

Rabies Surveillance, South Dakota, 2022

Rabies is a serious public health and veterinary health concern in South Dakota, with cases in animals reported every year. A viral disease that can be transmitted from animals to people, rabies is endemic in certain wild animal species in the state. Rabies is almost uniformly fatal in people who are infected with the rabies virus but is successfully prevented by using post-exposure prophylaxis in people exposed to the rabies virus (see below). While a human rabies case has not occurred in South Dakota since 1970, substantial resources are spent managing potential exposures to rabies because of its constant presence in the state.

In 2022, 9 animals tested positive for rabies (Table 1), a 40% decrease from 2021 (15 positives). This represents the lowest yearly number of rabid animals recorded in South Dakota (Figure 3). These 9 rabid animals included only wildlife species (8 bats and 1 skunk). No human rabies was reported.

During the year, 422 animals tested negative for rabies (Table 1, Figure 1). Bats were the species most often tested for rabies, accounting for 39% of rabies tests, followed by cats (28%). In 2022, 2.1% of South Dakota animals tested for rabies were positive.

Table 1. Rabies test results, South Dakota, 2022

	POSITIVE	NEGATIVE	TOTAL
Domestic Animals:			
CAT	0	113	113
DOG	0	68	68
CATTLE	0	22	22
HORSE	0	6	6
OTHER DOMESTIC*	0	5	5
Wild Animals:			
BAT	8	158	166
RACCOON	0	21	21
SKUNK	1	9	10
SQUIRREL	0	6	6
FOX	0	3	3
OTHER WILD**	0	2	2
Totals	9	413	422
*Other domestic includes 1 each donkey, ferret, goat, pig, and sheep.			
**Other wild includes 1 each rat and woodchuck.			

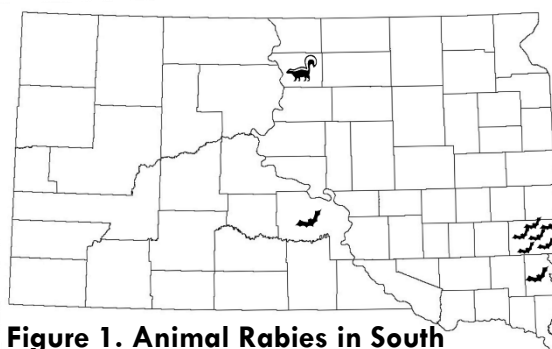


Figure 1. Animal Rabies in South Dakota, 2022

In 2022, animals from 57 of South Dakota's 66 counties were submitted for testing, and animals from 4 of those counties were rabid. One county (Minnehaha) accounted for 35% of rabies tests, and 4 (Minnehaha, Brookings, Codington and Lincoln) combined to account for 50% of tests.

Rabies Surveillance in South Dakota, 2013–2022

During the past decade, 5,572 animals originating from South Dakota were tested for rabies, with 192 positive rabid animals identified (Table 3). Domestic animals accounted for 20% of positive rabies cases, with 11 rabid cats and 7 rabid dogs identified. These animals were very likely unvaccinated; rabies in vaccinated pets is exceedingly rare. Rabid livestock included 19 cattle and 2 goats. Rabies vaccines are available for these species but not commonly administered.

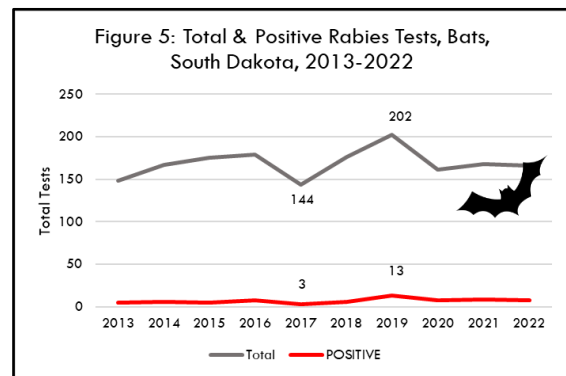
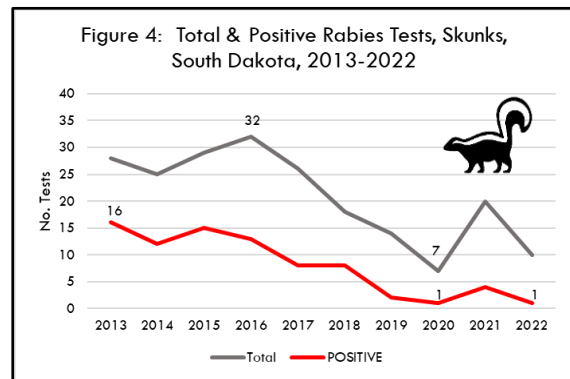
Table 3. Rabies test results, South Dakota, 2013-2022

