

INFECTIOUS DISEASES IN SOUTH DAKOTA 2008

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	
<p>Anthrax (<i>Bacillus anthracis</i>) Botulism (<i>Clostridium botulinum</i>) Cholera (<i>Vibrio cholerae</i>) Diphtheria (<i>Corynebacterium diphtheriae</i>) Enterohemorrhagic <i>E. coli</i> (EHEC) shiga toxin-producing (<i>Escherichia coli</i>), includes <i>E. coli</i> O157:H7 Measles (<i>paramyxovirus</i>) Meningococcal disease, invasive (<i>Neisseria meningitidis</i>) Plague (<i>Yersinia pestis</i>) Poliomyelitis (<i>picornavirus</i>) Rabies, human and animal (<i>rhabdovirus</i>) Ricin toxin Rubella and congenital rubella syndrome (<i>togavirus</i>) SARS (Severe Acute Respiratory Syndrome, <i>coronavirus</i>) Smallpox (<i>Variola</i>) Tularemia (<i>Francisella tularensis</i>) Typhoid (<i>Salmonella typhi</i>) Viral Hemorrhagic Fevers (filoviruses, arenaviruses)</p> <p>Outbreaks: - Acute upper respiratory illness - Diarrheal disease - Foodborne - Illnesses in child care settings - Nosocomial - Rash illness - Waterborne</p> <p>Syndromes suggestive of bioterrorism and other public health threats Unexplained illnesses or deaths in humans or animals</p>	<p>Acquired immunodeficiency syndrome (AIDS) Arboviral encephalitis, meningitis and infection (<i>West Nile, St. Louis, Eastern and Western equine, California serotype, Japanese, Powassan</i>) Brucellosis (<i>Brucella spp.</i>) Campylobacteriosis (<i>Campylobacter spp.</i>) Chancroid (<i>Haemophilus ducreyi</i>) Chicken pox/Varicella (<i>herpesvirus</i>) Chlamydia infections (<i>Chlamydia trachomatis</i>) Cryptosporidiosis (<i>Cryptosporidium parvum</i>) Cyclosporiasis (<i>Cyclospora cayetanensis</i>) Dengue fever (<i>flavivirus</i>) Drug resistant organisms: <ul style="list-style-type: none"> • Methicillin-resistant <i>Staphylococcus aureus</i> (MRSA), invasive • Vancomycin-resistant and -intermediate <i>Staphylococcus aureus</i> (VRSA and VISA) • Drug resistant <i>Streptococcus pneumoniae</i> (DRSP), invasive Ehrlichiosis (<i>Ehrlichia spp.</i>) Epsilon toxin of <i>Clostridium perfringens</i> Giardiasis (<i>Giardia lamblia / intestinalis</i>) Glanders (<i>Burkholderia mallei</i>) Gonorrhea (<i>Neisseria gonorrhoeae</i>) <i>Haemophilus influenzae</i> type b disease, invasive Hantavirus pulmonary syndrome (<i>hantavirus</i>) 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)</p>	<p>Influenza: 1) hospitalizations and deaths; 2) lab confirmed cases (culture, DFA, PCR); 3) weekly aggregate report of total rapid antigen positive test (A & B) and total tested Legionellosis (<i>Legionella spp.</i>) Leprosy/Hansen's disease (<i>Mycobacterium leprae</i>) Listeriosis (<i>Listeria monocytogenes</i>) Lyme disease (<i>Borrelia burgdorferi</i>) Malaria (<i>Plasmodium spp.</i>) Melioidosis (<i>Burkholderia pseudomallei</i>) Mumps (<i>paramyxovirus</i>) Nipah virus (<i>paramyxovirus</i>) Pertussis/Whooping cough (<i>Bordetella pertussis</i>) Psittacosis (<i>Chlamydia psittaci</i>) Q fever (<i>Coxiella burnetii</i>) Rocky Mountain spotted fever (<i>Rickettsia rickettsii</i>) Salmonellosis (<i>Salmonella spp.</i>) Shigellosis (<i>Shigella spp.</i>) Staphylococcus enterotoxin B Streptococcal disease, Group A, invasive Streptococcal disease, Group B, invasive <i>Streptococcus pneumoniae</i>, invasive, (<5-years of age) Syphilis (<i>Treponema pallidum</i>) Tetanus (<i>Clostridium tetani</i>) Toxic shock syndrome Transmissible spongiform encephalopathies Trichinosis (<i>Trichinella spiralis</i>) Tuberculosis (<i>Mycobacterium tuberculosis</i> and <i>Mycobacterium bovis</i>) active disease and latent infection (positive skin test) Typhus fever (<i>Rickettsia prowazekii</i>) Vaccine Adverse Events Yellow fever (<i>flavivirus</i>)</p>

