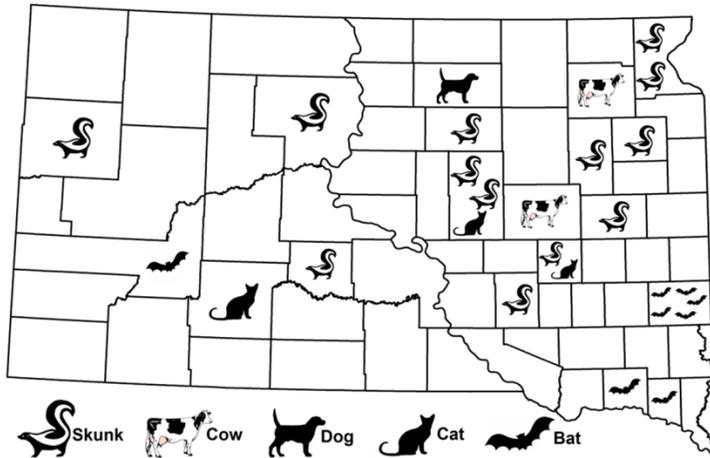


# Rabies surveillance, South Dakota, 2016

Rabies is a serious public health and veterinary health concern in South Dakota. In 2016, 27 animals tested positive for rabies, a -7% decrease from the previous year. The 27 rabid animals included 6 domestic animals (3 cats, 2 cattle, 1 dog) and 21 wild animals (13 striped skunks, 8 bats). No human rabies was reported. South Dakota's last human rabies case was in 1970.

Animal Rabies in South Dakota, 2016



During 2016, 637 animals tested negative for rabies, including 174 cats, 171 bats, 89 dogs, 71 cattle, 65 raccoons, 19 skunks, 7 horses, 7 squirrels, 6 deer, 5 mice, 4 sheep, 3 coyotes, 3 goats, 2 each beaver, fox, gopher, prairie dog, woodchucks, and 1 each lemur, mole, and rat.

During 2016 animals from 60 of South Dakota's 66 counties were submitted for testing, and animals from 19 of those counties were rabid.

During the past decade 28% of our 341 South Dakota rabies cases were domestic animals, including 22 rabid cats and 16 rabid dogs, many of which were unvaccinated. Rabid livestock included 47 cattle, 8 horses and 3 goats.

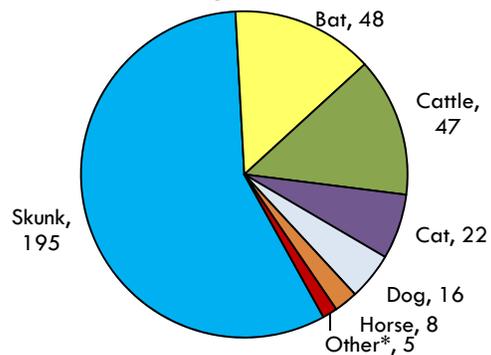
Skunks (*Mephitis mephitis*) are the primary rabies reservoir in South Dakota. Over the past decade 48% of skunks tested have been rabid. Bat rabies is also enzootic in South Dakota with 3% bats tested being positive. Although rabies is not enzootic in other South Dakota animals, during the past decade 2 rabid raccoons were detected, likely spillover infections from skunk exposure.

Over the decade 6,759 animals were tested and 341 (5.0%) were rabid in South Dakota. Rabid animals were reported every month during the year. Over the past decade June was the peak month with 51 rabies cases. The fewest rabid animals (n=13) were reported in November. Skunk rabies reports have been most common in April, bats rabies peak in August and September, and cattle rabies peak in May and June.

Over the past 57 years, since 1960, the most rabid animals were reported in 1980 (472), whereas the fewest were in 2014, with 21 rabies cases reported. During the past decade, 2007-2016, rabid animals were reported from 59 of the state's counties, with every county submitting animal brains for testing. The most rabid animals were from Minnehaha County, 30, followed by Tripp 21, Brookings 16 and Day 13 counties. Minnehaha County also submitted the most animals for testing (1,475) of which 2% were found to be rabid.

