayed diagnosis and/or missed opportunities for appropriate treatment. This indicates an increased need for provider education and public outreach for awareness regarding fungal disease risks in Arkansas.



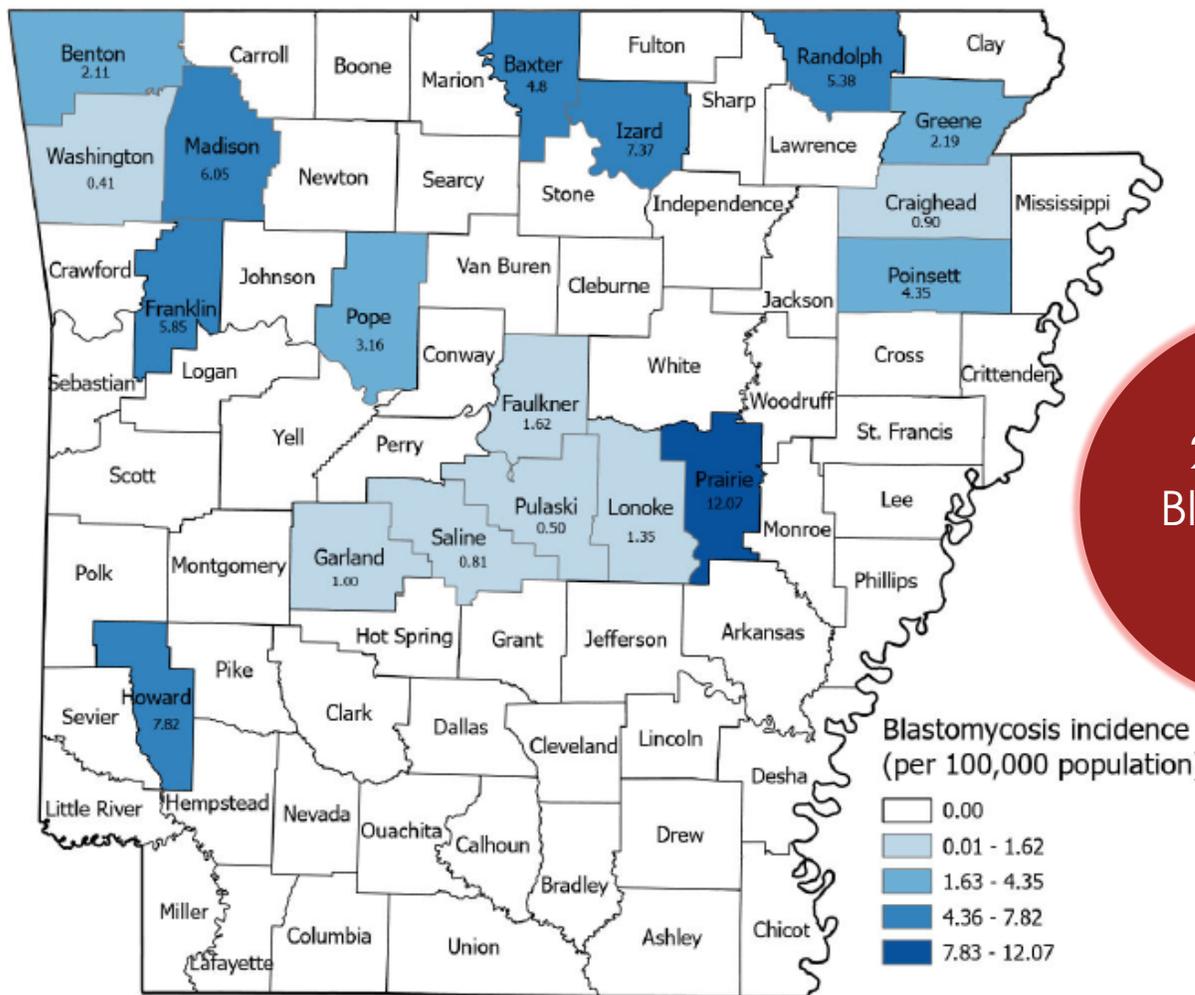
96 cases of Histoplasmosis in 2021



Fungal Diseases

Blastomycosis is less frequently reported than histoplasmosis in Arkansas, but similarities in clinical symptoms and cross-reactivity of serological tests, make distinguishing between the two difficult for most cases. Like histoplasmosis, many cases of blastomycosis reflected more severe disease progression, delayed diagnosis, and missed opportunities for appropriate therapy, indicating the need for improved provider education and public outreach for awareness of fungal disease risks in Arkansas.

