INFECTIOUS DISEASES IN SOUTH DAKOTA 2007

The South Dakota Department of Health (DOH) is authorized by South Dakota Codified Law 34-22-12 and Administrative Rules Article 44:20 to receive and process mandatory reports of communicable diseases by physicians, hospitals, laboratories, and institutions.

Category I: Report immediately on suspicion of disease	Category II: Report within 3 days	
Anthrax (*Bacillus anthracis*) Botulism (*Clostridium botulinum*) Cholera (*Vibrio cholerae*) Diphtheria (*Corynebacterium diphtheriae*) Enterohemorrhagic *E. coli* (EHEC) shiga toxin-producing (*Escherichia coli), includes E. coli O157:H7* Measles (*paramyxovirus*) Meningococcal disease, invasive (*Neisseria meningitidis*) Pertussis (*Bordetella pertussis*) Plague (*Yersinia pestis*) Poliomyelitis (*picornavirus*) Rabies, human and animal (*rhabdovirus*) Ricin toxin Rubella and congenital rubella syndrome (*togavirus*) SARS (Severe Acute Respiratory Syndrome, *coronavirus*) Smallpox (*Variola*) Tularemia (*Francisella tularensis*) Typhoid (*Salmonella typhi*) Viral Hemorrhagic Fevers (filoviruses, arenaviruses) Outbreaks: - Acute upper respiratory illness - Diarrheal disease - Foodborne - Illnesses in child care settings - Nosocomial - Rash illness - Waterborne Syndromes suggestive of bioterrorism and other public health threats Unexplained illnesses or deaths in humans or animals	Acquired immunodeficiency syndrome (AIDS) Arboviral encephalitis, meningitis and infection (*West Nile, St. Louis, Eastern and Western equine, California serotype, Japanese, Powassan*) Brucellosis (*Brucella spp.*) Campylobacteriosis (*Campylobacter spp.*) Chancroid (*Haemophilus ducreyi*) Chicken pox/Varicella (*herpesvirus*) Chlamydia infections (*Chlamydia trachomatis*) Cryptosporidiosis (*Cryptosporidium parvum*) Cyclosporiasis (*Cyclospora cayetanensis*) Dengue fever (*flavivirus*) Drug resistant organisms: • Methicillin-resistant *Staphylococcus aureus* (MRSA), invasive • Vancomycin-resistant and -intermediate *Staphylococcus aureus* (VRSA and VISA) • Drug resistant *Streptococcus pneumoniae* (DRSP), invasive Ehrlichiosis (*Ehrlichia spp.*) Epsilon toxin of *Clostridium perfringens* Giardiasis (*Giardia lamblia / intestinalis*) Glanders (*Burkholderia mallei*) Gonorrhea (*Neisseria gonorrhoeae*) *Haemophilus influenzae* type b disease, invasive Hantavirus pulmonary syndrome (*hantavirus*) Hemolytic uremic syndrome Hepatitis, acute viral A, B, C, D, and E Hepatitis, chronic viral B and C Hepatitis B infection, perinatal *Herpes simplex* virus infection, neonatal or genital Human immunodeficiency virus infection (HIV))	Influenza: all lab confirmed cases, pediatric deaths and - weekly reports of number of rapid antigen influenza positive tests and total number tested Legionellosis (*Legionella spp.*) Leprosy/Hansen's disease (*Mycobacterium leprae)* Listeriosis (*Listeria monocytogenes*) Lyme disease (*Borrelia burgdorferi*) Malaria (*Plasmodium spp.*) Melioidosis (*Burkholderia pseudomallei*) Mumps (*paramyxovirus*) Nipah virus (*paramyxovirus*) Psittacosis (*Chlamydophila psittaci*) Q fever (*Coxiella burnetii*) Rocky Mountain spotted fever (*Rickettsia rickettsii*) Salmonellosis (*Salmonella spp.*) Shigellosis (*Shigella spp.*) Staphylococcus enterotoxin B Streptococcal disease, Group A, invasive Streptococcal disease, Group B, invasive *Streptococcus pneumoniae*, invasive, in a child less than 5-years of age Syphilis (*Treponema pallidum*) Tetanus (*Clostridium tetani*) Toxic shock syndrome Transmissible spongiform encephalopathies Trichinosis (*Trichinella spiralis*) Tuberculosis (*Mycobacterium tuberculosis and Mycobacterium bovis*) active disease and latent infection (positive skin test) Typhus fever (*Rickettsia prowazekii*) Vaccine Adverse Events Yellow fever (*flavivirus*)

WHEN TO REPORT

Category I diseases are reportable immediately by telephone on recognition or strong suspicion of disease.
Category II diseases are reportable by telephone, mail, or fax within 3 days of recognition or strong suspicion of disease.

WHAT TO REPORT: Disease reports must include as much of the following as is known:

- Disease or condition diagnosed or suspected
- Case's name, age, date of birth, sex, race, address, and occupation
- Date of disease onset
- Pertinent laboratory results and date of specimen collection
- Attending physician's name, address and phone number
- Name and phone number of the person making the report.

HOW TO REPORT

Secure website: www.state.sd.us/doh/diseasereport

Telephone: 1-800-592-1804 confidential answering-recording device, or **1-800-592-1861** or **605-773-3737** for a disease surveillance person during normal business hours; after hours to report Category I diseases or other emergencies, call **605-280-4810**.

Fax: 605-773-5509

Mail or **courier,** address to: Infectious Disease Surveillance, Office of Disease Prevention, Department of Health, 615 East 4th Street, Pierre, SD 57501; marked *"Confidential Disease Report"*

COMMUNICABLE DISEASE SURVEILLANCE

The Department of Health (DOH) has adopted administrative rules, ARSD 44:20, authorizing a statewide surveillance system for communicable diseases. The rules also establish public health measures that control and prevent disease transmission.

Infectious disease surveillance is the ongoing collection, analysis, interpretation, and dissemination of health data. This type of assessment is a core public health function. Communicable disease surveillance monitors patterns of disease occurrence, which contribute to the health status of South Dakota's population. Surveillance can detect sudden changes in disease occurrence, such as outbreaks, or identify long-term disease trends, or monitor new and emerging diseases. Surveillance activities are linked to public health actions, such as investigation, control and prevention, evaluation, planning, and allocating resources to address the diseases affecting the population.

An important surveillance component is sharing infectious disease data with health care providers, public health agencies, the general population, academia, and public health and medical policy makers at local, state, tribal and national levels. Surveillance assessment reports should serve to inform and motivate.

Table 79 catalogs the infectious disease reports from 1997 to 2007. Table 80 reports the 2007 disease numbers by county of residency, statewide total, and shows the statewide incidence rate (cases per 100,000 population). Each disease is compared to the median case count of the previous five years (2002-2006), and the percentage increase or decrease is shown. Table 81 presents selected diseases stratified by gender, race, and age group.

In 2007 the following diseases (cases) were reported and found to meet the case definition:

- Anthrax (0)
- Botulism (0)
- Brucellosis (0)
- Campylobacteriosis (235)
- Chancroid (0)
- Chlamydia trachomatis infections (2,619)
- Cholera (0)
- Cryptosporidiosis (169)
- Dengue fever (3)
- Diphtheria (0)
- Giardiasis (104)
- Gonorrhea (261)
- Haemophilus influenzae type B (0)
- Hantavirus pulmonary syndrome (1)
- Hemolytic uremic syndrome (1)
- Hepatitis A (6)
- Hepatitis B, acute (7)
- Hepatitis B, chronic (39)
- Hepatitis C, chronic (317)
- Herpes simplex, genital and neonatal (360)
- HIV and AIDS (25)
- Legionellosis (4)
- Leprosy (0)
- Listeriosis (2)
- Lyme disease (0)
- Malaria (1)
- Measles (0)
- Meningococcal disease (3)
- Methicillin resistant *Staphylococcus aureus*, invasive (88)
- Mumps (6)
- Pertussis (60)
- Plague (0)
- Polio (0)
- Psittacosis (0)
- Q fever (1)
- Rabies, animal (27)
- Rabies, human (0)
- Rocky Mountain spotted fever (5)
- Rubella and congenital rubella syndrome (0)
- Saint Louis encephalitis (0)
- Salmonellosis (174)
- Shiga-toxin producing E. coli (47)
- Shigellosis (122)
- Streptococcal disease, Group A, invasive (12)
- Streptococcal disease, Group B, invasive (20)
- *Streptococcus pneumoniae*, drug resistant (17)
- Syphilis, primary and secondary, early latent (11)
- Tetanus (0)
- Toxic shock syndrome (0)
- Transmissible spongiform encephalopathies (0)
- Trichinosis (0)
- Tuberculosis (13)
- Tularemia (7)
- Varicella (84)
- West Nile neuroinvasive disease (48)
- West Nile fever (160)

Table 79
Reportable Diseases in South Dakota, 1997-2007

Reportable Diseases	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Anthrax	0	0	0	0	0	1	0	0	0	0	0
Botulism	0	0	1	1	0	0	1	0	1	0	0
Brucellosis	0	0	0	0	0	0	1	0	0	0	0
Campylobacteriosis	108	103	140	141	160	198	188	273	244	219	235
Chlamydia trachomatis infections	1439	1573	1554	1835	1821	2215	2606	2534	2701	2633	2619
Cholera	0	0	0	0	0	1	0	0	0	0	0
Cryptosporidiosis	23	25	7	15	8	42	49	44	31	86	169
Dengue fever	0	0	0	0	0	1	0	0	1	0	3
Diphtheria	1	0	0	0	0	0	0	0	0	0	0
Giardiasis	127	181	143	108	106	83	89	87	118	97	104
Gonorrhea	172	221	192	277	289	263	226	304	351	367	261
Haemophilus influenzae type b	3	1	4	1	0	1	1	0	0	0	0
Hantavirus pulmonary syndrome	0	0	0	1	0	0	1	1	2	2	1
Hemolytic uremic syndrome	1	0	4	2	1	0	1	0	3	8	1
Hepatitis A	27	40	10	3	3	3	0	4	1	9	6
Hepatitis B, acute	1	4	1	2	1	3	4	1	8	5	7
Hepatitis B, chronic	NR	NR	NR	NR	NR	NR	NR	26	33	16	39
Hepatitis C, chronic	NR	NR	NR	NR	NR	NR	NR	NR	207	355	317
Herpes simplex, genital and neonatal	94	142	275	339	345	310	297	322	342	371	360
HIV and AIDS	25	17	27	22	22	21	25	19	33	34	25
Legionellosis	4	7	6	2	3	4	2	5	21	5	4
Leprosy	0	1	0	0	0	0	0	0	0	0	0
Listeriosis	1	0	1	0	0	1	0	1	0	2	2
Lyme disease	1	0	0	0	0	2	1	1	2	1	0
Malaria	3	1	0	1	0	2	3	1	0	1	1
Measles	8	0	0	0	0	0	0	0	0	0	0
Meningococcal disease	6	9	11	6	5	2	1	4	4	4	3
Methicillin-resistant *Staph aureus*, invasive	NR	NR	NR	NR	NR	NR	NR	36	47	50	88
Mumps	0	0	0	0	0	0	0	0	0	296	6
Pertussis (whooping cough)	5	8	8	11	5	8	7	169	183	26	60
Plague	0	0	0	0	0	0	0	0	0	0	0
Q fever	NR	NR	NR	NR	0	1	0	0	2	2	1
Rabies, animal	94	166	180	96	58	96	132	94	68	38	27
Rabies, human	0	0	0	0	0	0	0	0	0	0	0
Rocky Mountain Spotted Fever	2	0	4	2	2	1	5	4	5	0	5
Rubella and congenital rubella syndrome	0	0	0	0	0	0	0	0	0	0	0
St. Louis Encephalitis	0	0	0	0	0	0	2	0	0	0	0
Salmonellosis	90	132	100	100	151	121	131	156	160	135	174
Shiga-toxin producing E. coli, including O157:H7	29	37	47	69	50	43	33	35	33	50	47
Shigellosis	31	33	18	8	716	157	17	12	131	389	122
Streptococcal disease, Group A, invasive	15	9	11	16	17	14	25	22	26	10	12
Streptococcal disease, Group B, invasive	NR	NR	NR	NR	NR	20	14	11	26	13	20
Streptococcus pneumoniae, drug resistant	0	0	3	8	6	1	1	5	3	4	17
Syphilis, Primary and Secondary, Early Latent	3	1	1	0	1	0	5	0	2	19	11
Tetanus	0	1	0	0	0	0	0	0	0	0	0
Toxic shock syndrome	1	2	0	2	0	1	1	1	2	0	0
Transmissible spongiform encephalopathies	--	--	1	0	1	0	2	2	0	1	0
Tuberculosis	19	23	21	16	13	13	20	11	16	14	13
Tularemia	4	3	7	13	7	3	5	4	8	5	7
Varicella (chicken pox)	NR	NR	NR	NR	NR	NR	NR	99	136	118	84
West Nile neuroinvasive disease	0	0	0	0	0	14	170	6	35	38	48
West Nile fever	0	0	0	0	0	23	869	45	194	74	160