Rabid animals, South Dakota 2007-2016

\*Others include 3 goats and 2 raccoons



**Rabid animals by month, South Dakota 2007-2016**

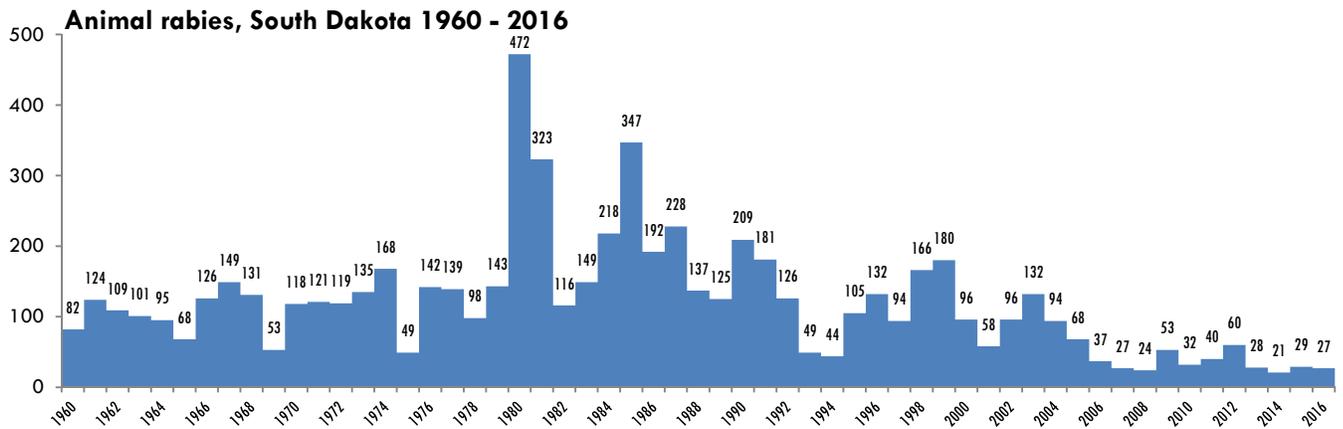
Month / Animal	Skunk	Bat	Cow	Cat	Dog	Horse	Goat	Raccoon	Total
January	9	0	2	2	0	1	0	0	14
February	9	0	2	1	2	0	0	0	14
March	15	1	2	2	1	0	0	1	22
April	37	0	1	1	0	3	0	0	42
May	20	4	10	1	1	1	0	0	37
June	30	6	10	2	0	1	1	1	51
July	20	6	3	1	2	0	0	0	32
August	14	14	2	5	3	1	0	0	39
September	13	13	2	2	1	0	0	0	31
October	12	2	8	1	2	1	2	0	28
November	5	0	3	3	2	0	0	0	13
December	11	2	2	1	2	0	0	0	18
<b>Total</b>	<b>195</b>	<b>48</b>	<b>47</b>	<b>22</b>	<b>16</b>	<b>8</b>	<b>3</b>	<b>2</b>	<b>341</b>