ADH investigated 60 reports of blastomycosis in 2021, resulting in 27 confirmed or probable cases.



27 cases of Blastomycosis in 2021

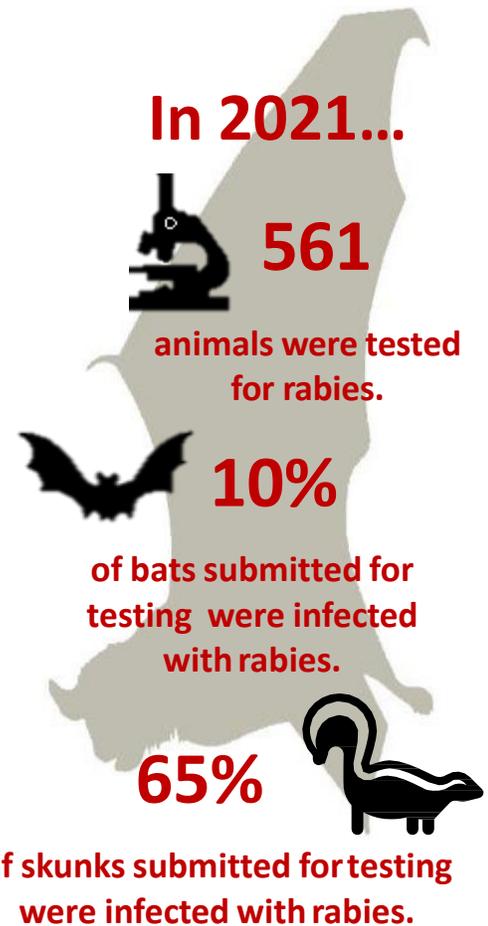
Rabies



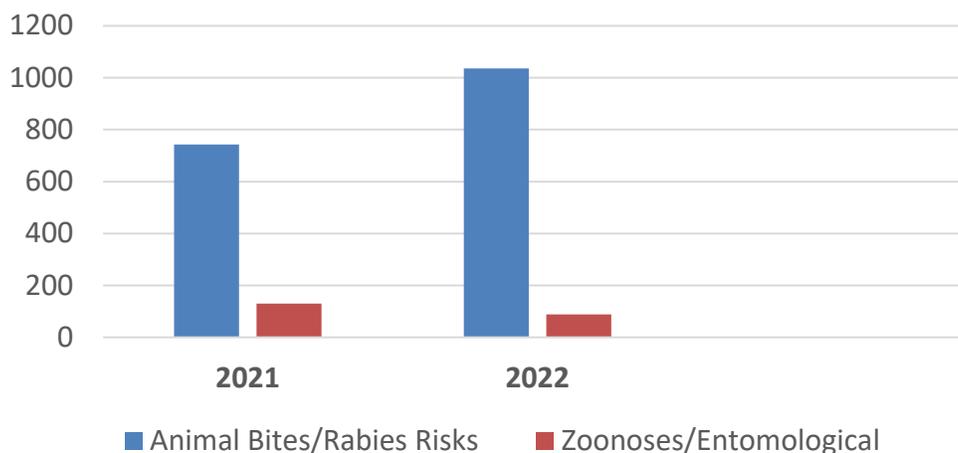
Rabies is a deadly but preventable viral disease of mammals most often transmitted through a bite from an infected animal. The rabies virus is transmitted when saliva from an infected animal is exposed to broken skin or mucous membranes. Rabies infects the central nervous system, which causes disease in the brain and death in almost 100% of symptomatic cases.