*NR= not reportable

Source: South Dakota Department of Health, Office of Disease Prevention

Table 80a
South Dakota Selected Notifiable Diseases by County, 2007 (continued)

County	Campylobacteriosis	Chlamydia	Cryptosporidiosis	*Shiga toxin-producing E. coli*	Giardiasis	Gonorrhea	Hepatitis C, Chronic	Methicillin-resistant *Staphylococcus aureus*, invasive	Mumps	Pertussis	Salmonellosis	Shigellosis	Tuberculosis	Varicella	West Nile Disease
Aurora	8	≤ 3	0	0	0	0	0	≤ 3	≤ 3	0	0	0	0	0	0
Beadle	8	44	8	≤ 3	0	≤ 3	5	≤ 3	0	0	≤ 3	0	0	≤ 3	4
Bennett	≤ 3	9	0	0	≤ 3	0	0	0	0	0	0	0	0	0	≤ 3
Bon Homme	≤ 3	4	≤ 3	≤ 3	0	≤ 3	13	≤ 3	0	0	0	0	0	0	≤ 3
Brookings	11	56	8	≤ 3	≤ 3	≤ 3	7	≤ 3	0	≤ 3	10	6	0	0	≤ 3
Brown	9	96	31	4	6	5	6	0	≤ 3	0	10	0	0	0	33
Brule	≤ 3	7	≤ 3	0	0	≤ 3	≤ 3	≤ 3	0	0	0	0	0	0	≤ 3
Buffalo	0	17	≤ 3	0	0	0	0	0	0	0	≤ 3	≤ 3	0	0	0
Butte	0	8	0	0	≤ 3	≤ 3	4	≤ 3	0	0	≤ 3	0	0	0	6
Campbell	≤ 3	0	0	0	0	0	≤ 3	0	0	0	≤ 3	0	0	0	≤ 3
Charles Mix	6	60	5	0	≤ 3	5	6	≤ 3	0	≤ 3	≤ 3	0	≤ 3	6	≤ 3
Clark	0	≤ 3	0	0	0	0	≤ 3	0	0	0	≤ 3	0	0	0	≤ 3
Clay	≤ 3	38	≤ 3	0	≤ 3	8	≤ 3	≤ 3	0	0	≤ 3	0	0	≤ 3	≤ 3
Codington	0	68	4	5	≤ 3	5	≤ 3	≤ 3	0	0	≤ 3	0	0	≤ 3	7
Corson	≤ 3	52	0	0	0	7	≤ 3	≤ 3	0	0	0	0	0	≤ 3	≤ 3
Custer	≤ 3	28	0	≤ 3	0	≤ 3	8	0	0	0	≤ 3	0	0	≤ 3	≤ 3
Davison	14	57	9	4	≤ 3	4	11	7	0	0	6	≤ 3	0	0	6
Day	≤ 3	5	0	0	0	0	0	0	0	0	≤ 3	0	0	0	6
Deuel	0	5	≤ 3	0	≤ 3	0	≤ 3	≤ 3	0	0	≤ 3	0	0	0	≤ 3
Dewey	≤ 3	113	0	0	0	21	≤ 3	≤ 3	0	0	≤ 3	≤ 3	0	≤ 3	≤ 3
Douglas	5	0	≤ 3	0	0	0	0	≤ 3	0	0	≤ 3	0	0	0	0
Edmunds	≤ 3	≤ 3	≤ 3	0	≤ 3	0	0	0	0	≤ 3	≤ 3	0	0	0	7
Fall River	≤ 3	7	0	0	≤ 3	0	≤ 3	0	0	0	≤ 3	0	0	≤ 3	≤ 3
Faulk	≤ 3	≤ 3	0	0	0	≤ 3	≤ 3	0	0	0	≤ 3	0	0	0	0
Grant	≤ 3	≤ 3	≤ 3	0	≤ 3	0	≤ 3	≤ 3	0	0	0	0	0	0	≤ 3
Gregory	4	≤ 3	≤ 3	≤ 3	0	≤ 3	≤ 3	≤ 3	0	0	0	0	0	0	0
Haakon	0	≤ 3	≤ 3	0	≤ 3	0	0	0	0	0	0	0	≤ 3	0	0
Hamlin	≤ 3	≤ 3	≤ 3	0	7	0	≤ 3	0	0	≤ 3	≤ 3	0	0	0	5
Hand	5	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Hanson	≤ 3	≤ 3	≤ 3	0	0	0	0	≤ 3	0	0	≤ 3	0	0	0	≤ 3
Harding	0	≤ 3	0	0	0	0	0	0	0	0	0	0	0	0	≤ 3
Hughes	≤ 3	59	≤ 3	0	≤ 3	5	4	≤ 3	0	0	0	67	0	6	4
Hutchinson	8	6	≤ 3	≤ 3	0	0	≤ 3	≤ 3	0	0	0	0	0	0	0
Hyde	0	0	0	0	0	0	0	0	0	0	0	≤ 3	0	0	0
Jackson	≤ 3	11	0	0	0	0	0	0	0	0	0	4	0	0	≤ 3
Jerauld	≤ 3	≤ 3	0	0	0	0	0	0	0	0	≤ 3	0	0	0	0

Continued

Table 80b
South Dakota Selected Notifiable Diseases by County, 2007 (continuing)

County	Campylobacteriosis	Chlamydia	Cryptosporidiosis	*Shiga toxin-producing E. coli*	Giardiasis	Gonorrhea	Hepatitis C, Chronic	Methicillin-resistant *Staphylococcus aureus*, invasive	Mumps	Pertussis	Salmonellosis	Shigellosis	Tuberculosis	Varicella	West Nile Disease
Jones	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kingsbury	≤ 3	≤ 3	≤ 3	0	0	≤ 3	0	0	0	≤ 3	0	0	0	0	≤ 3
Lake	6	20	≤ 3	≤ 3	≤ 3	8	≤ 3	≤ 3	0	0	0	0	0	0	4
Lawrence	≤ 3	79	0	0	5	≤ 3	10	0	0	0	≤ 3	≤ 3	≤ 3	≤ 3	4
Lincoln	12	18	8	≤ 3	8	≤ 3	≤ 3	4	0	≤ 3	13	0	0	5	≤ 3
Lyman	≤ 3	13	0	0	0	0	0	≤ 3	0	0	≤ 3	0	0	0	≤ 3
Marshall	6	≤ 3	0	≤ 3	0	0	0	0	0	0	≤ 3	0	0	0	4
McCook	≤ 3	4	≤ 3	0	≤ 3	≤ 3	≤ 3	≤ 3	0	0	0	0	0	≤ 3	≤ 3
McPherson	≤ 3	≤ 3	0	≤ 3	0	0	0	≤ 3	0	0	≤ 3	0	0	0	0
Meade	≤ 3	21	0	0	≤ 3	≤ 3	10	≤ 3	≤ 3	≤ 3	4	0	0	0	7
Mellette	0	7	0	0	0	≤ 3	≤ 3	≤ 3	0	0	0	0	0	0	≤ 3
Miner	≤ 3	5	≤ 3	0	≤ 3	0	0	0	0	0	0	0	0	≤ 3	≤ 3
Minnehaha	43	675	36	9	17	89	91	20	0	40	32	5	≤ 3	30	6
Moody	≤ 3	12	≤ 3	0	≤ 3	0	5	0	0	≤ 3	0	0	0	≤ 3	≤ 3
Pennington	8	413	≤ 3	≤ 3	10	34	64	7	0	≤ 3	28	≤ 3	0	13	26
Perkins	≤ 3	≤ 3	0	≤ 3	≤ 3	≤ 3	0	≤ 3	0	0	≤ 3	0	0	0	≤ 3
Potter	0	≤ 3	0	0	≤ 3	0	0	0	0	0	0	0	0	≤ 3	≤ 3
Roberts	4	52	0	0	≤ 3	0	9	≤ 3	0	0	4	≤ 3	0	0	5
Sanborn	≤ 3	≤ 3	0	≤ 3	≤ 3	0	≤ 3	0	0	0	0	0	0	0	4
Shannon	0	287	0	0	4	43	7	≤ 3	0	0	≤ 3	6	≤ 3	0	≤ 3
Spink	6	≤ 3	≤ 3	≤ 3	≤ 3	0	≤ 3	≤ 3	≤ 3	0	≤ 3	0	≤ 3	0	≤ 3
Stanley	0	5	0	0	0	≤ 3	0	0	0	0	0	5	0	≤ 3	≤ 3
Sully	0	0	0	0	0	0	0	0	≤ 3	0	0	0	0	≤ 3	0
Todd	8	124	0	0	≤ 3	≤ 3	≤ 3	4	0	7	≤ 3	15	≤ 3	0	≤ 3
Tripp	4	10	0	4	0	0	0	≤ 3	0	0	≤ 3	≤ 3	0	0	≤ 3
Turner	≤ 3	≤ 3	0	0	≤ 3	0	0	≤ 3	0	0	10	0	0	≤ 3	≤ 3
Union	≤ 3	7	0	0	≤ 3	0	7	≤ 3	0	0	4	0	0	≤ 3	0
Walworth	≤ 3	25	≤ 3	0	0	0	0	≤ 3	0	0	0	≤ 3	0	0	≤ 3
Yankton	5	39	21	≤ 3	8	4	9	≤ 3	≤ 3	0	5	0	0	0	0
Ziebach	0	12	0	0	0	0	0	0	0	0	0	0	≤ 3	0	0
South Dakota	**235**	**2619**	**169**	**47**	**104**	**261**	**317**	**88**	**6**	**60**	**174**	**122**	**13**	**84**	**208**
Rate per 100,000	29.5	328.9	21.2	5.9	13.1	32.8	39.8	11.1	0.8	7.5	21.9	15.3	1.6	10.5	26.1
5-year median	219	2606	44	35	89	304	N A	N A	0	26	135	131	14	NA	112
% change of median	7%	0.5%	284%	34%	17%	-14%	N A	N A	NA	131%	29%	-8%	-7%	NA	86%

In 2007 there were also: 39 cases of Hepatitis B, chronic; 20 cases of Streptococcal disease, Group B invasive; 17 cases of drug resistant *Streptococcus pneumoniae*; 12 cases of Streptococcal disease, Group A invasive; 7 cases each of Hepatitis B, acute, Tularemia and Syphilis (primary & secondary); 6 cases of Hepatitis A; 5 cases of E. coli associated with HUS; 4 cases each of Legionellosis and shiga-toxin producing E.coli, serotype unknown, 3 cases of Meningococcal disease; 1 case each of Q fever and Hemolytic uremic syndrome of unknown cause.