	POSITIVE	NEGATIVE	TOTAL
Domestic Animals:			
CAT	11	1,517	1,528
DOG	7	849	856
CATTLE	19	523	542
HORSE	0	70	70
SHEEP	0	27	27
GOAT	2	26	28
OTHER DOMESTIC*	0	10	10
Wild Animals:			
BAT	71	1,615	1,686
RACCOON	2	338	340
SKUNK	80	129	209
SQUIRREL	0	50	50
DEER	0	39	39
MUSKRAT	0	33	33
OPOSSUM	0	21	21
MOUSE	0	20	20
COYOTE	0	17	17
FOX	0	16	16
WOODCHUCK	0	15	15
RAT	0	14	14
RABBIT	0	9	9
GOPHER	0	7	7
MINK	0	7	7
OTHER WILD**	0	28	28
Totals	192	5,380	5,572

*Other domestic includes 4 each donkeys and ferrets; 1 llama, and 1 pig.

**Other wild includes 4 each beavers and prairie dogs; 3 shrews; 2 each badgers, moles, and otters; and 1 each bison, elk, chipmunk, groundhog, lemur, marmot, moose, mountain lion, porcupine, and vole.

In wild animals, skunks are the primary terrestrial reservoirs of rabies in South Dakota. Over the past decade, 38% of tested skunks were rabid (Figure 4). In bats, another species in which rabies is endemic, 4% tested positive during the decade (Figure 5). Rabies testing for bats increased slightly over the decade, while testing for skunks declined (Figures 4 & 5)



The 2 cases of rabies found in raccoons during the decade were spillover exposures from skunks. Rabies is not endemic in raccoons in South Dakota as it is in other parts of the US (eastern states, for example).

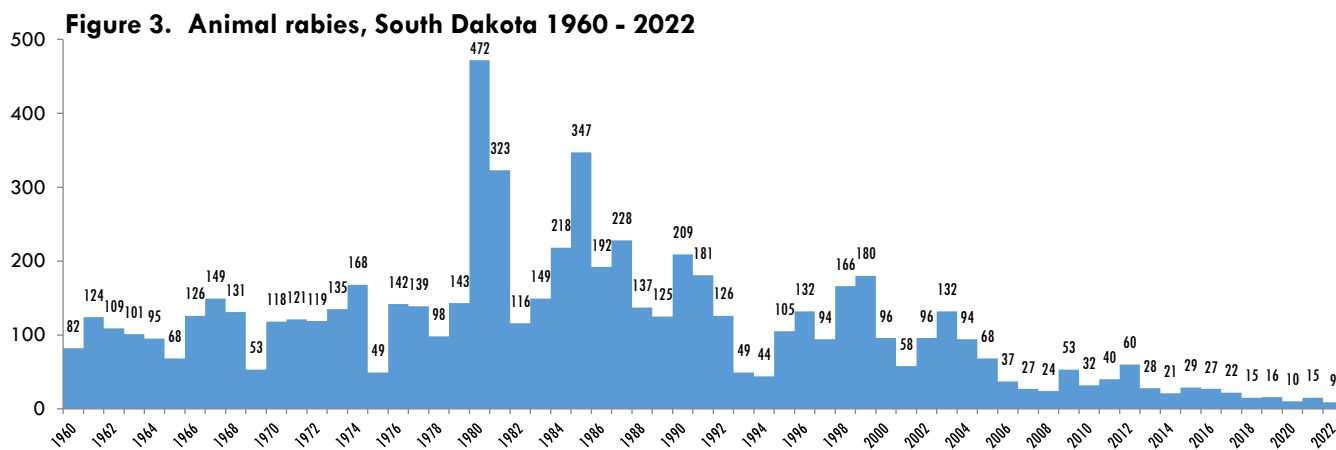
During 2013–2022, animals from each county were submitted for testing; rabid animals were diagnosed in every county except 10: Brule, Buffalo, Gregory, Harding, McCook, Mellette, Potter, Stanley, Union, and Ziebach (Table 5). Minnehaha County led the state in submissions for rabies testing (1,691) as well as the number of rabid animals identified (35, all bats). Six counties accounted for nearly 50% of rabies test submissions (Minnehaha, Brookings, Pennington, Codington, Brown, and Davison).