In Arkansas, the State Public Health Veterinarian investigated and coordinated positive animal rabies follow-up, including quarantines for domestic animals and risk assessments for people exposed to rabid animals.

Additionally, the State Public Health Veterinarian coordinated the recommendation for Post-Exposure Prophylaxis (PEP) for animal bites and non-bite encounters, whether the rabies status of the animal is known or not. Arkansas Department of Health (ADH) Environmental Health Specialists (EHS) conducted quarantine monitoring for animals that were either exposed themselves to a rabid animal (incubation period quarantine) or that bit a person (infectious period quarantine).



Animal bite exposures / rabies PEP consult calls

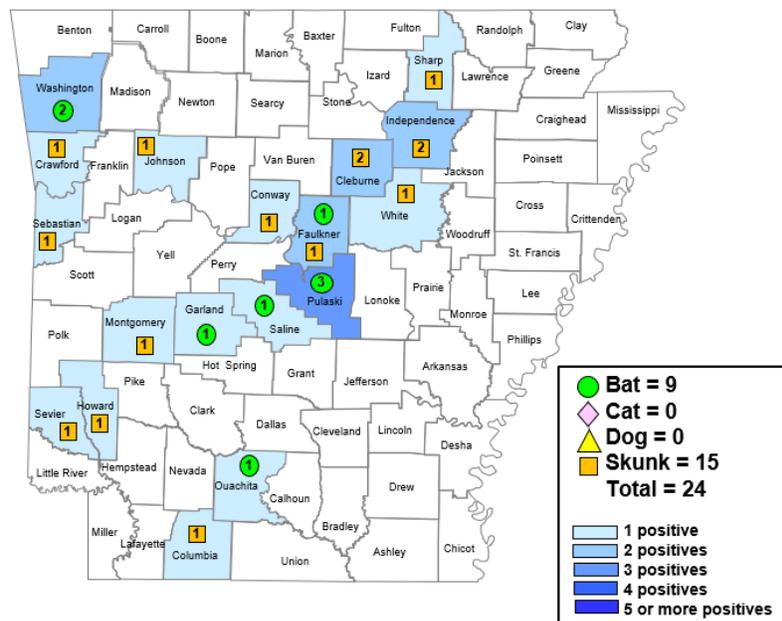