To safeguard privacy "≤ 3" designates strata with 1, 2 or 3 cases.
Source: South Dakota Department of Health, Office of Disease Prevention

Table 81
South Dakota Selected Notifiable Disease Summary by Gender, Race, and Age, 2007

		Gender*				Race*							Age group (in years)						
Disease	**Total**	Male (%)		Female (%)		White (%)		American Indian (%)		Other or unknown (%)		Median age	<1	1-4	5-14	15-24	25-39	40-64	≥65
Campylobacteriosis	**235**	142	60%	93	40%	199	85%	16	7%	20	9%	26	9	29	26	49	38	63	21
Chlamydia	**2619**	724	28%	1894	72%	1312	50%	1129	43%	178	7%	21	0	0	37	1912	581	41	0
Cryptosporidiosis	**169**	86	51%	83	49%	157	93%	6	4%	6	4%	9	7	50	39	16	30	20	7
Shiga-toxin producing E. coli	**47**	20	43%	27	57%	40	85%	1	2%	6	13%	6	2	18	12	8	3	2	1
Giardiasis	**104**	57	55%	47	45%	87	84%	14	13%	3	3%	18	3	32	13	8	20	20	6
Gonorrhea	**261**	107	41%	153	59%	104	40%	121	46%	36	14%	22	0	0	3	173	72	7	0
Hepatitis C, Chronic	**317**	198	63%	117	37%	154	49%	52	16%	110	35%	46	0	1	0	12	67	229	8
HIV/AIDS	**25**	14	56%	11	44%	8	32%	6	24%	11	44%	32	0	0	0	5	14	6	0
Methicillin-resistant *Staph. aureas*, invasive	**88**	52	59%	36	41%	59	67%	15	17%	14	16%	68	3	1	2	0	6	28	47
Mumps	**6**	4	67%	2	33%	6	100%	0	0%	0	0%	23.5	0	1	0	2	2	1	0
Pertussis	**60**	32	53%	28	47%	50	83%	6	10%	4	7%	9	8	6	23	6	5	7	2
Salmonellosis	**174**	80	46%	94	54%	151	87%	13	7%	10	6%	34	5	11	20	26	31	57	22
Shigellosis	**122**	59	48%	63	52%	54	44%	63	52%	5	4%	4.5	8	53	29	6	21	5	0
Streptococcus A, invasive	**12**	12	100%	0	0%	8	67%	3	25%	1	8%	56.5	0	0	0	0	1	8	3
Streptococcus B, invasive	**20**	7	35%	13	65%	17	85%	1	5%	2	10%	62	3	0	0	0	3	6	8
Tuberculosis	**13**	7	54%	6	46%	3	23%	7	54%	3	23%	57	0	0	0	0	1	8	4
Varicella	**84**	45	54%	39	46%	60	71%	15	18%	9	11%	7	5	14	59	3	1	1	1
West Nile virus disease	**208**	118	57%	90	43%	181	87%	18	9%	9	4%	45	0	2	10	17	50	95	34

Total cases reported on this table may differ slightly from row totals due to incomplete case information.
*South Dakota's overall population was 50% male and 50% female; 89% White, 9% American Indian and 2% other races.
Source: South Dakota Department of Health, Office of Disease Prevention

VACCINE-PREVENTABLE DISEASES: Diphtheria, Pertussis, Tetanus, Measles, Mumps, Rubella, Polio, *Haemophilus influenzae* type b disease, Varicella, Hepatitis A and B.

The Centers for Disease Control and Prevention (CDC) regards vaccination as one of the 10 great public health achievements of the twentieth century. Vaccination is responsible for the global eradication of smallpox, the elimination of poliomyelitis from the Western Hemisphere, and the control of measles, rubella, tetanus, diphtheria, *Haemophilus influenzae* type b (Hib), and other infectious diseases in the United States and many other countries.

Immunization is a fundamental component of comprehensive child health care. South Dakota's statewide goal is to immunize 90 percent of 2-year old children for measles, mumps, rubella, diphtheria, pertussis, polio, Hib, varicella, Tetanus and Hepatitis B.

In South Dakota, factors contributing to increased vaccination rates and disease reduction include enacting a statewide school immunization law in 1971; implementing child-care facility immunization standards; providing vaccines (measles vaccine distribution began in 1967, rubella in 1969, mumps in 1976, *Haemophilus influenzae* b in 1989, hepatitis B in 1993, hepatitis A in 1995, and chicken pox in 2001); and since 1978 providing free supplies of all required childhood vaccines for private and public clinic use.

In 1996, the South Dakota Immunization Information System (SDIIS) was implemented, and it currently networks the immunization records of 258 health clinics, 188 public schools, colleges, universities, tribal colleges and headstart facilities across the state. The DOH strives to enroll all children in South Dakota in SDIIS.

During 2007, no cases of measles, rubella, diphtheria, tetanus, or polio were reported in South Dakota.

Sixty cases of pertussis (whooping cough) were reported in South Dakota in 2007. Eight of this year's cases were in a child less than one year of age.

Complications of pertussis may include severe cough, pneumonia, otitis media, seizures, encephalopathy, brain damage, and occasionally death. Pertussis is most severe in young infants, with 70 percent of all pertussis deaths occurring during the first year of life. The bacterial agent, *Bordetella pertussis*, has been isolated from 25 percent of adults with cough illness lasting more than seven days. These adults often serve as a source of infection for unimmunized children.

Mumps Mumps is an acute viral infection typified by inflammation and swelling of the parotid salivary glands. Complications may include deafness, meningoencephalitis, and orchitis. After nearly 20 years of decreasing cases in the United States a mumps outbreak hit several Midwestern states, including South Dakota, in 2006. Nationally, 6,617 cases of mumps were reported including 296 cases in South Dakota.

In 2007, six cases of mumps were reported, which was an incidence rate of 0.8 cases per 100,000 population.

A decreasing trend of *Haemophilus influenzae* type b is evident from the 54 cases reported in 1990 down to zero in 2007. Invasive *H. influenzae* disease can cause meningitis, pneumonia, osteomyelitis, epiglottitis, cellulitis and pericarditis. This preventable disease has a case-fatality rate of 2 percent to 5 percent.

Immunization requirements for entrance into South Dakota schools since 2000 have included:

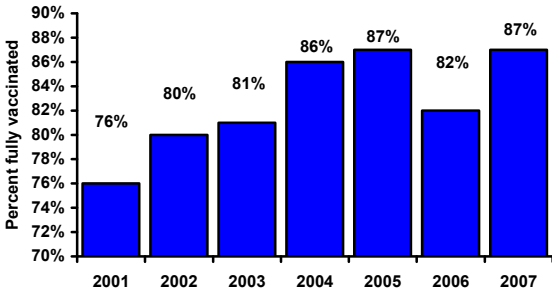
a) 4 doses of diphtheria, tetanus, pertussis vaccine (DTaP or DTP), and
b) 3 doses of poliovirus vaccine, and
c) 2 doses of measles vaccine, and
d) 2 doses of rubella vaccine, and
e) 2 doses of mumps vaccine, and
f) 2 doses of chicken pox vaccine.

Child vaccination coverage rates are estimated by the National Immunization Survey (NIS). The NIS provides vaccination coverage estimates for children aged 19-35 months for each of the 50 states, including South Dakota.

To collect vaccination data for age-eligible children, NIS uses a quarterly random-digit-dialing sample of telephone numbers to find households with children aged 19 to 35 months. Parents or guardians are asked to report the vaccines, with dates, that appear on the child's "shot card" kept in the home. At the end of the interview, permission is requested to contact the child's vaccination providers. The providers are then contacted by mail to verify each child's vaccinations.

In 2007, 87 percent of children 19-35 months old in South Dakota were adequately immunized (Figure 30). There has been a steadily improving trend in vaccination coverage rates since the SDIIS was launched in 1996, but we are still short of our 90 percent immunization coverage objective.

Figure 30
South Dakota Immunization Rates, Children 19-35 Months, 2001 – 2007
(National Immunization Survey 4:3:1:3:3)

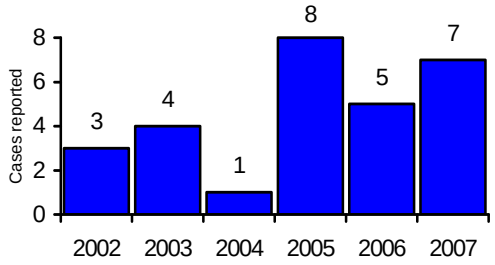


Immunization rates of children 19-35 months old immunized with 4 doses of DTaP, 3 doses polio, 1 dose of MMR, 3 doses of *Haemophilus influenzae* b, and 3 doses of hepatitis B vaccine.
Source: South Dakota Department of Health, Office of Disease Prevention

Viral Hepatitis There were seven cases of acute hepatitis B reported in 2007 (Figure 31). The year 2004 marked the first year that chronic hepatitis B infections became reportable. There were 39 cases of chronic hepatitis B infections reported in South Dakota in 2007. Hepatitis B is caused by a virus transmitted by blood and other body fluids. It can cause lifelong infection, liver cirrhosis, liver cancer, liver failure, and death.

As part of a nationwide prevention program, hepatitis B vaccine has been made available for routine use in newborns and for children and adolescents who did not complete vaccination as infants. Hepatitis B vaccination is not mandatory for school entry in South Dakota. Adults at risk for hepatitis B infection who should consider vaccination include: people who have more than one sex partner in six months, men who have sex with other men, sex contacts of infected people, people who inject illegal drugs, health care and public safety workers who might be exposed to infected blood or body fluids, household contacts of persons with chronic HBV infection and hemodialysis patients.

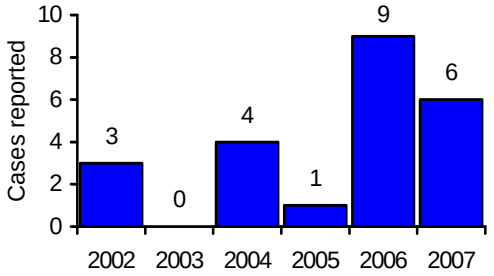
Figure 31
Acute Hepatitis B in South Dakota, 2002 – 2007



Source: South Dakota Department of Health, Office of Disease Prevention

In 2007, there were six cases of hepatitis A reported in South Dakota (Figure 32). Several of these cases were acquired by South Dakota residents traveling to foreign countries. The Healthy People 2010 target is 4.5 new cases of hepatitis A per 100,000 population. For the past 9 years, South Dakota has met this target.