WHEN TO REPORT

Category I diseases are reportable immediately by telephone on recognition or strong suspicion of disease.


Category II diseases are reportable by secure website, telephone, fax or mail 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 77 catalogs the infectious disease reports from 1998 to 2008. Table 78 reports the 2008 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 (2004-2008), and the percentage increase or decrease is shown. Table 79 presents selected diseases stratified by gender, race, and age group.

In 2008 the following diseases (cases) were reported and found to meet the case definition:

- Anthrax (0)
- Botulism (0)
- Brucellosis (0)
- Campylobacteriosis (262)
- Chancroid (0)
- Chlamydia trachomatis infections (2,942)
- Cryptosporidiosis (88)
- Cyclosporiasis (1)
- Dengue fever (0)
- Diphtheria (0)
- Ehrlichiosis/anaplasmosis (1)
- Giardiasis (136)
- Gonorrhea (370)
- Haemophilus influenzae type B (0)
- Hantavirus pulmonary syndrome (0)
- Hemolytic uremic syndrome (3)
- Hepatitis A (4)
- Hepatitis B, acute (0)
- Hepatitis B, chronic (47)
- Hepatitis C, chronic (365)
- Herpes simplex, genital and neonatal (358)
- HIV and AIDS (34)
- Legionellosis (3)
- Leprosy/Hansen's disease (1)
- Listeriosis (1)
- Lyme disease (3)
- Malaria (0)
- Measles (0)
- Meningococcal disease (3)
- Methicillin resistant *Staphylococcus aureus*, invasive (77)
- Mumps (1)
- Pertussis (67)
- Plague (0)
- Psittacosis (0)
- Q fever, acute (1)
- Rabies, animal (24)
- Rabies, human (0)
- Rocky Mountain spotted fever (3)
- Rubella and congenital rubella syndrome (0)
- Salmonellosis (152)
- Shiga-toxin producing E. coli (53)
- Shigellosis (76)
- Streptococcal disease, Group A, invasive (23)
- Streptococcal disease, Group B, invasive (22)
- *Streptococcus pneumoniae*, drug resistant (9)
- Syphilis, primary and secondary, early latent (4)
- Tetanus (0)
- Toxic shock syndrome (1)
- Transmissible spongiform encephalopathies (0)
- Trichinosis (0)
- Tuberculosis (16)
- Tularemia (10)
- Typhoid fever (2)
- Varicella/Chickenpox (55)
- West Nile neuroinvasive disease (11)
- West Nile fever (28)