County	Total tests (Positives)	Most common species tested	Most common positive species	County	Total tests (Positives)	Most common species tested	Most common positive species
Minnehaha	1691 (35)	Bat	Bat	Walworth	46 (5)	Cat	Skunk
Brookings	332 (7)	Cat	Bat/Skunk	Sanborn	45 (3)	Cat	Cat/Cattle/Skunk
Pennington	250 (5)	Cat	Bat	Miner	41 (5)	Cat	Skunk
Codington	179 (4)	Cat	Skunk	Spink	41 (1)	Cat	Skunk
Brown	175 (2)	Cat	Bat/Skunk	Marshall	40 (4)	Cat	Skunk
Davison	154 (4)	Cat	Bat	Gregory	40	Cat	
Lincoln	116 (6)	Bat	Bat	Hand	39 (6)	Cattle	Skunk
Butte	115 (2)	Cat	Cat/Skunk	Fall River	39 (1)	Cat	Bat
Meade	109 (4)	Dog	Dog/Skunk	Bon Homme	32 (1)	Cat	Skunk
Hutchinson	108 (1)	Bat	Bat	Faulk	31 (2)	Cattle	Skunk
Lake	108 (1)	Cat	Cat	Haakon	29 (1)	Cat	Skunk
Dewey	102 (4)	Dog	Cattle/Skunk	Custer	27 (1)	Cat	Bat
Turner	96 (1)	Bat	Bat	Perkins	25 (7)	Cat	Skunk
Yankton	89 (3)	Bat	Bat	Jackson	20 (2)	Cat	Cat/Raccoon
Roberts	86 (14)	Cat	Skunk	Aurora	20 (1)	Cat	Skunk
Hughes	85 (1)	Cat	Cat	Lyman	19 (1)	Cat	Bat
Day	80 (8)	Cat	Skunk	Douglas	18 (1)	Cat	Skunk
Hamlin	80 (2)	Dog	Bat	Jerauld	18 (1)	Cat	Skunk
Tripp	78 (5)	Cat	Skunk	Hanson	16 (2)	Cat	Bat
Kingsbury	76 (4)	Cat/Cattle	Skunk	Jones	15 (1)	Cat	Skunk
Beadle	70 (2)	Cat	Cattle/Skunk	Campbell	14 (1)	Cat/Cattle	Skunk
Lawrence	69 (5)	Dog	Bat	Potter	14	Cat	
Charles Mix	65 (1)	Cat/Dog	Skunk	Hyde	13 (2)	Cattle	Cattle/Skunk
Deuel	61 (1)	Bat	Bat	McPherson	12 (1)	Cat	Cattle
Union	60	Bat		Bennett	11 (3)	Cat	Skunk
Clay	57 (2)	Bat	Bat	Mellette	11	Cat	
Stanley	56	Cat		Corson	9 (1)	Cattle/Dog	Dog
Clark	53 (5)	Cat	Skunk	Harding	9	Cat/Deer	
Edmunds	52 (3)	Dog	Skunk	Ogl. Lakota	7 (1)	Cat	Skunk
Moody	52 (1)	Dog	Bat	Todd	7 (1)	Cat	Skunk
Grant	50 (2)	Cat	Cattle	Buffalo	7	Raccoon	
McCook	49	Cat		Ziebach	4	Dog	
Brule	47	Cat		Sully	3 (1)	Cat/Cattle	Skunk

Over the past decade, rabid animals were identified in each calendar month (Table 6). More rabid animals were detected in June (30) than any other month, with bats and skunks the predominant affected species. The low month for rabies diagnoses was January, with 3.