Figure 32
Hepatitis A in South Dakota, 2002 – 2007



Source: South Dakota Department of Health, Office of Disease Prevention

Hepatitis A is a virus shed in the feces and transmitted person-to-person or by contaminated food or water. The illness causes mild to serious liver disease. To prevent hepatitis A the vaccine is available for children and adults.

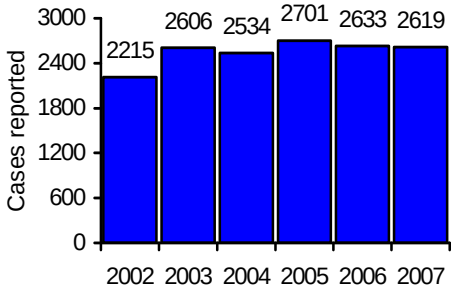
SEXUALLY TRANSMITTED DISEASES

Sexually transmitted diseases (STDs) include several bacterial and viral infections that can be passed person-to-person by genital, oral or anal sexual contact. STDs include gonorrhea, chlamydia, genital herpes, syphilis, genital warts, HIV infection, chancroid, trichomoniasis, lymphogranuloma venereum, and others. All STDs have the potential to cause serious illness, but most are treatable. STDs are preventable by abstinence, uninfected partner monogamy, and proper use of condoms.

Over the past decade, South Dakota has generally reduced the occurrence of STDs through intensive efforts to identify and treat infected persons. Although gonorrhea and chlamydia cases have decreased over the past 20 years, they are still common. Syphilis and lymphogranuloma venereum have become rare, and chancroid is almost unheard of in our state. STDs in South Dakota primarily affect young people between the ages of 15 and 24 years, and minority populations.

Chlamydia Chlamydia is the most commonly reported STD in South Dakota. During 2007, the DOH received 2,619 case reports (Figure 33), which was an incidence rate of 328.9 cases per 100,000 population.

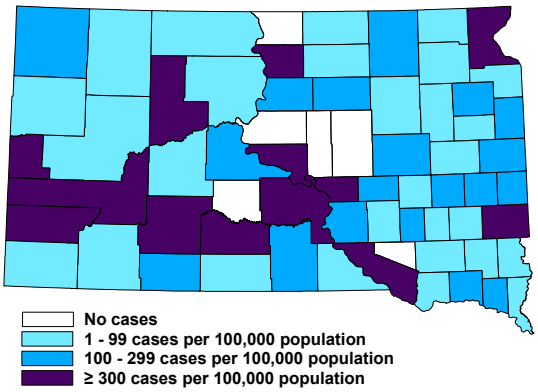
Figure 33
Chlamydia in South Dakota, 2002 – 2007



Source: South Dakota Department of Health, Office of Disease Prevention

Counties with the highest incidence (cases per 100,000 population) included Buffalo (805), Charles Mix (670), Roberts (527), Walworth (475), Ziebach (454), Pennington (429), Jackson (394), Minnehaha (385), Custer (358), Hughes (350), Mellette (347), Lawrence (338), and Lyman (333) (Figure 34).

Figure 34
Chlamydia Incidence Rates by County, South Dakota, 2007



Source: South Dakota Department of Health, Office of Disease Prevention

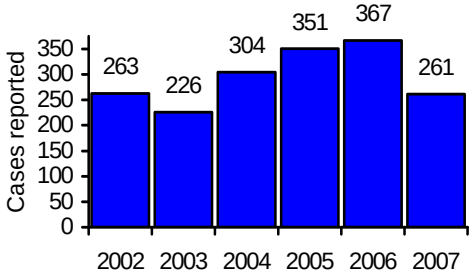
Nationally, the incidence of chlamydia in 2006 was 347.5 cases per 100,000 population. South Dakota ranked 24th that year with an incidence of 339.2.

Screening for chlamydia infection has become standard practice for many health care providers in the state. Indian Health Service, family planning clinics, and many private providers have incorporated chlamydia screening as part of the routine health examination for sexually active young women. Screening follow-up encompasses treatment and partner referral. Because screening efforts are focused on women, female infections are more likely to be identified than males. Our data show that 72 percent of chlamydia cases were female in 2007.

Young people between 15 and 24 years old accounted for 73 percent of the chlamydia cases reported in 2007. Although American Indians comprise 9 percent of the state's population, a disproportionate share, 43 percent, of chlamydia case reports were in this population group. This higher disease rate necessitates continued targeting of screening and disease intervention among American Indians.

Gonorrhea In 2007 the DOH received 261 reports of Gonorrhea (Figure 35), which was an incidence of 32.8 cases per 100,000 population. This is a 14 percent decrease over the 5-year median.

Figure 35
Gonorrhea in South Dakota, 2002 – 2007



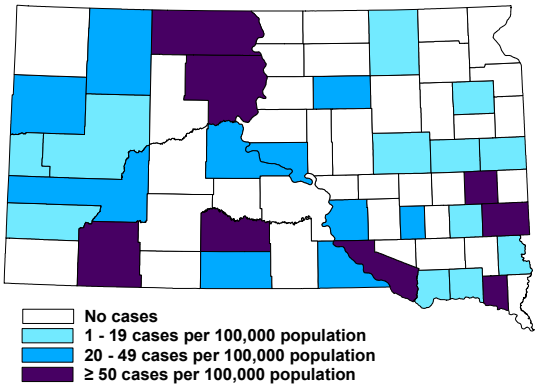
Source: South Dakota Department of Health, Office of Disease Prevention

Forty percent of the gonorrhea case reports occurred in the white population, and 59 percent were female. The Healthy People 2010 objective is 19 new cases of gonorrhea per 100,000 population.

Counties with the highest incidence (cases per 100,000 population) included Dewey (350), Shannon (316), Corson (167), Lake (70), Clay (60), Charles Mix (56), Minnehaha (51), and Mellette (50) (Figure 36).

Sexually active adolescents and young adults are the population most at risk with 66 percent of the gonorrhea cases reported being 15 to 24 years old. The American Indian population was disproportionately affected with 46 percent of the reported cases.

Figure 36
Gonorrhea Incidence Rates by County, South Dakota, 2007

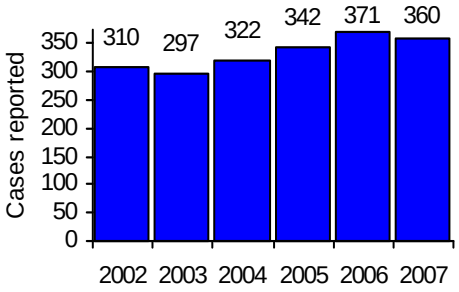


Source: South Dakota Department of Health, Office of Disease Prevention

Nationally the incidence of gonorrhea was 120.9 cases per 100,000 population in 2006. South Dakota ranked 39th that year with an incidence of 47.3. In 2007, the incidence decreased to 32.8.

Herpes Genital herpes became reportable in 1993 in South Dakota. In 2007, 360 cases were reported (Figure 37), which was an incidence of 45.2 cases per 100,000 population.

Figure 37
Genital Herpes in South Dakota, 2002 – 2007



Source: South Dakota Department of Health, Office of Disease Prevention

Management of genital herpes depends on clinical presentation, and may include antiviral therapy and counseling for behavior adaptations and prevention.

Syphilis After many years of sporadic and very low syphilis rates in South Dakota, the disease made a resurgence in the state in 2006. There were 19 cases of infectious syphilis (primary and secondary, and early latent cases) reported in South Dakota in 2006. In 2007 there were 11 cases (Table 82) which was an incidence of 1.5 cases per 100,000 population. The Healthy People 2010 target for primary and secondary syphilis is 0.2 cases per 100,000 population. South Dakota participates in syphilis elimination through expedited case management, partner referral, and interstate coordination of outbreak investigations.

Table 82
Syphilis in South Dakota, 1992-2007

Year	Primary and Secondary	Congenital	Early Latent	Late Latent
1992	1	0	0	0
1993	0	0	1	0
1994	2	0	0	1
1995	0	0	1	6
1996	0	0	0	2
1997	1	0	2	5
1998	1	1	0	1
1999	0	1	1	1
2000	0	0	0	1
2001	1	0	0	0
2002	0	0	0	0
2003	2	0	3	0
2004	0	0	0	0
2005	2	0	0	0
2006	13	0	6	10
2007	7	0	4	1
Total	**30**	**2**	**18**	**28**

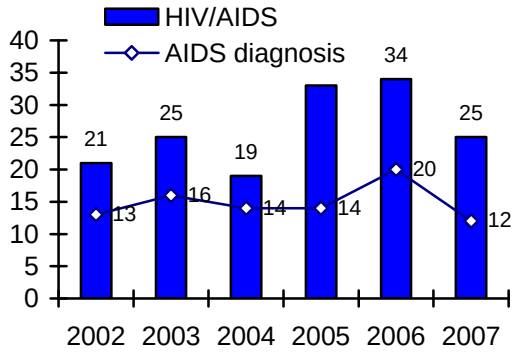
Source: South Dakota Department of Health, Office of Disease Prevention

HIV/AIDS

Acquired immunodeficiency syndrome (AIDS) is caused by an infection of human immunodeficiency virus (HIV). From 1981, when AIDS was first identified in the United States, through December 2006, 1,014,797 AIDS cases had been reported to the CDC. Of these cases, 565,927 (56 percent) are estimated to have died.

AIDS became a reportable disease in South Dakota in 1985 and HIV infection became reportable in 1988. Through December 2007, there were 554 cases of HIV/AIDS reported in the state (326 AIDS cases and 228 HIV cases). In 2007, there were 25 new cases of HIV reported and 12 new cases of AIDS diagnosed. Figure 38 shows the number of combined new HIV/AIDS cases reported to the DOH by year and the number of conversions to AIDS. South Dakota had one of the lowest incidence rates of AIDS in the USA in 2006. In 2005, the AIDS incidence rate was 2.3 cases per 100,000.

Figure 38
HIV/AIDS in South Dakota, 2002 – 2007

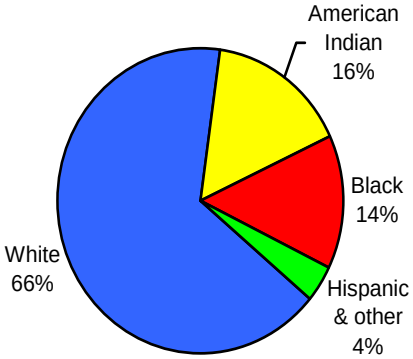


Source: South Dakota Department of Health, Office of Disease Prevention

In 2002, there were more women (62 percent) than men (38 percent) reported with HIV/AIDS, which was the first time this was observed. In South Dakota, the number of females with HIV is still small, 23 percent cumulative as of December 2007, but the number is generally increasing yearly. Most women who become infected with HIV are in their childbearing years.

Nationally, there are a disproportionate number of AIDS cases in the black and Hispanic communities. South Dakota's minority groups are also disproportionately affected by HIV/AIDS (Figure 39). Blacks made up 14 percent of the HIV/AIDS cases in the state, but comprise less than 1 percent of the total population. American Indians comprised 16 percent of the state's HIV/AIDS cases, but 9 percent of the population; and Hispanic and other residents accounted for 4 percent of the HIV/AIDS cases, but only 1 percent of the population. White people make up 89 percent of the state's population, and 66 percent of the HIV/AIDS cases.