Table 77
Reportable Diseases in South Dakota, 1998-2008

Reportable Diseases	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Anthrax	0	0	0	0	1	0	0	0	0	0	0
Botulism	0	1	1	0	0	1	0	1	0	0	0
Brucellosis	0	0	0	0	0	1	0	0	0	0	0
Campylobacteriosis	103	140	141	160	198	188	273	244	219	235	262
Chlamydia trachomatis infections	1573	1554	1835	1821	2215	2606	2534	2701	2633	2619	2942
Cholera	0	0	0	0	1	0	0	0	0	0	0
Cryptosporidiosis	25	7	15	8	42	49	44	31	86	169	88
Denque fever	0	0	0	0	1	0	0	1	0	3	0
Diphtheria	0	0	0	0	0	0	0	0	0	0	0
Giardiasis	181	143	108	106	83	89	87	118	97	104	136
Gonorrhea	221	192	277	289	263	226	304	351	367	261	370
Haemophilus influenzae type b	1	4	1	0	1	1	0	0	0	0	0
Hantavirus pulmonary syndrome	0	0	1	0	0	1	1	2	2	1	0
Hemolytic uremic syndrome	0	4	2	1	0	1	0	3	8	1	3
Hepatitis A	40	10	3	3	3	0	4	1	9	6	4
Hepatitis B, acute	4	1	2	1	3	4	1	8	5	7	0
Hepatitis B, chronic	NR	NR	NR	NR	NR	NR	26	33	16	39	47
Hepatitis C, chronic	NR	NR	NR	NR	NR	NR	NR	207	355	317	365
Herpes simplex, genital and neonatal	142	275	339	345	310	297	322	342	371	360	358
HIV and AIDS	17	27	22	22	21	25	19	33	34	25	34
Legionellosis	7	6	2	3	4	2	5	21	5	4	3
Leprosy	1	0	0	0	0	0	0	0	0	0	1
Listeriosis	0	1	0	0	1	0	1	0	2	2	1
Lyme disease	0	0	0	0	2	1	1	2	1	0	3
Malaria	1	0	1	0	2	3	1	0	1	1	0
Measles	0	0	0	0	0	0	0	0	0	0	0
Meningococcal disease	9	11	6	5	2	1	4	4	4	3	3
Methicillin-resistant <i>Staph aureus</i> , invasive	NR	NR	NR	NR	NR	NR	36	47	50	88	77
Mumps	0	0	0	0	0	0	0	0	296	6	1
Pertussis (whooping cough)	8	8	11	5	8	7	169	183	26	60	67
Plague	0	0	0	0	0	0	0	0	0	0	0
Q fever	NR	NR	NR	0	1	0	0	2	2	1	1
Rabies, animal	166	180	96	58	96	132	94	68	38	27	24
Rabies, human	0	0	0	0	0	0	0	0	0	0	0
Rocky Mountain Spotted Fever	0	4	2	2	1	5	4	5	0	5	3
Rubella and congenital rubella syndrome	0	0	0	0	0	0	0	0	0	0	0
St. Louis Encephalitis	0	0	0	0	0	2	0	0	0	0	0
Salmonellosis	132	100	100	151	121	131	156	160	135	174	152
Shiga-toxin producing E. coli, including O157:H7	37	47	69	50	43	33	35	33	50	47	53
Shigellosis	33	18	8	716	157	17	12	131	389	122	76
Streptococcal disease, Group A, invasive	9	11	16	17	14	25	22	26	10	12	23
Streptococcal disease, Group B, invasive	NR	NR	NR	NR	20	14	11	26	13	20	22
<i>Streptococcus pneumoniae</i> , drug resistant	0	3	8	6	1	1	5	3	4	17	9
Syphilis, Primary and Secondary, Early Latent	1	1	0	1	0	5	0	2	19	11	4
Tetanus	1	0	0	0	0	0	0	0	0	0	0
Toxic shock syndrome	2	0	2	0	1	1	1	2	0	0	1
Transmissible spongiform encephalopathies	--	1	0	1	0	2	2	0	1	0	0
Tuberculosis	23	21	16	13	13	20	11	16	14	13	16
Tularemia	3	7	13	7	3	5	4	8	5	7	10
Varicella (chicken pox)	NR	NR	NR	NR	NR	NR	99	136	118	84	55
West Nile neuroinvasive disease	0	0	0	0	14	170	6	35	38	48	11
West Nile fever	0	0	0	0	23	869	45	194	74	160	28