Table 6. Positive Rabies Diagnoses by Calendar Month, South Dakota, 2013-2022.

MONTH	BAT	CAT	CATTLE	DOG	GOAT	RACCOON	SKUNK	TOTAL
JAN	0	0	0	0	0	0	3	3
FEB	0	3	1	1	1	0	4	10
MAR	1	1	3	0	0	0	8	13
APR	0	0	0	0	0	1	17	18
MAY	6	0	3	0	0	1	11	21
JUN	13	2	3	0	1	0	11	30
JUL	11	0	1	1	0	0	6	19
AUG	18	1	2	1	0	0	6	28
SEP	13	3	2	0	0	0	2	20
OCT	7	0	4	0	0	0	7	18
NOV	1	1	0	1	0	0	3	6
DEC	1	0	0	3	0	0	2	6
TOTAL	71	11	19	7	2	2	80	192



Currently, one South Dakota laboratory offers rabies testing services: the Animal Disease Research Diagnostic Laboratory (ADRDL) at SDSU in Brookings, which uses the direct fluorescent antibody (DFA) technique.

Rabies Prevention and Interventions

(Reference: Compendium of Animal Rabies Prevention and Control, 2016. National Association of State Public Health Veterinarians. <http://nasphv.org/DocumentsCompendiaRabies.html>)

Pet rabies prevention:

- Vaccinate pet dogs, cats and ferrets.
- Keep pets away from wildlife so they won't be bitten by a rabid animal.
- Call local Animal Control to remove wild or stray animals, especially if acting strangely.
- If a wild animal bites your pet, contact your veterinarian.
 - Euthanize and submit the wild animal for rabies testing if possible.
 - If the wild animal tests positive, or is not available for testing but suspicious of being rabid:
 - Booster previously vaccinated pets
 - Euthanize non-vaccinated pets and test for rabies

Human rabies prevention:

- Never touch stray, unfamiliar or wild animals, especially skunks and bats.
 - Don't adopt wild animals or bring them into your home.
 - Keep your trash cans tightly closed and don't leave pet food out to attract skunks.
 - If you are bitten by a wild animal or a suspect rabid animal, consult your physician.
 - Euthanize and submit the animal for rabies testing if possible (in most cases, waiting for test results is preferable to starting unnecessary post-exposure prophylaxis).
 - If the animal tests positive, or is not available for testing but suspicious of being rabid, post-exposure prophylaxis will be recommended.
 - If you are bitten by a pet or owned animal, the animal should be monitored for 10 days and euthanized and tested for rabies if signs of illness develop during that time.
 - Post-exposure prophylaxis: rabies immune globulin and 4 doses of rabies vaccine over 28 days.
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To get answers to questions about:

1. Whether post-exposure prophylaxis is warranted after exposure to a potentially rabid animal:

South Dakota Department of Health (rabies consultations)

Phone: 800-592-1861 or 605-773-3737 (24 hours)

<https://doh.sd.gov/diseases/rabies/>

Rabies consultations by the South Dakota Department of Health are available seven days a week. Consultations are based on Centers for Disease Control and Prevention (CDC) recommendations.

2. Testing an animal for rabies:

South Dakota Animal Disease Research and Diagnostic Laboratory (ADRDL; SDSU)

1155 North Campus Drive

South Dakota State University

Brookings, SD 57007-1396

Phone: 605-688-5171

www.sdstate.edu/vs/adrld

3. Rabies in animals; domestic animals exposed to rabid animals:

SD Animal Industry Board
 Phone: 605-773-3321
<http://aib.sd.gov>

4. Other information sources:

CDC Rabies: www.cdc.gov/rabies
 South Dakota Bat Working Group: <http://sdbwg.org>

