Rabies is a nearly always fatal, viral disease affecting the central nervous system.

Transmitted when the virus is introduced into bite wounds or open cuts in skin, onto mucus membranes or by transplant.

Infectious agent: RNA Lyssavirus.
Human rabies progression

- **Incubation** period: few days to 19 years.
- **Prodrome** (2-10 days):
  - malaise,
  - anorexia,
  - headache, fever, irritability,
  - pain at bite site.
- **Acute neurological, furious rabies** 80% of cases (2-7 days):
  - dysphagia (difficulty swallowing),
  - hydrophobia,
  - manic behavior alternating with lethargy,
  - salivation with abnormal biting or chewing.
- **Paralytic rabies**, 20% of cases (2 - 7 days):
  - Ascending flaccid paralysis
- **Death**.

K. Singh et al., in Mandell Douglas and Bennett’s Principles and Practice of Infectious Diseases 8th ed, 2015.
Global Rabies deaths 2010-2014

- China 7,236
- Philippines 1,182
- Viet Nam 467
- Sri Lanka 175
- Uganda 163
- Egypt 130
- South Africa 52
- Yemen 48
- Thailand 38
- Zimbabwe 38
- Senegal 34
- Tanzania 32
- Iran 27
- Kyrgyzstan 27
- Morocco 25
- Russia 24
- Sudan 23

http://apps.who.int/gho/data/node.main.NTDRABIESHUMANDEATHS?lang=en
Rabid Animals Reported in the United States during 2009
Rabies in domestic animals, United States, 1958-2008
Terrestrial Rabies Reservoirs in the United States, 2015

The **SKUNK** is the primary reservoir of rabies in South Dakota.
Animal rabies tests and percent positive, South Dakota, 1990 – 2016

Animals tested

Percent positive
Rabies

Rabies is a fatal, but preventable, disease of mammals most often transmitted through the bite of a rabid animal.

**County: rabid animals 18**

- Edmunds: skunk 1
- Grant: cow 1
- Hand: goat 1
- Hughes: cat 1
- Hyde: cow 1
- Lawrence: bat 2
- Minnehaha: bat 1
- Miner: skunk 2, cow 1
- Perkins: raccoon 1
- Roberts: skunk 3, cat 1
- Walworth: skunk 1

-33% below baseline

(5-yr median)

Rabies in Domestic and Wild Animals, South Dakota 1990-2016

Wild (Range: 65% - 86%)
Animals tested and confirmed rabid cases, South Dakota 2007 – 2016

**Rabid:** 341
- Cattle, 47
- Bat, 48
- Cat, 22
- Dog, 16
- Equine, 8
- Other*, 5

**Skunk:** 195

---

**All tested:** 6,759
- Bat, 1,402
- Cattle, 774
- Skunk, 407
- Raccoon, 346
- Equine, 112
- 94
- 70
- 41
- 40
- 34
- 33
- 21
- 19
- 18
- 17
- 16
- 28

---

*C Other: 3 goat, 2 raccoon

Cervid 94, Rodent 70, Squirrel 41, Muskrat 40, Sheep 34, Goat 33, Coyote 21, Fox 19, Weasel 18, Woodchuck 17, Opossum 16, Lagomorph 6, Pig 3, Badger 6, Mountain lion 2, Bison 1, Shrew 1, Lemur 1, Mongoose 1, Otter 1
Number and percent of animals rabid (positive/total tested), South Dakota, 2007-2016

- Skunk: 195 (48%)
- Bat: 48 (3%)
- Cattle: 47 (6%)
- Cat: 22 (1%)
- Dog: 16 (1%)
- Horse: 8 (7%)
- Goat: 3 (9%)
- Raccoon: 2 (1%)
- TOTAL: 200 (5%)

Number rabid
% of tested rabid
Animal rabies tests (464 positive/7,077 total tested), South Dakota 2004-2013

East River:  82% of positives, 79% of tests
West River: 18% of positives, 21% of tests
Rabies in Domestic Animals, South Dakota 1990-2016

- Bovine: 279
- Dog: 120
- Cat: 116
- Equine: 65
- Sheep: 6
- Goat: 4
- Pig: 3
Domestic animal rabies by month, South Dakota 1993-2016

- Cattle 198
- Dog 92
- Cat 93
- Horse 59
- Others:
  - Sheep 6
  - Goat 5
  - Pig 1
Human rabies in the USA, 1991-2016 (n=72)

72 human rabies cases
69 deaths
3 survived
96% fatality rate

Human cases

Year


3 3 5 4 4 4 5 5 8 3 3 1 1 1 1 1 2 2 1 1 1 1 3 0
Source of human rabies virus, United States, 2003-20016 (n = 35 deaths, 3 survivals)

- Bat: 58%
- Dog: 29%
- Raccoon: 8%
- Unknown: 3%
- Fox: 2%

Country of exposure:
- Texas 6
- California 6
- Massachusetts 3
- Indiana 2
- Missouri 2
- Virginia 2
- Wisconsin 2
- Puerto Rico 2
- Arkansas 1
- Florida 1
- Louisiana 1
- Maryland 1
- Michigan 1
- Minnesota 1
- Mississippi 1
- New Jersey 1
- New York 1
- North Carolina 1
- Oklahoma 1
- South Carolina 1
- Wyoming 1
- Haiti 2
- Philippines 2
- Afghanistan 1
- Brazil 1
- Caribbean 1
- El Salvador 1
- Guatemala 1
- India 1
Last known rabies deaths in South Dakota

A. 1966, Hamlin County, 10 yr old white male, bitten by skunk.

B. 1970, Brule County, 3 yr old white male, bitten by skunk.
1966 Rabies death in South Dakota

“A Bryant youth, who was bitten by a rabid skunk August 3 (1966), died at a Sioux Falls hospital Monday. CS, 10, seemed to be recovering from the bites until Saturday when he began suffering headaches and was rushed to Sioux Falls.

CS was bitten while sleeping out with friends. The skunk entered the sleeping bag which CS had received a week before as a birthday gift.

He was bitten on about 6 places on the ear, arm, hand and leg. The animal was found 5 blocks away and was killed and sent to Brookings for tests. The lad underwent treatment at the DeSmet Hospital for rabies before being transferred to Sioux Valley Hospital.”

(Argus Leader, 6 September 1966)
1966 Rabies death in South Dakota

“The skunk was chased down and killed with a baseball bat 5 blocks away. The animal’s brain was brought to the veterinary science department at SDSU where fears were confirmed; It was rabid.

CS was treated at DeSmet Hospital, received 21 rabies shots, and returned home, them later returned to the hospital. He died over a month after he was bitten.

Dr. Keith Van Steenberg (SDSU) tested the skunk. The skunk’s brain contained “negri bodies” . . . .”

(Brookings Register, 10 September 1966)
Thank you