**Animal rabies cases by county, South Dakota 2007-2016**

<u>County</u>	<u>Positives</u>	<u>County</u>	<u>Positives</u>	<u>County</u>	<u>Positives</u>
Aurora	2	Fall River	1	McPherson	6
Beadle	4	Faulk	4	Meade	11
Bennett	5	Grant	7	Mellette	2
BonHomme	2	Gregory	6	Miner	3
Brookings	16	Haakon	5	Minnehaha	30
Brown	10	Hamlin	11	Moody	0
Brule	2	Hand	5	Oglala Lakota	0
Buffalo	0	Hanson	1	Pennington	5
Butte	6	Harding	5	Perkins	6
Campbell	0	Hughes	2	Potter	0
CharlesMix	9	Hutchinson	10	Roberts	11
Clark	11	Hyde	2	Sanborn	3
Clay	3	Jackson	2	Spink	4
Codington	9	Jerauld	1	Stanley	1
Corson	3	Jones	1	Sully	1
Custer	0	Kingsbury	11	Todd	1
Davison	4	Lake	10	Tripp	21
Day	13	Lawrence	2	Turner	9
Deuel	2	Lincoln	3	Union	1
Dewey	5	Lyman	3	Walworth	7
Douglas	1	Marshall	6	Yankton	5
Edmunds	6	McCook	3	Ziebach	0
				<b>South Dakota</b>	<b>341</b>

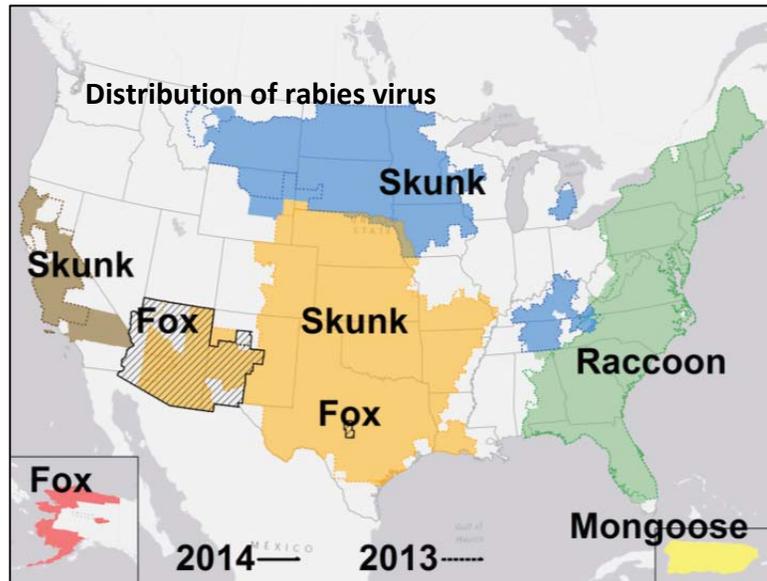
Two South Dakota laboratories offer rabies testing services: (1) Animal Disease Research Diagnostic Laboratory (ADRDL) in Brookings; (2) State Public Health Laboratory (SDPHL) in Pierre. During 2016, 63% of rabies tests were done at ADRDL and 37% at SDPHL. Both laboratories use the direct fluorescent antibody (DFA) technique. Human serum rabies antibody titers may be ordered through SDPHL.

The case definition of a confirmed animal rabies case is a positive DFA test, performed preferably on central nervous system tissue, or isolation of the rabies virus in cell culture or in a laboratory animal.



The most recent national animal rabies surveillance data are reported for 2014 (Monroe, et al.). Nationally, there was a -2.8% decrease from the previous year with 6,033 rabid animals rabies reported (7% domestic and 93% wild animals). Nationally, rabid domestic animals included 272 cats, 78 cattle, 59 dogs, 25 horses/mules, 10 sheep/goats and 1 llama. Wild animals testing positive for rabies included 1,822 raccoons, 1,756 bats, 1,588 skunks, 311 foxes, 43 groundhogs, 32 mongooses, 18 bobcats, 9 coyotes, 4 deer, 2 beavers, 2 opossums and 1 otter.

Over the past decade (2006-2015) 25 human rabies cases were reported nationally, including 23 deaths and 2 survivals, which is a 92% case fatality rate. The 25 human rabies cases were from Texas (3), California (4), Massachusetts (3), Indiana (2), Missouri (2), and 1 each in Louisiana, Maryland, Michigan, Minnesota, New Jersey, New York, North Carolina, South Carolina, Virginia, Wisconsin and Wyoming. Fourteen of the human cases (56%) were associated with bat-rabies virus, 7 (28%) had dog rabies virus (all foreign exposures: Afghanistan, Brazil, Guatemala, Haiti, India, Philippines), 2 raccoon, 1 fox, 1 unknown exposure, and 1 human rabies cases was attributed to an infected kidney transplant.