Rabies in 2021

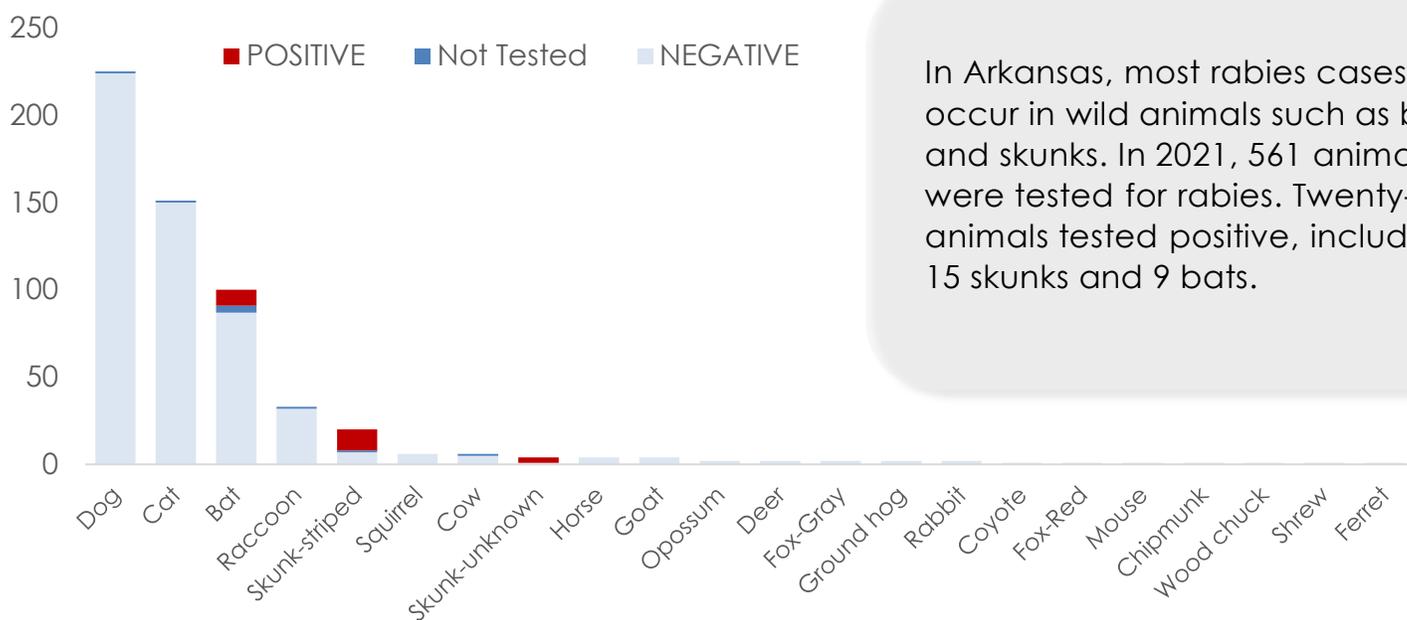


Rabies data is collected from a passive surveillance system. The data is dependent on informed veterinarians, animal control officers, and citizens submitting specimens of animals suspected to be infected with rabies. Because this system does not include widespread sampling from wildlife populations, statewide surveillance is incomplete, and the true incidence of rabies is unknown, but widely underestimated.

Animal Rabies in 2021



Rabies Testing in Arkansas, 2021

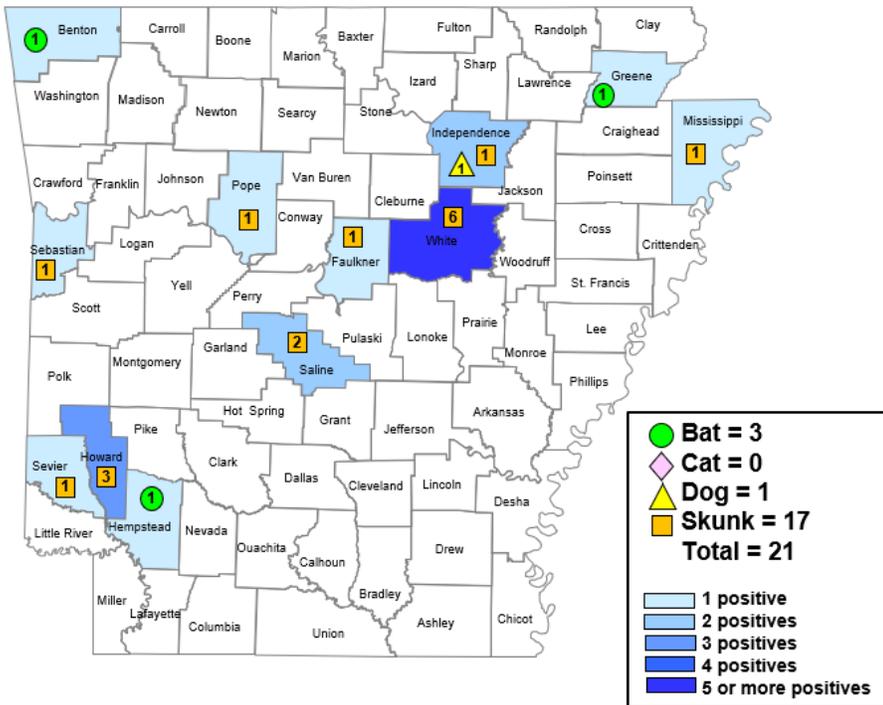


In Arkansas, most rabies cases occur in wild animals such as bats and skunks. In 2021, 561 animals were tested for rabies. Twenty-four animals tested positive, including 15 skunks and 9 bats.