Pre-exposure Prophylaxis for People with Frequent Potential Rabies Exposures https://www.cdc.gov/mmwr/volumes/71/wr/mm7118a2.htm	
Treatment	Regimen
Primary Series	Human diploid cell vaccine (HDCV) or purified chick embryo cell vaccine (PCECV); 1.0 mL (deltoid area), one each on days 0 and 7.
Notes	<ul style="list-style-type: none"> Persons in Risk Category 1* should have a serum sample tested for rabies virus neutralizing antibody every 6 months. Persons in Risk Category 2** should be tested every 2 years. Persons in Risk Category 3*** should be tested once between 1 and 3 years following the primary series Human serum rabies antibody titers may be ordered through SDPHL An intramuscular booster dose of vaccine should be administered if the serum titer falls to maintain a value of at least 0.5 IU/ml by rapid fluorescent focus inhibition test. <p>* Elevated risk for unusual, unrecognized, and recognized rabies exposures (e.g., rabies virus researchers, vaccine production workers). ** Elevated risk for unrecognized and recognized rabies exposures (e.g. workers performing animal necropsy examinations, those in frequent contact with bats). *** Elevated risk for recognized rabies exposures (e.g., most veterinarians).</p>
Post-exposure Prophylaxis for Non-immunized Individuals www.cdc.gov/rabies/medical_care/index.html	
Treatment	Regimen
Wound cleansing	All postexposure prophylaxis should begin with immediate, thorough cleansing of all wounds with soap and water. If available, a virucidal agent such as povidine-iodine solution should be used to irrigate the wounds.
RIG	If possible, the full dose should be infiltrated around any wound(s) and any remaining volume should be administered IM at an anatomical site distant from vaccine administration. RIG should not be administered in the same syringe as vaccine. Because RIG might partially suppress active production of antibody, no more than the recommended dose should be given.
Vaccine	HDCV or PCECV 1.0 mL, IM (deltoid area), one each on days 0, 3, 7, and 14.
Post-exposure Prophylaxis for <i>Previously Immunized</i> Individuals	
Treatment	Regimen
Wound cleansing	All postexposure prophylaxis should begin with immediate, thorough cleansing of all wounds with soap and water. If available, a virucidal agent such as povidine-iodine solution should be used to irrigate the wounds.
RIG	RIG should not be administered.
Vaccine	HDCV or PCECV 1.0 mL, IM (deltoid area), one each on days 0 and 3.

Human Rabies Vaccines and Immunoglobulin Available in the United States			
Type	Name	Route	Indications
Human Diploid Cell Vaccine (HDCV)	Imovax® Rabies	Intramuscular	Pre-exposure or Post-exposure

Purified Chick Embryo Cell Vaccine (PCECV)	RabAvert®	Intramuscular	Pre-exposure or Post-exposure
Human Rabies Immune Globulin (RIG)	Imogam® Rabies-HT	Local infusion at wound site, with additional amount intramuscular at site distant from vaccine	Post-exposure
Human Rabies Immune Globulin (RIG)	HyperRab TM S/D	Local infusion at wound site, with additional amount intramuscular at site distant from vaccine	Post-exposure
Human Rabies Immune Globulin (RIG)	KEDRAB TM	Local infusion at wound site, with additional amount intramuscular at site distant from vaccine	Post-exposure

References and resources

Human rabies prevention – United States, 2008 (ACIP). MMWR 2008; 57 (RR-3). www.cdc.gov/mmwr/preview/mmwrhtml/rr5703a1.htm

Use of a Modified Preexposure Prophylaxis Vaccination Schedule to Prevent Human Rabies: Recommendations of the Advisory Committee on Immunization Practices — United States, 2022. MMWR 2022; 71:619. <https://www.cdc.gov/mmwr/volumes/71/wr/mm7118a2.htm>

Compendium of animal rabies prevention and control, 2016. National Association of State Public Health Veterinarians. <http://nasphv.org/Documents/NASPHVRabiesCompendium.pdf>

Compendium of measures to prevent disease associated with animals in public settings, 2023: National Association of State Public Health Veterinarians. <http://nasphv.org/documentsCompendiumAnimals.html>

Rabies surveillance in the United States during 2021. Journal of the American Veterinary Medical Assoc 261:1045. <https://doi.org/10.2460/javma.23.02.0081>

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