Figure 39
HIV/AIDS by Race or Ethnic Group, South Dakota, 1985-2007 (n=554)



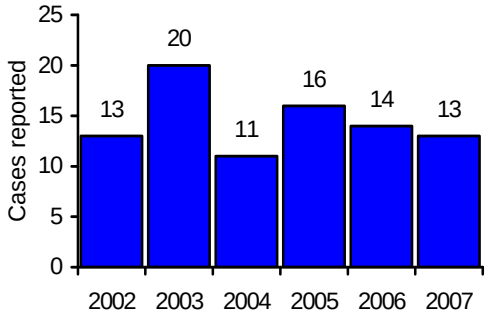
Source: South Dakota Department of Health, Office of Disease Prevention

The DOH coordinates a statewide HIV/AIDS prevention and control program. Counseling and testing sites are located in Pierre, Aberdeen, Watertown, Dupree, Rapid City, and Sioux Falls. These sites provide free, confidential counseling and testing for HIV. A toll-free statewide phone number (1-800-592-1861) is available to answer questions about AIDS and HIV during working hours. The national 24-hour AIDS number is 1-800-342-2437.

TUBERCULOSIS

During calendar year 2007, 13 cases of active tuberculosis were reported (Figure 40) to the DOH, including three white (23 percent), seven American Indians (54 percent), two black (15 percent) and one Asian (8 percent).

Figure 40
Tuberculosis in South Dakota, 2002 – 2007



Source South Dakota Department of Health, Office of Disease Prevention

The overall incidence rate was 1.9 per 100,000; with an incidence of 10.3 for American Indians, 0.4 for whites, 32.3 for blacks and 17.4 for Asians. Of the cases reported in 2007, 6 were female (46 percent), 7 were male (54 percent). Fifty-four percent of cases were foreign borne.

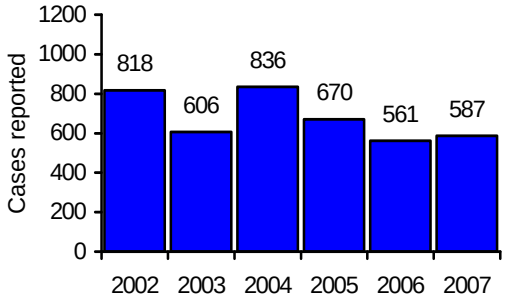
The DOH's goal is the elimination of tuberculosis in South Dakota. The objective of the State Tuberculosis Elimination Advisory Committee was to reduce the incidence of tuberculosis in South Dakota to no more than 3.5 cases per 100,000 population by the year 2010. This overall target has been reached, including the special objective for the American Indian population which is 15 cases per 100,000. The Healthy People 2010 target is 1.0 new case of tuberculosis per 100,000 per year.

The occurrence of tuberculosis in young children is of special concern. Each child case represents a failure to stop transmission of infection and a failure to prevent the emergence of disease in an unexposed person. There were no tuberculosis cases reported in children aged 5-9 years of age.

There were no drug resistant tuberculosis cases reported in 2007. There were three cases of tuberculosis reported with single drug resistance in 2006.

In 2007, there were 587 reports of positive skin tests for tuberculosis infection (Figure 41). Since no data is collected on negative tests, it is not known how many people were skin tested overall. Skin testing is targeted to detect persons with latent tuberculosis infection and disease who would benefit from treatment. A positive skin test indicates that the person has been exposed to active tuberculosis, and an evaluation must follow.

Figure 41
Latent Tuberculosis Infection (Positive Skin Tests) in South Dakota, 2002-2007

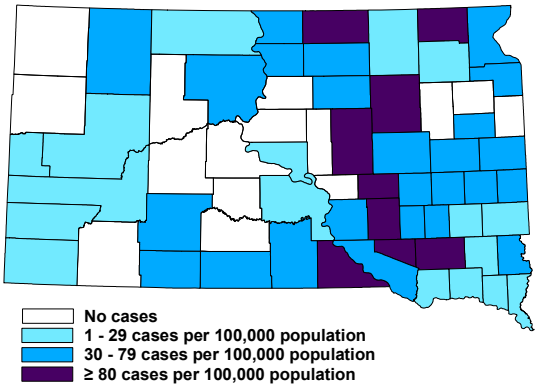


Source: South Dakota Department of Health, Office of Disease Prevention

The DOH has an aggressive tuberculosis control strategy that includes contact investigations and rigorous oversight of patient treatment adherence. The challenge to eliminate tuberculosis in South Dakota focuses on preventing and monitoring disease activation among the elderly, the American Indian population, and foreign-born persons.

Campylobacteriosis *Campylobacter* has been one of the most commonly isolated enteric bacteria in South Dakota since 1999 (Table 79). In 2007, there were 235 cases of campylobacteriosis, which is an incidence of 29.5 cases per 100,000 population. This was a small increase over the five-year median. Sixteen percent of the cases were in children less than five years old. Counties with the highest incidence (cases per 100,000 population) included Aurora (280), Douglas (166), Hand (153), Marshall (139), Hutchinson (109), Jerauld (100), Gregory (97), Spink (89), and McPherson (80) (Figure 42).

Figure 42
Campylobacteriosis Incidence Rates by County, South Dakota, 2007



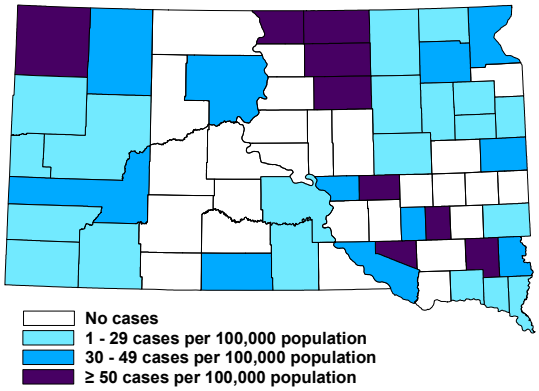
Source: South Dakota Department of Health, Office of Disease Prevention

Campylobacter is a spiral-shaped Gram negative bacteria that can cause diarrhea, often bloody, abdominal pain, vomiting, fever, nausea, and malaise. Most cases of campylobacteriosis are relatively mild, lasting one to two days. Some cases, however, are more severe and relapses occur in about 20 percent of patients.

Complications may include convulsions, neonatal septicemia, extraintestinal infection, arthritis, Guillain-Barré syndrome, or Reiter syndrome. *Campylobacter* associated deaths are rare, occurring primarily in infants, the elderly, and immunocompromised individuals.

Salmonellosis There were 174 culture-confirmed cases of salmonellosis reported in South Dakota in 2007, which was an incidence of 21.9 cases per 100,000 population. This was a increase of 29 percent from the five-year median. Nine percent of the cases were reported among children less than five years old. Counties with the highest incidence (cases per 100,000 population) included McPherson (120), Turner (119), Douglas (99), Faulk (88), Harding (85), Campbell (72), Hanson (55), Jerauld (50) (Figure 43).

Figure 43
Salmonellosis Incidence Rates by County, South Dakota, 2007



Source: South Dakota Department of Health, Office of Disease Prevention

Table 83 shows the most commonly isolated serotypes of *Salmonella* over the past decade year in South Dakota. *S. typhimurium, S. enteriditis* and *S. newport* were the most commonly isolated serotypes in 2007. An outbreak of *S. newport* occurred in western South Dakota in November and December of 2007.

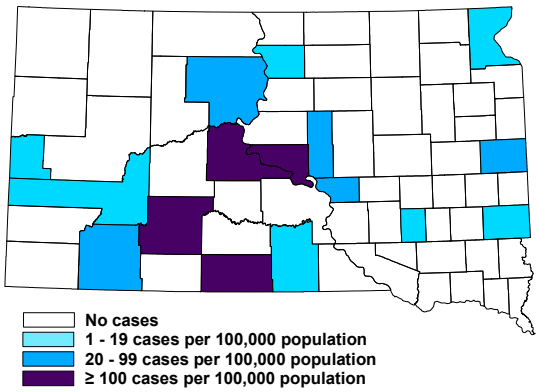
Table 83
Most Common Salmonella Serotypes, South Dakota, 1997-2007

Salmonella serotype	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	*Total*	*Percent*
Agona	2	2	0	2	0	0	0	0	0	1	2	**9**	**1%**
Bovismorbificans	0	2	1	0	1	0	0	0	0	0	1	**5**	**0%**
Braenderup	1	0	3	3	2	0	3	1	6	0	0	**19**	**1%**
Brandenburg	0	0	0	0	0	0	0	0	1	0	0	**1**	**0%**
Enteritidis	8	8	8	9	12	14	15	20	24	17	29	**164**	**11%**
Hadar	4	4	0	7	5	0	7	1	1	2	3	**34**	**2%**
Heidelberg	1	6	6	11	22	10	3	6	6	5	4	**80**	**6%**
Infantis	1	0	0	1	2	1	1	0	9	6	1	**22**	**2%**
Litchfield	0	1	2	1	0	2	1	0	3	0	2	**12**	**1%**
Montevideo	3	2	2	1	1	4	3	6	5	5	7	**39**	**3%**
Muenchen	3	2	4	2	1	3	2	5	2	3	8	**35**	**2%**
Muenster	0	2	1	2	1	2	0	0	0	0	1	**9**	**1%**
Newport	9	8	8	5	6	11	9	9	10	11	23	**109**	**8%**
Oranienburg	1	3	2	0	1	1	2	5	5	2	2	**24**	**2%**
Paratyphi A	0	1	0	1	0	0	0	0	0	0	0	**2**	**0%**
Paratyphi B	0	4	2	1	4	0	5	3	3	3	2	**27**	**2%**
Poona	0	0	1	0	0	0	0	1	1	0	0	**3**	**0%**
Reading	0	2	0	0	0	0	0	1	0	2	0	**5**	**0%**
Saint Paul	0	1	3	1	1	1	5	1	0	3	1	**17**	**1%**
Senftenberg	0	0	0	1	1	0	0	0	0	0	0	**2**	**0%**
Thompson	3	3	2	1	2	2	0	1	2	2	1	**19**	**1%**
Typhimurium	43	64	42	33	48	36	50	61	49	45	41	**578**	**40%**
Other serotypes	11	17	13	18	41	34	25	35	33	28	46	**301**	**21%**
Total	**90**	**132**	**100**	**100**	**151**	**121**	**131**	**156**	**160**	**135**	**174**	**1450**	**100%**

Source: South Dakota Department of Health, Office of Disease Prevention

Shigellosis In 2007 there were 122 cases of shigellosis reported which represent an eight percent decrease over the five-year median. This was an incidence rate of 15.3 cases per 100,000 population. Figure 44 shows shigellosis incidence rates (cases per 100,000 population) by county in South Dakota for 2007.

Figure 44
Shigellosis Incidence Rates by County, South Dakota, 2007



Source: South Dakota Department of Health, Office of Disease Prevention

Shigella sonnei was the most common species isolated since 1997 (66 percent), while *S. flexneri* was the second most common (Table 84).

Shigellosis is an intestinal infection causing diarrhea (may be mucoid or bloody), fever, nausea, vomiting, and abdominal cramps. Complications, such as severe dehydration or seizures, may occur, especially among infants.