*NR= not reportable

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

Table 78
South Dakota Selected Notifiable Diseases by County, 2008

County	Campylobacteriosis	Chlamydia	Cryptosporidiosis	<i>Shiga toxin-producing E. coli</i>	Giardiasis	Gonorrhea	Hepatitis B, Chronic	Hepatitis C, Chronic	Methicillin-resistant <i>Staphylococcus aureus</i> , invasive	Pertussis	Salmonellosis	Shigellosis	Tuberculosis	Varicella	West Nile Disease
Aurora	≤ 3	≤ 3	≤ 3	≤ 3	0	0	0	0	0	≤ 3	0	0	0	0	0
Beadle	6	44	≤ 3	4	0	≤ 3	≤ 3	4	≤ 3	11	≤ 3	0	0	0	≤ 3
Bennett	6	22	0	0	0	≤ 3	≤ 3	≤ 3	≤ 3	0	0	0	0	0	≤ 3
Bon Homme	4	≤ 3	≤ 3	0	≤ 3	0	0	15	0	0	≤ 3	0	0	≤ 3	0
Brookings	5	77	7	≤ 3	≤ 3	≤ 3	≤ 3	≤ 3	≤ 3	6	≤ 3	0	5	≤ 3	0
Brown	7	78	29	4	5	10	≤ 3	11	≤ 3	0	11	≤ 3	0	6	7
Brule	5	8	0	0	0	≤ 3	0	≤ 3	≤ 3	0	≤ 3	0	0	≤ 3	0
Buffalo	≤ 3	29	0	≤ 3	≤ 3	0	0	≤ 3	0	≤ 3	≤ 3	0	0	0	0
Butte	≤ 3	18	0	0	≤ 3	0	0	5	≤ 3	0	≤ 3	0	0	0	0
Campbell	0	0	0	0	0	0	0	0	0	≤ 3	0	0	0	0	0
Charles Mix	11	61	≤ 3	6	≤ 3	4	≤ 3	6	≤ 3	≤ 3	7	0	0	≤ 3	≤ 3
Clark	≤ 3	0	0	≤ 3	0	0	0	3	0	0	0	0	0	0	≤ 3
Clay	≤ 3	50	≤ 3	≤ 3	0	0	0	0	≤ 3	0	≤ 3	0	0	0	0
Codington	9	83	≤ 3	≤ 3	4	10	6	6	≤ 3	0	4	0	0	0	0
Corson	4	51	0	0	0	4	0	0	≤ 3	0	≤ 3	56	0	0	≤ 3
Custer	≤ 3	26	0	0	≤ 3	≤ 3	0	6	0	0	≤ 3	0	0	0	0
Davison	6	51	4	≤ 3	≤ 3	0	0	≤ 3	≤ 3	0	4	0	0	≤ 3	≤ 3
Day	≤ 3	4	0	≤ 3	0	≤ 3	0	0	≤ 3	0	≤ 3	0	0	0	0
Deuel	≤ 3	≤ 3	0	≤ 3	0	0	0	≤ 3	≤ 3	≤ 3	0	0	0	0	0
Dewey	≤ 3	137	0	0	≤ 3	32	0	5	5	0	4	≤ 3	0	0	≤ 3
Douglas	6	≤ 3	0	0	≤ 3	0	0	≤ 3	0	0	≤ 3	0	0	0	0
Edmunds	≤ 3	0	≤ 3	≤ 3	0	0	0	0	0	0	4	0	0	0	≤ 3
Fall River	≤ 3	9	0	0	≤ 3	0	≤ 3	6	0	0	0	0	0	0	0
Faulk	≤ 3	0	0	≤ 3	≤ 3	0	0	≤ 3	0	0	0	0	0	≤ 3	0
Grant	≤ 3	13	0	0	0	≤ 3	0	0	0	0	≤ 3	0	0	≤ 3	≤ 3
Gregory	7	6	≤ 3	0	0	0	0	0	≤ 3	0	0	0	0	0	0
Haakon	≤ 3	0	0	0	0	0	0	≤ 3	0	0	≤ 3	0	0	0	0
Hamlin	4	5	0	≤ 3	≤ 3	0	0	0	0	0	≤ 3	0	0	0	0
Hand	0	≤ 3	≤ 3	0	0	0	0	0	0	0	0	0	0	0	0
Hanson	≤ 3	≤ 3	0	0	0	0	0	0	0	≤ 3	0	0	0	0	0
Harding	6	0	0	0	≤ 3	0	0	0	0	≤ 3	0	0	0	0	0
Hughes	≤ 3	77	0	0	0	5	0	5	0	0	5	0	0	≤ 3	≤ 3
Hutchinson	≤ 3	5	≤ 3	0	0	≤ 3	0	≤ 3	0	≤ 3	≤ 3	0	0	0	0
Hyde	≤ 3	≤ 3	0	0	≤ 3	0	0	0	0	0	0	0	0	0	0
Jackson	≤ 3	17	0	0	0	≤ 3	0	≤ 3	0	0	0	0	≤ 3	0	0
Jerauld	≤ 3	≤ 3	≤ 3	0	≤ 3	0	0	0	0	0	≤ 3	0	0	0	0