**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 an animal bites your pet, take it to a veterinarian for a rabies booster vaccination.

**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 an animal, consult your physician.
- Post-exposure prophylaxis: rabies immune globulin and 4 doses of rabies vaccine over 14 days.

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\*. We recommend appropriate rabies prevention measures to minimize unnecessary and inappropriate testing and post-exposure prophylactic treatment.

**Addresses, telephone numbers and websites**

**Department of Health** (rabies consultations)  
 615 East Fourth Street  
 Pierre, SD 57501-1700  
 Phone: 800-592-1861 or 605-773-3737;  
 after hours 800-592-1861 or 605-773-3737  
<https://doh.sd.gov/diseases/infectious/diseases/facts/rabies.aspx>

**Animal Disease Research and Diagnostic Laboratory** (rabies testing)  
 North Campus Drive  
 South Dakota State University  
 Brookings, SD 57007-1396  
 Phone: 605-688-5171  
[www.sdstate.edu/vs/adrdl](http://www.sdstate.edu/vs/adrdl)

**Department of Health, Public Health Laboratory** (rabies testing)  
 615 East Fourth Street  
 Pierre, SD 57501-1700  
 Phone: 800-592-1861 or 605-773-3368  
<http://doh.sd.gov/Lab/rabies.aspx>

**SD Animal Industry Board** (livestock and animal veterinary and regulatory issues)  
 441 S. Fort Street, Pierre, SD 57501  
 Phone: 605-773-3321  
<http://aib.sd.gov>

**CDC Rabies:** [www.cdc.gov/rabies](http://www.cdc.gov/rabies)

**South Dakota Bat Group** <http://sdbwg.org>

<b>Pre-exposure Prophylaxis for Rabies</b> <a href="http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5703a1.htm">www.cdc.gov/mmwr/preview/mmwrhtml/rr5703a1.htm</a>	
Treatment	Regimen
<b>Primary</b>	Human diploid cell vaccine (HDCV) or purified chick embryo cell vaccine (PCECV); 1.0 mL (deltoid area), one each on days 0,* 7, and 21 or 28
<b>Booster</b>	HDCV or PCECV; 1.0 mL (deltoid area), day 0 only
<b>Note</b>	Persons in the continuous-risk category* should have a serum sample tested for rabies virus neutralizing antibody every 6 months, and persons in the frequent-risk category** should be tested every 2 years. An intramuscular booster dose of vaccine should be administered if the serum titer falls to maintain a value of at least complete neutralization at a 1:5 serum dilution by rapid fluorescent focus inhibition test. * Rabies research laboratory workers; rabies biological production workers. ** Rabies diagnostic laboratory workers, cavers, veterinarians and staff, and animal-control and wildlife workers in areas where rabies is enzootic. All persons who frequently handle bats.
<b>Post-exposure Prophylaxis for Non-immunized Individuals</b> <a href="http://www.cdc.gov/rabies/medical_care/index.html">www.cdc.gov/rabies/medical_care/index.html</a>	
Treatment	Regimen
<b>Wound</b>	All postexposure prophylaxis should begin with immediate thorough cleansing of all wounds with soap and water.

<b>cleansing</b>	If available, a virucidal agent such as povidine-iodine solution should be used to irrigate the wounds.
<b>RIG</b>	If possible, the <b>full dose</b> should be infiltrated around any wound(s) and any remaining volume should be administered IM at an anatomical site distant from vaccine administration. Also, 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.
<b>Vaccine</b>	HDCV or PCECV 1.0 mL, IM (deltoid area), one each on days 0, 3, 7, and 14.
<b>Post-exposure Prophylaxis for Previously Immunized Individuals</b>	
<b>Treatment</b>	<b>Regimen</b>
<b>Wound cleansing</b>	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.
<b>RIG</b>	RIG should <b>not</b> be administered.
<b>Vaccine</b>	HDCV or PCECV 1.0 mL, IM (deltoid area), one each on days 0 and 3.