Table 84
Most Common Shigella Serotypes, South Dakota, 1997-2007

Year	S. flexneri	S. sonnei	S. boydii	Species Unk	Total
1997	16	13	0	2	31
1998	12	16	0	5	33
1999	13	4	0	1	18
2000	2	2	0	4	8
2001	6	508	1	201	716
2002	5	113	0	39	157
2003	3	9	0	5	17
2004	0	6	4	2	12
2005	1	70	5	55	131
2006	0	268	1	120	389
2007	0	75	0	47	122
Total	**58**	**1084**	**11**	**481**	**1634**
Percent	**4%**	**66%**	**1%**	**29%**	**100%**

Source: South Dakota Department of Health, Office of Disease Prevention

Shigella is transmitted by the fecal-oral route (human feces), with a very small dose (10 organisms) sufficient to cause illness. Following exposure, illness usually follows after a one to four day incubation period. Transmission is typically person-to-person within families, child day care centers, and residential living services for the developmentally disabled. Food may also be contaminated by people not washing their hands properly. Shigellosis may also be transmitted by contaminated drinking or recreational water, anal intercourse, houseflies, or by fecally contaminated objects.

***Escherichia coli*, shiga toxin-producing**
Escherichia coli O157:H7 infection has been legally reportable since 1996 and all shiga-toxin-producing *E. coli* have been reportable since 2005. During 2007 there were 47 cases of shiga toxin-producing *E. coli* reported, representing a 34 percent increase over the five-year median. This was an incidence rate of 5.9 cases per 100,000 population. Sixty-eight percent of the cases were in children less than 15 years of age. There were five cases of hemolytic uremic syndrome (HUS) associated with *E. coli* infection.

E. coli O157:H7 is only one of several enterohemorrhagic, shiga toxin-producing serotypes of the bacteria. There were 37 cases of *E. coli* O157:H7 and also five cases of other enterohemorrhagic *E. coli* (unknown serotype) reported.

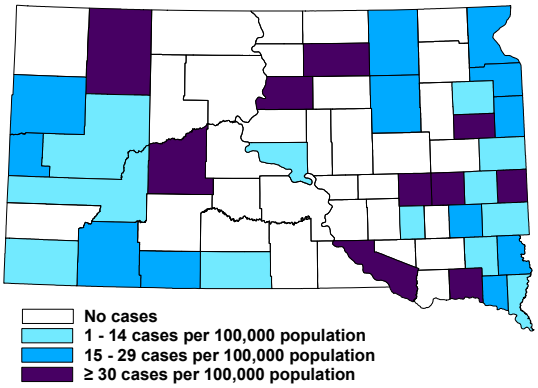
Shiga-toxin producing *E. coli* often causes severe bloody diarrhea and abdominal cramps. The illness usually resolves in five to 10 days. In some individuals, however, complications may involve severe hemorrhagic colitis, HUS, thrombotic thrombocytopenic purpura, and even death.

Shiga-toxin producing *E. coli* is transmitted by meat, water, fresh vegetables or other foods contaminated by the intestinal contents or manure of cattle, sheep, deer, and other animals. Human infection can be prevented by proper slaughtering methods, thorough cooking of meats, proper kitchen hygiene, pasteurization of fruit juices and dairy products, and handwashing after contact with cattle or manure. Individuals with shiga toxin-producing *E. coli* infections are restricted from commercial food handling, child day care, or patient care until two successive negative fecal samples are collected.

Giardiasis Giardiasis is a gastrointestinal disease caused by a protozoan parasite called *Giardia lamblia (G. intestinalis)* which is transmitted person-to-person or by contaminated water. During 2007, 104 cases of giardiasis were reported. This represents a 17 percent increase from the five-year median. Forty-eight percent of the cases were from children less than 15 years of age. Counties with the highest incidence

(cases per 100,000 population) included Potter (92), Edmunds (75), Haakon (54), Sanborn (41), Miner (40), Yankton (37), Perkins (34), Charles Mix (34), and Moody (31) (Figure 45).

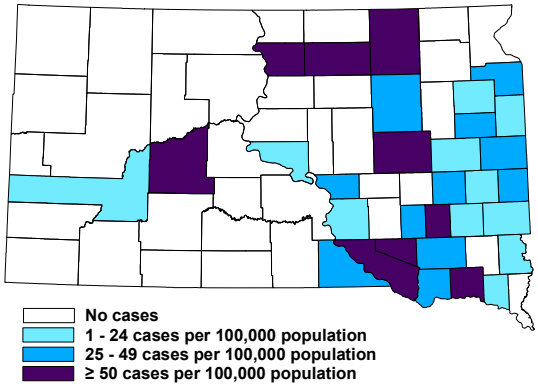
Figure 45
Giardiasis Incidence Rates by County, South Dakota, 2007



Source: South Dakota Department of Health, Office of Disease Prevention

Cryptosporidiosis Cryptosporidiosis is a protozoan diarrheal disease transmitted by cattle and human feces. The disease has been reportable since 1996. Since then, 499 cases have been reported statewide. In 2007 there were 169 cases reported representing a 284 percent increase over the five-year median. Fifty-seven percent of the cases were from children less than 15 years of age. Generally, an increase in reported cases is occurring nationally with outbreaks often being traced to outdoor recreational water sources and contaminated swimming pools. Figure 46 shows cryptosporidiosis incidence rates (cases per 100,000 population) by county in South Dakota for 2007.

Figure 46
Cryptosporidiosis Incidence Rates by County, South Dakota, 2007

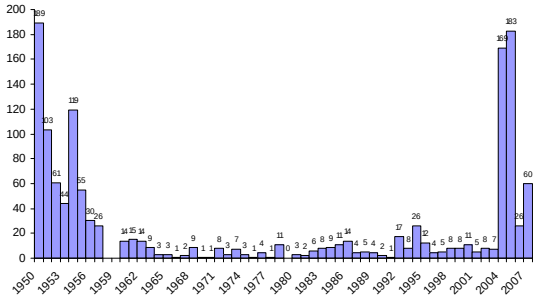


Source: South Dakota Department of Health, Office of Disease Prevention

PERTUSSIS

During 2005 183 cases of pertussis were reported, the highest number since 1950. Pertussis, commonly called whooping cough, is an acute infectious bacterial disease caused by *Bordetella pertussis*. The bacteria produce toxins that inflame and paralyze respiratory cilia causing severe coughing. Pertussis is transmitted by aerosolized droplets of respiratory secretions from infected individuals. In the first half of the twentieth century, pertussis was a common childhood disease and major cause of death. In the 1930s South Dakota averaged 480 pertussis cases reported annually. The pertussis vaccine became available in the 1940s reducing the incidence of the disease. Since 1950 South Dakota has a median of eight cases per year. During 2007, 60 (7.5 cases per 100,000 population) cases of pertussis were reported in South Dakota (112 confirmed cases and 8 probable cases). No deaths were reported due to pertussis complications.

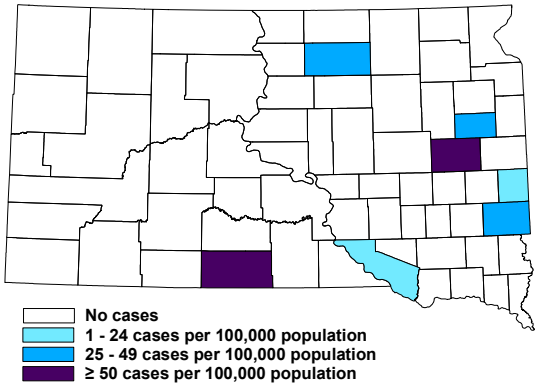
Figure 47
Pertussis Cases Reported in South Dakota, 1950 – 2007



No data available for 1958 and 1959.
Source: South Dakota Department of Health, Office of Disease Prevention

In addition to the 60 cases, 546 individuals were identified as direct contacts to cases or suspects. Individuals who are direct, exposed contacts should receive antibiotic prophylaxis, and if they are symptomatic or suspected of having pertussis, they are recommended for diagnostic testing, isolated and not allowed to attend day care, school or work. Pertussis cases were reported from 7 of 66 South Dakota counties during 2007.

Figure 48
Pertussis Incidence Rates by County, South Dakota, 2007



Source: South Dakota Department of Health, Office of Disease Prevention

Infants and young children are at higher risk of pertussis-associated complications, hospitalization and death. The most common complication is secondary bacterial pneumonia. Twenty-three percent of cases were less than five years old, and 62 percent were less than 15 years old. Pertussis infected youth and adults may expose unprotected infants who are at risk of severe disease and complications.

Immunization is the best protection for infants and young children. The current pertussis vaccine is an acellular purified, inactivated vaccine (DTaP) licensed only for children six years and younger. The primary series of DTaP consists of four doses. The first three doses are given when the child is two, four, and six months old, and the fourth dose given when the child is 15-18 months old. A fifth booster dose should be given when the child is four to six years old, before entering school. Since 2005 pertussis vaccine has been licensed in the United States for adolescents and adults.

The current pertussis vaccine has a reported efficacy of 80 percent – 85 percent. Immunity conferred by either vaccination or natural infection wanes over time. Although unvaccinated children are at highest risk for pertussis, children who are fully vaccinated may also develop disease. Pertussis in previously immunized children is usually milder than in unvaccinated children.

The diagnostic gold standard for pertussis is a positive culture result for *Bordetella pertussis.* The preferred specimen is a nasopharyngeal aspirate or a nasopharyngeal swab. Throat or anterior nasal specimens are unacceptable. Molecular polymerase chain reaction (PCR) testing of nasopharyngeal specimens became available at the SD Public Health Laboratory in 2004. The PCR method is more sensitive than the traditional culture method and is likely responsible in part for more cases reported. The direct fluorescent antibody (DFA) stain of a nasopharyngeal swab is unreliable, so this test cannot be used to confirm pertussis. Serologic testing is not acceptable for clinical diagnosis.

INFLUENZA

Summary
The 2007-08 influenza season was of moderate severity and 26 week duration. A total of 684 laboratory confirmed influenza cases, 394 influenza A and 290 influenza B, were reported to the South Dakota Department of Health (SD DOH) from the beginning of the influenza season starting October 6th, 2007 through season's end on May 17th. 2008. The peak of the influenza season occurred during the 3rd week of February. There were 361 influenza hospitalizations and 22 influenza deaths reported for the season.

Background
The Centers for Disease Control and Prevention (CDC) guidelines for the 2007-08 season were published in the *Prevention and Control of Influenza* MMWR, June 29, 2007.
www.cdc.gov/flu/professionals/acip/index.htm

Approximately 132 million doses of influenza vaccine were produced for the 2007-08 U.S. influenza season. The doses were produced by four companies: Sanofi Pasteur, MedImmune Vaccines, Novartis CSL Biotherapies, and GlaxoSmithKline. The trivalent vaccine included A/Solomon Islands/3/2006(H1N1)-like, A/Wisconsin/67/2005(H3N2)-like, and B/Malaysia/2506/2004-like antigens.

The SD DOH distributed 123,530 doses of influenza vaccine. Of these 31,770 doses for Community Health Services field offices and 44,040 doses for clinics participating in the Vaccines For Children program. In addition, SD DOH promoted the influenza prevention campaign *"Stop it . . . Don't spread it"* by distributing posters in newspapers and to healthcare and childcare facilities.