Rabies in 2022



Animal Rabies in 2022



In 2022...



633

animals were tested for rabies.



4%

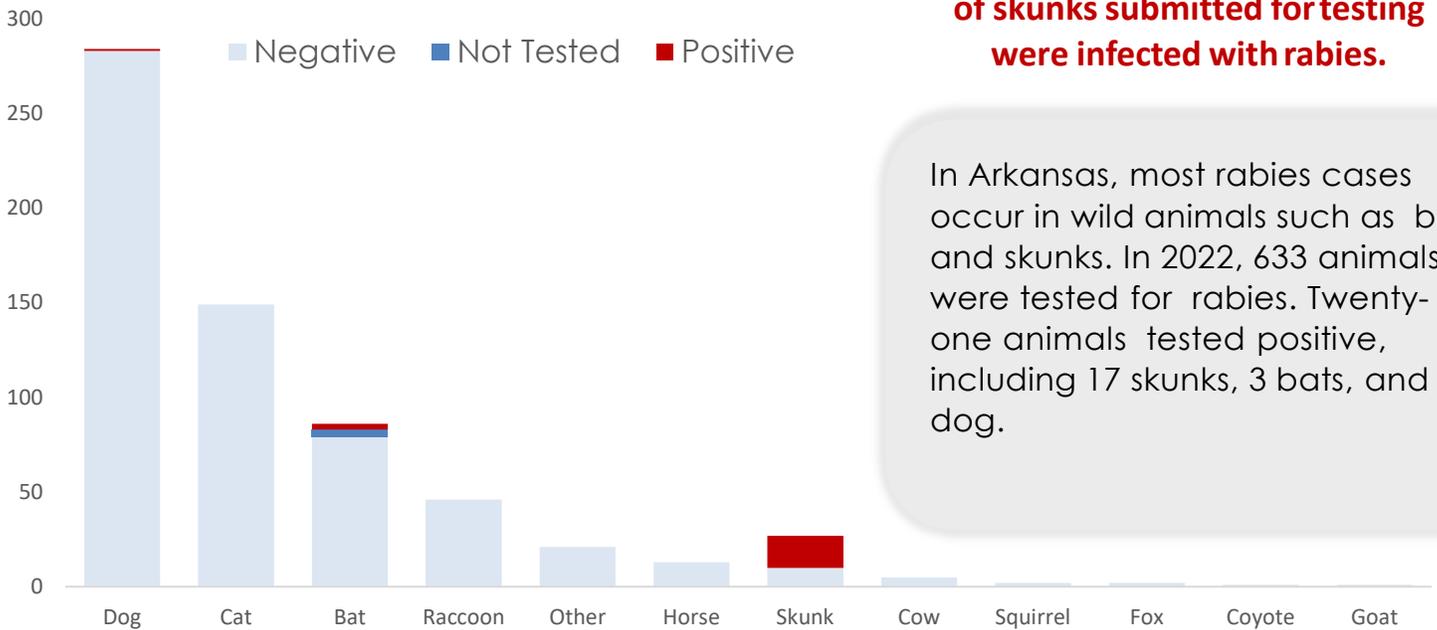
of bats submitted for testing were infected with rabies.

63%



of skunks submitted for testing were infected with rabies.

Rabies Testing in Arkansas, 2022



In Arkansas, most rabies cases occur in wild animals such as bats and skunks. In 2022, 633 animals were tested for rabies. Twenty-one animals tested positive, including 17 skunks, 3 bats, and 1 dog.



Laura K. Rothfeldt, DVM, DACVPM
State Public Health Veterinarian
Zoonotic Disease Section
Arkansas Department of Health
4815 W. Markham, Slot 62
Little Rock, AR 72205
O: (501) 280-4136
F: (501) 280-4431

Laura.Rothfeldt@arkansas.gov
ADH.zoonotic@arkansas.gov
<https://www.healthy.arkansas.gov/>



ONE HEALTH
ARKANSAS