<b>Human Rabies Vaccines and Immunoglobulin Available in the United States</b>			
<b>Type</b>	<b>Name</b>	<b>Route</b>	<b>Indications</b>
<b>Human Diploid Cell Vaccine (HDCV)</b>	Imovax® Rabies	Intramuscular	Pre-exposure or Post-exposure
<b>Purified Chick Embryo Cell Vaccine (PCECV)</b>	RabAvert®	Intramuscular	Pre-exposure or Post-exposure
<b>Human Rabies Immune Globulin (RIG)</b>	Imogam® Rabies-HT	Local infusion at wound site, with additional amount intramuscular at site distant from vaccine	Post-exposure
<b>Human Rabies Immune Globulin (RIG)</b>	HyperRab™ S/D	Local infusion at wound site, with additional amount intramuscular at site distant from vaccine	Post-exposure

## References and resources

\*CDC. Human rabies prevention – United States, 2008 (ACIP). MMWR 2008; 57 (RR-3).

[www.cdc.gov/mmwr/preview/mmwrhtml/rr5703a1.htm](http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5703a1.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, 2013: National Assoc of State Public Health Veterinarians. Journal of the American Veterinary Medical Association 243: 1270-1288.

<http://avmajournals.avma.org/doi/pdf/10.2460/javma.243.9.1270>

Monroe, B., P. Yager, J. Blanton, M. Birhane, A. Wadhwa, L. Orciari, B. Peterson and R. Wallace. 2015. Rabies surveillance in the United States during 2014. Journal of the American Veterinary Medical Assoc 248: 777—788.

<http://avmajournals.avma.org/doi/pdfplus/10.2460/javma.248.7.777>

## South Dakota Rabies Control Laws

### **RABIES CONTROL STATUTE: Chapter 40-12 (Section 12-1, 2, 3, 4, 5, 6)**

40-12-1. Confinement of animals required in localities where rabies exists -- Neglect as misdemeanor. In localities where rabies exists, the animal industry board may require that any animal deemed likely to spread such disease shall be muzzled, caged, tied or confined in any manner that may be deemed necessary. It is a Class 1 misdemeanor for any owner or person in charge of any animal so ordered to be muzzled, caged, tied or confined, to refuse or neglect to carry out such order.

40-12-2. Destruction of rabid animal required. If the animal industry board determines that rabies exists in any animal, the board may kill such animal and any animal there is reason to believe has been bitten by any animal affected with rabies.

40-12-4. Definition of terms. Terms used in this chapter mean:

- (1) "Department," the department of health;
- (2) "Owner," any person who has a right of property in a pet, keeps or harbors a pet or who has it in his care or acts as its custodian, or permits a pet to remain on or about any premises occupied by him;
- (3) "Pet," any dog, cat or other species of carnivore kept for domestication or display.

40-12-5. Confinement of pet after attack upon person -- Violation as misdemeanor. The department may serve written notice upon the owner of any dog or cat which has attacked or bitten a person to confine the animal at the owner's expense upon his premises or at a city pound or other place designated in the notice for a period of at least ten days after the animal has attacked or bitten any person. The department may examine the animal at any time within the ten-day period of confinement to determine whether such animal shows symptoms of rabies. In the case of any pet other than a dog or cat, which has attacked or bitten a person, the department may serve written notice upon the owner of such animal that the owner shall have the animal euthanized immediately and submit the brain to an approved laboratory for rabies examination. Any owner who fails to comply with a written notice served pursuant to this section is guilty of a Class 1 misdemeanor.