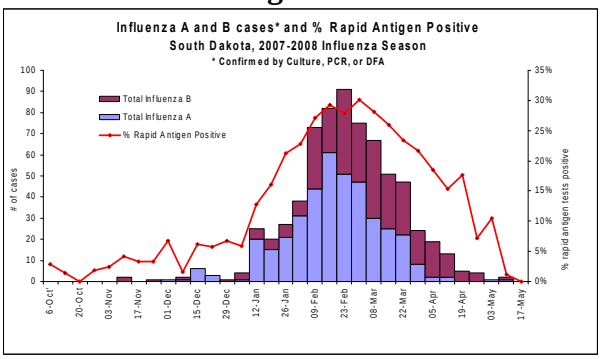
Results from the 2007 Behavioral Risk Factor Surveillance System (BRFSS) showed South Dakota ranking 6th in the nation with 77 percent of individuals aged ≥ 65 years receiving influenza vaccination. The survey also showed the state ranking 38th in pneumococcal vaccination coverage with 64 percent of individuals in that age group receiving vaccine.

Influenza Epidemiology and Laboratory Surveillance
The SD DOH and SD Public Health Laboratory (SDPHL) conduct surveillance for influenza year-round, and intensifies activities October through May. The components of South Dakota's influenza

surveillance program for the 2007-08 season included 30 sentinel sites; five Sentinel Provider Network physicians; SDPHL culture and PCR testing; Pine Ridge, Rapid City Regional, and Sanford Laboratories DFA testing; reporting of aggregate rapid antigen results; confirmed influenza, influenza hospitalizations and deaths, and institutional outbreaks. During the influenza season, weekly summary reports are posted on the SD DOH website at: www.doh.sd.gov/Flu/.

South Dakota's first confirmed case of influenza was identified during the second week of November, 2007 (Figure 49). The case, a 23 month-old male from Todd County, was positive for influenza B by PCR and culture at the SDPHL

Figure 49



Source: South Dakota Department of Health, Office of Disease Prevention

Following the first positive detection, influenza activity remained low until mid January. Activity then steadily increased in both percentage of positive rapid antigen tests and laboratory confirmed cases until the peak was reached during the third full week of February.

A total of 684 confirmed influenza cases, 394 (58 percent) influenza A and 290 (42 percent) influenza B, were reported to SD DOH. Of 394 influenza A isolates, 39 (10 percent) sub typed as A/H1, 105 (27 percent) sub typed as A/H3, and 250 (63 percent) were not sub typed. Of the 21 influenza B isolates identified, 1 (1 percent) were sub typed as B/Malaysia, 20 (7 percent) as B/Shanghai, and 269 (92 percent) were not sub typed.

Other viral respiratory pathogen reports included 82 adenovirus, 147 parainfluenza - 1, 25 parainfluenza - 2, 157 parainfluenza - 3, 54 parainfluenza - 4, and 504 respiratory syncytial virus (RSV).

The median age of confirmed influenza cases (Table 85) was 23 years of age with an age range of 20 days to 99 years. There were 310 (45 percent) cases < 19 years old and 271 (40 percent) were 19-64 years old. Individuals >65 years of age accounted for only 104 (15 percent) of influenza cases.

Table 85,
Age Distribution of Reported Influenza Cases, South Dakota, 2007-2008 Influenza Season

Lab Confirmed Influenza Cases (by DFA, PCR, or culture)			Influenza Associated Hospitalizations		Influenza Associated Deaths
Age Group	# Cases	%	# Hosp	%	# Deaths
0-9	249	36%	73	20%	
10-18	61	9%	4	1%	
19-29	78	11%	19	5%	
30-39	67	10%	23	6%	1
40-49	52	8%	13	4%	
50-59	50	7%	32	9%	3
60-69	36	5%	56	16%	3
70+	91	13%	141	39%	15
Total	684		361		22

Source: South Dakota Department of Health, Office of Disease Prevention

There were 361 individuals reported hospitalized during the 2007-08 influenza season (Table 85). Influenza-associated hospitalizations became officially reportable on December 25th, 2006. The first hospitalization (Figure 49) was identified during the week ending October 6th. Hospitalizations peaked during week ending February 23rd when 47 patients were hospitalized for influenza.

For patients who were hospitalized with influenza, the age range was 5 days to 97

years with a median age of 64 years. Further age stratification revealed 20 percent of hospitalized cases were <10 years of age and 48 percent were >65 years of age.

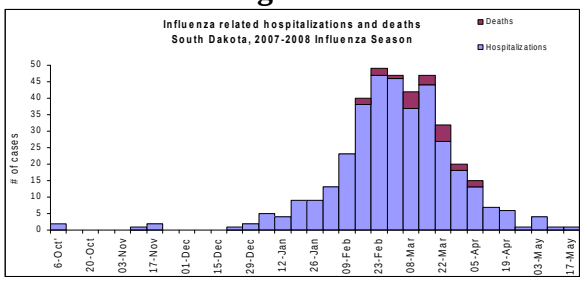
Twenty-two individuals died due to influenza and its complications (Table 85/Figure 50) during the 2007-08 influenza season. Gender breakdown was 36 percent male and 64 percent female. The median age was 81, with an age range of 30 - 97 years.

National Influenza Surveillance Data

During the 2007-08 season, influenza A (H1), A (H3), and B viruses have co-circulated in the United States. Influenza A (H3) viruses have predominated during the season overall; however, the most commonly reported influenza virus has varied by week and by region. Nationally 220,666 respiratory specimens were tested for influenza with 39,453 (17.9 percent) positive: 28,105 (71 percent) were influenza A and 11,348 (29 percent) were influenza B. Among the influenza A isolates sub typed, 26 percent were influenza A/H1, 74 percent were influenza A/H3, and 67 percent were not typed. The full report is available at www.cdc.gov/flu/weekly/fluactivity.htm .

Interim results from a study carried out with the Marshfield Clinic in Wisconsin found vaccine effectiveness of 44 percent. Additional information on this study can be found at: http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5715a1.htm

Figure 50



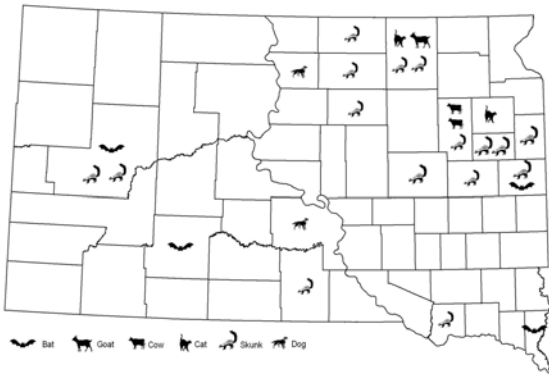
Source: South Dakota Department of Health, Office of Disease Prevention

The antiviral medications recommended for chemoprophylaxis or treatment of influenza (oseltamivir or zanamivir) have not changed for the 2008-2009 influenza season.

RABIES

Rabies is a fatal viral disease and a serious enzootic public health concern in South Dakota. In 2007, 633 animals were submitted for rabies testing with 27 animals testing positive. This is a decrease of 29 percent from 2006 and is the fourth consecutive year of decreasing rabies and the lowest number of rabid animals reported in South Dakota since at least 1960. The 27 rabid animals included 20 wild animals (16 skunks and 4 bats) and 7 domestic animals (2 cats, 2 cattle, 2 dogs and 1 goat). The last human rabies case in South Dakota was in 1970.

Figure 51
Animal Rabies in South Dakota, 2007



Source: South Dakota Department of Health, Office of Disease Prevention

Table 86
Animals tested and confirmed rabies cases, SD, 1998-2007

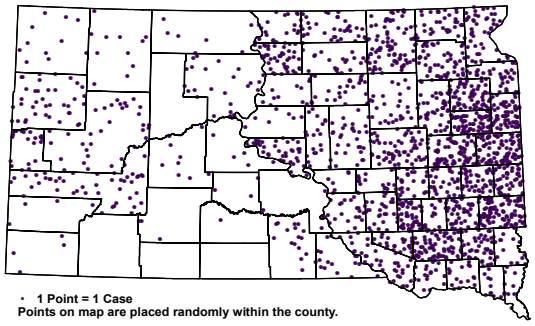
	2007		1998 - 2007		
Animal	Pos	Total tested	Pos	Total tested	% Pos
Skunk	16	35	646	944	68%
Bat	4	99	61	2112	3%
Cat	2	226	50	2598	2%
Dog	2	133	50	1762	3%
Cattle	2	66	100	1120	9%
Goat	1	3	3	20	15%
Raccoon	0	29	1	478	0%
Horse	0	11	39	293	13%
Rodents*	0	7	0	134	0%
Deer/elk/donkey/llama	0	5	0	78	0%
Fox	0	4	3	53	6%
Weasel/ferret/mink	0	3	0	39	0%
Opossum	0	2	0	41	0%
Sheep	0	2	0	80	0%
Badger	0	1	1	8	13%
Coyote/wolf	0	1	0	26	0%
Mountain lion	0	1	0	3	0%
Rabbits/hares	0	1	0	13	0%
Squirrel/chipmunk	0	1	0	66	0%
Woodchuck	0	1	1	20	5%
Bison	0	0	0	5	0%
Bobcat/bear	0	0	0	2	0%
Muskrat	0	0	0	22	0%
Pig	0	0	0	7	0%
Shrew/mole	0	0	0	3	0%
Other animals	0	2	0	9	0%
TOTAL	**27**	**633**	**955**	**9,936**	**10%**

*Rodents: rat, mouse, prairie dog, gopher, beaver, porcupine, vole
Source: South Dakota Department of Health, Office of Disease Prevention

Animals testing negative in 2007 included 224 cats, 131 dogs, 95 bats, 64 cattle, 29 raccoons, 19 skunks, 11 horses, 5 deer, 4 fox, 3 rats, 2 each goat, mink, mouse, opossum and sheep, and 1 each badger, coyote, ferret, gerbil, gopher, mountain lion, otter, rabbit, kangaroo, squirrel and woodchuck.

In 2007 rabid animals were detected in 18 South Dakota counties (Table 86/Figure 51). Animals were submitted for testing from all counties except Bennett, Campbell, Harding, Mellette, Perkins, Sully and Ziebach.

Figure 52
1998-2007 South Dakota Animal Rabies Detections



Source: South Dakota Department of Health, Office of Disease Prevention

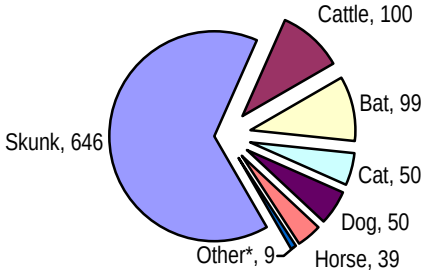
During the 10-year period (1998-2007) 955 of 9,936 (10 percent) animals tested were positive for rabies. During these years

animals were tested from all counties, and rabid animals were detected in all counties except Bennett, Shannon, Todd, and Ziebach. The most animals were submitted for testing from Minnehaha County (2,309), whereas Ziebach County submitted the fewest (1).

Since 1998, 25 percent of rabies cases in South Dakota have been domestic animals. There were 50 rabid dogs and 50 rabid cats, many of which were unvaccinated strays. Rabid livestock included 100 cattle, 39 horses and 3 goats.

The common skunk (*Mephitis mephitis*) is the enzootic rabies reservoir in South Dakota. Since 1998, 68 percent of skunks tested have been rabid. Bat rabies is also enzootic in South Dakota with 61 of 2,112 (3 percent) bats testing positive since 1998.