40-12-6. Confinement of pet bitten by animal suspected of having rabies -- Violation as misdemeanor. The department may serve written notice upon the owner of a dog or cat known to have been bitten by an animal known or suspected of being affected by rabies, requiring the owner to confine such dog or cat for a period of not less than six months. However, if such dog or cat had been properly treated with an antirabic vaccine, confinement shall be for a period of not less than three months. In the case of any pet other than a dog or cat, the department may serve written notice upon the owner of such animal that the owner shall have the animal euthanized immediately. Any owner who fails to comply with a written notice served pursuant to this section is guilty of a Class 1 misdemeanor.

**SHERIFF: Chapter 7-12 (Section 7-12-29)** Taking and holding animal suspected of being dangerous -- Formal determination -- Disposal of dangerous animal. The sheriff may take possession of any animal suspected of being dangerous. The sheriff may hold such animal until a formal determination can be made of the extent of the danger such animal poses. If the animal has attacked or bitten a human or an animal pet, the formal determination shall include consultation with the Department of Health for the purposes of rabies control. The sheriff may dispose of any animal so determined to be dangerous.

**REPORTABLE DISEASES: Administrative Rule 44:20:01:03** Category I reportable diseases have a potential for epidemic spread or require rapid application of public health measures to prevent a serious threat to public health or safety. Category I reportable diseases include: Rabies, human and animal.

**CONTROL MEASURES: Administrative Rule 44:20:03:10** Application of public health measures to animals. The department may instruct a person who owns or is in possession of an animal known or suspected to be a carrier of an infectious agent in public health measures for preventing infection and spread of disease. If the department knows or has reason to believe, because of testing or epidemiological information, that an animal is infected with an infectious agent and is a threat to the public health, it may issue a public health notice directing the person who owns or is in possession of the animal to take one or more of the following actions:

- (1) To examine or test the animal to determine whether it is infected with an infectious agent capable of causing human disease
- (2) To report to an authorized department representative for counseling on methods for preventing transmission of the infectious agent;
- (3) To confine or quarantine the animal for the duration of the incubation period or contagious period;
- (4) To destroy the animal or provide treatment until it is cured or free from the infection and to follow measures for preventing reinfection;
- (5) To cease from specific activities involving the infected animal that endanger the health of others;
- (6) To cooperate with the department in implementation of reasonable public health measures.

**Health requirements for dogs and cats on exhibit: Administrative Rule 12:02:10:03** All dogs for exhibition must be accompanied by a health certificate signed by a licensed accredited veterinarian within 30 days before entry to the South Dakota State Fair. The health certificate shall indicate the dates of vaccination for rabies, canine distemper, and canine parvovirus. All vaccines must be current. All cats for exhibition must be accompanied by a health certificate signed by a licensed accredited veterinarian within 30 days before entry to the South Dakota State Fair. The health certificate shall indicate the dates of vaccination for rabies and feline distemper. All vaccines must be current.

**Importation of imported cats and dogs: Administrative Rule 12:68:06:09** No person may import any dog or cat over three months of age without certification of a current rabies vaccination. If a dog or cat is imported from an area that is quarantined for rabies, a certifying statement is required from an accredited veterinarian that the dog or cat has not been exposed to rabies. No person may import any dog or cat less than three months of age from an area under quarantine for rabies. A certificate of veterinary inspection is not required for dogs and cats entering the state unless: (a) The animal originates from an area quarantined for rabies; (b) The animal originates from a foreign county; (c) The animal is to remain in the state for 30 days or more; (d) A resident travels with an animal to another state or province and does not return within 30 days; or (e) The state veterinarian determines that it is necessary based on disease information for a time period not to exceed the term of the threat; (3) It is not a violation of this section to bring a dog or cat into the state from a bordering state for the purpose of obtaining any vaccination or other health care from a licensed veterinarian.