Figure 53
Rabid Animals, South Dakota
1998-2007



*Other includes fox 3, goat 3, badger 1, raccoon 1, woodchuck 1.
Source: South Dakota Department of Health, Office of Disease Prevention

Although rabies is not enzootic in other wild animals in South Dakota, since 1998 rabies has been detected in 3 foxes, 1 badger, 1 raccoon and 1 woodchuck. These other animals are likely spillover rabies following exposure to rabid skunks.

Animal rabies cases by County, 1998 – 2007

	2007		1998 – 2007		
County	Pos	Neg	Pos	Neg	% Pos
Aurora	0	2	15	46	25%
Beadle	1	8	27	129	17%
Bennett	0	0	0	5	0%
Bon Homme	1	4	11	54	17%
Brookings	2	28	48	432	10%
Brown	4	27	52	317	14%
Brule	0	4	11	70	14%
Buffalo	0	2	1	6	14%
Butte	0	14	15	174	8%
Campbell	0	0	6	18	25%
Charles Mix	0	10	28	144	16%
Clark	3	11	22	72	23%
Clay	0	5	8	90	8%
Codington	1	16	29	213	12%
Corson	0	1	4	6	40%
Custer	0	3	3	30	9%
Davison	0	13	22	289	7%
Day	0	9	29	84	26%
Deuel	1	10	24	132	15%
Dewey	0	5	4	23	15%
Douglas	0	1	8	31	21%
Edmunds	1	5	11	55	17%
Fall River	0	1	2	107	2%
Faulk	1	7	12	38	24%
Grant	0	8	17	114	13%
Gregory	0	2	11	68	14%
Haakon	0	4	4	31	11%
Hamlin	2	10	37	127	23%
Hand	0	3	14	56	20%
Hanson	0	1	8	28	22%
Harding	0	0	3	16	16%
Hughes	0	21	16	207	7%
Hutchinson	0	14	30	184	14%
Hyde	0	3	8	73	10%
Jackson	1	0	1	33	3%
Jerauld	0	1	7	41	15%
Jones	0	1	3	12	20%
Kingsbury	1	11	37	147	20%
Lake	0	19	23	180	11%
Lawrence	0	11	9	105	8%
Lincoln	0	10	5	163	3%
Lyman	1	2	1	39	3%
Marshall	0	4	24	84	22%
McCook	0	7	24	118	17%
McPherson	1	3	13	70	16%
Meade	3	11	11	150	7%
Mellette	0	0	1	7	13%
Miner	0	7	14	62	18%
Minnehaha	0	128	68	2,241	3%
Moody	0	7	32	123	21%
Pennington	0	44	13	804	2%
Perkins	0	0	4	17	19%
Potter	0	1	3	12	20%
Roberts	0	8	17	147	10%
Sanborn	0	2	17	40	30%
Shannon	0	1	0	41	0%
Spink	0	3	12	77	13%
Stanley	0	2	2	17	11%
Sully	0	0	4	4	50%
Todd	0	1	0	57	0%
Tripp	1	5	12	91	12%
Turner	0	13	20	188	10%
Union	1	10	5	72	6%
Walworth	1	26	24	253	9%
Yankton	0	16	9	116	7%
Ziebach	0	0	0	1	0%
South Dakota	**27**	**606**	**955**	**8,981**	**10%**

Although rabid animal events occur throughout the year in South Dakota, most rabies events occur during the spring and summer months.

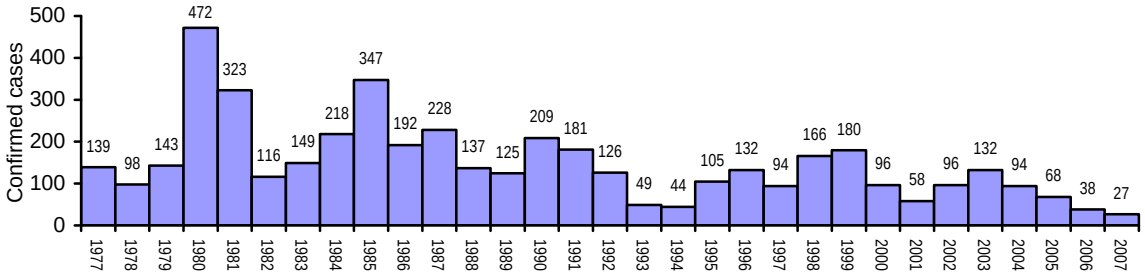
In 2007 a resident of our neighboring state, Minnesota, died of bat rabies. Nationally there have been 25 human rabies cases in the United States since 2000. Eighteen of the human cases (72 percent) were associated with a bat-rabies virus, 6 (24 percent) had dog virus (all foreign imports), and 1 (4 percent) was a raccoon virus variant. Four of the bat virus cases were not exposed directly by bat bites, but by organ transplant from a human donor who died from bat rabies. These 25 human rabies cases were from Arkansas, California (6), Florida, Georgia, Indiana, Iowa, Minnesota (2), Mississippi, New York, Oklahoma, Puerto Rico, Tennessee, Texas (4), Virginia and Wisconsin (2).

The latest national animal rabies surveillance data reported are for year 2006. Nationally, there were 6,940 cases of animal rabies reported in 2006, which is an 8.2 percent increase over the previous year. Ninety-two percent of the 2006 rabies cases were wild animals and 8 percent were domestic animals. Nationally in 2006 domestic animals included 318 cats, 82 cattle, 79 dogs, 53 horses/mules, 11 goats/sheep, 3 pet ferrets and 1 llama. Nationally, wild animals testing positive for rabies included 2,615 raccoons, 1,692 bats, 1,494 skunks, 427 foxes, 66 mongooses, 43 groundhogs, 30 bobcats, 10 coyotes, 6 deer, 3 otters, 2 opossums and 1 each cougar, fisher, rabbit, ringtail and wolf-hybrid.

Two laboratories offer rabies tests in South Dakota: (1) the Animal Disease Research Diagnostic Laboratory (ADRDL) in Brookings, and (2) the State Public Health Laboratory (SDPHL) in Pierre. Both laboratories use the direct fluorescent antibody (DFA) technique. The ADRDL performed 389 rabies tests on South Dakota animals in 2007 with 12 being positive (3.1 percent); and the SDPHL performed 244 tests in 2007 with 15 being positive (6.1 percent). 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. Human serum rabies antibody titers on previously vaccinated people may be ordered through SDPHL.

Rabies consultations are available from the Office of Disease Prevention, South Dakota Department of Health, 7 days a week. Consultations are based on current Centers for Disease Control and Prevention (CDC) recommendations. We strive to recommend appropriate rabies prevention measures and to minimize unnecessary and inappropriate post-exposure testing and prophylactic treatment.

Figure 54
Animal Rabies in South Dakota, 1977-2007



Source: South Dakota Department of Health, Office of Disease Prevention

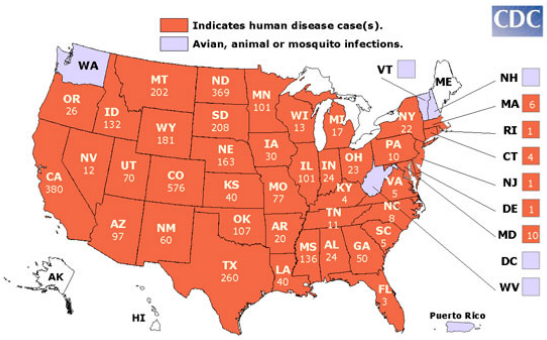
West Nile Virus

West Nile virus (WNV) was first detected in the Western Hemisphere in 1999. The virus spread west across the continent, reaching South Dakota in 2002. West Nile virus is now endemic in much of North America, including South Dakota.

2007 was the 9th year of WNV transmission in North America and the 6th transmission season in South Dakota. In 2003, North America experienced the largest ever recorded arboviral epidemic. The 2003 epidemic was centered in the Great Plains region with South Dakota having the third most WNV cases and the highest incidence of neuroinvasive disease (NID) in the country.

Nationally in 2007 there were 3,630 human WNV cases reported, with 124 deaths (Figure 55). The WNV cases included 1,227 NID cases (encephalitis or meningitis).

Figure 55
West Nile Human Deaths/Cases, United States, 2007

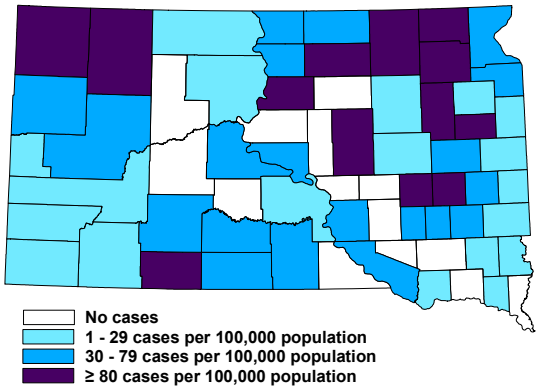


Source: Centers for Disease Control and Prevention

In South Dakota, there were 208 human cases of WNV disease and six deaths reported in 2007. Of these cases 48 were diagnosed with neuro-invasive disease (NID 23 percent) and 160 had West Nile fever (77 percent), a milder form of the disease. Two cases were reported to have had Acute Flaccid Paralysis. By contrast, in 2003 there were 1039 human WNV cases, including 170 cases of NID and 869 cases of WN fever in South Dakota. Of these cases, 19 were reported with Acute Flaccid Paralysis and 14 died of WNV-associated illness.

The overall incidence of West Nile disease in 2007 was 26.1 cases per 100,000 population. Figure 56 shows the incidence by county. The overall statewide incidence of WNV NID was 6.0 cases per 100,000.

Figure 56
Human West Nile Disease Incidence Rates by County, South Dakota, 2007



Source: South Dakota Department of Health, Office of Disease Prevention

The screening of donated blood has enhanced the safety of the blood supply and prevented many cases of WNV disease. In South Dakota 21 viremic blood donations were detected and removed from the blood supply in 2007.

During WNV season individuals with severe or unusual headaches should seek medical care as soon as possible. Physicians are encouraged to have a high index of suspicion for WNV disease. Free WNV testing is available at the South Dakota Public Health Laboratory for ill suspects. We do not encourage testing mildly ill patients or individuals who wish to know if they have an antibody titer. Serum or CSF should be submitted to the Public Health Laboratory.

OTHER INFECTIOUS DISEASES

***Neisseria meningitidis* invasive disease** There were three cases of invasive *Neisseria meningitidis* disease reported in 2007. This is an incidence of 0.4 cases per 100,000 population. The Healthy People 2010 target was 1.0 new cases of meningococcal disease per 100,000 population.

Vector borne diseases in South Dakota in 2007 included seven cases of tularemia, five cases of Rocky Mountain spotted fever and one case of Malaria. Although detections of plague in prairie dogs were reported in southwest South Dakota, there were no human cases detected in 2007.

Other Infectious Diseases There were 20 cases of invasive Group B *Streptococcus*, 17 cases of invasive drug resistant *Streptococcus pneumoniae,* and 12 cases of invasive Group A *Streptococcus* reported in 2007. There were also 84 cases of chicken pox and 88 cases of invasive Methicillin-Resistant *Staphylococcus aureus* (MRSA) in 2007. Additionally, 10 cases of non-meningococcal bacterial meningitis, four cases of legionellosis and two cases of listeriosis were reported. There were no reported cases of Streptococcal Toxic Shock Syndrome in 2007.