Continued

Table 78
South Dakota Selected Notifiable Diseases by County, 2008 (continued)

County	Campylobacteriosis	Chlamydia	Cryptosporidiosis	<i>Shiga toxin-producing E. coli</i>	Giardiasis	Gonorrhea	Hepatitis B, Chronic	Hepatitis C, Chronic	Methicillin-resistant <i>Staphylococcus aureus</i> , invasive	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	6	≤ 3	4	0	0	0	0	≤ 3	≤ 3	25	≤ 3	0	0	≤ 3	≤ 3
Lake	8	14	≤ 3	≤ 3	0	≤ 3	0	≤ 3	≤ 3	0	4	0	0	0	≤ 3
Lawrence	≤ 3	84	0	≤ 3	9	≤ 3	≤ 3	10	≤ 3	0	5	0	0	≤ 3	0
Lincoln	9	24	0	5	8	≤ 3	0	8	0	0	6	0	0	≤ 3	≤ 3
Lyman	≤ 3	38	0	0	≤ 3	10	0	≤ 3	0	0	0	0	0	≤ 3	0
Marshall	≤ 3	0	0	0	≤ 3	0	0	≤ 3	0	0	≤ 3	0	0	0	0
McCook	5	≤ 3	≤ 3	0	≤ 3	0	0	≤ 3	≤ 3	0	≤ 3	0	0	≤ 3	0
McPherson	≤ 3	0	0	≤ 3	0	0	0	≤ 3	0	0	0	0	0	0	≤ 3
Meade	4	27	0	0	8	≤ 3	≤ 3	11	≤ 3	≤ 3	4	0	0	7	≤ 3
Mellette	4	7	0	0	0	0	0	0	0	0	0	0	0	0	0
Miner	≤ 3	9	0	0	0	0	0	0	0	0	0	0	0	0	≤ 3
Minnehaha	32	774	10	4	38	152	32	119	22	≤ 3	23	4	10	12	≤ 3
Moody	≤ 3	20	0	0	≤ 3	≤ 3	0	≤ 3	≤ 3	0	≤ 3	0	0	0	0
Pennington	21	421	≤ 3	0	18	40	≤ 3	66	6	≤ 3	18	0	0	7	≤ 3
Perkins	≤ 3	≤ 3	≤ 3	0	0	0	0	≤ 3	0	0	4	0	0	≤ 3	0
Potter	0	0	0	0	0	0	0	≤ 3	0	0	0	0	0	0	0
Roberts	4	49	0	0	≤ 3	≤ 3	0	8	≤ 3	0	4	0	0	≤ 3	0
Sanborn	≤ 3	≤ 3	0	≤ 3	≤ 3	0	0	≤ 3	0	0	0	0	0	0	0
Shannon	0	297	≤ 3	0	≤ 3	49	0	10	5	5	4	0	0	0	0
Spink	≤ 3	6	≤ 3	4	0	0	0	≤ 3	0	0	0	0	0	0	0
Stanley	0	≤ 3	0	0	0	0	0	≤ 3	0	0	0	0	0	0	≤ 3
Sully	0	≤ 3	0	0	0	0	0	0	0	0	0	0	0	0	≤ 3
Todd	4	157	0	0	0	22	0	6	0	0	0	≤ 3	0	≤ 3	0
Tripp	5	8	0	0	0	≤ 3	≤ 3	0	≤ 3	0	≤ 3	0	0	0	≤ 3
Turner	5	6	≤ 3	0	0	0	0	≤ 3	≤ 3	0	4	0	0	≤ 3	≤ 3
Union	4	14	≤ 3	≤ 3	≤ 3	≤ 3	0	≤ 3	0	0	≤ 3	0	0	0	≤ 3
Walworth	≤ 3	27	0	≤ 3	≤ 3	≤ 3	≤ 3	≤ 3	≤ 3	≤ 3	≤ 3	10	0	0	≤ 3
Yankton	6	48	5	≤ 3	11	≤ 3	≤ 3	16	≤ 3	0	4	0	≤ 3	0	0
Ziebach	≤ 3	9	0	0	0	≤ 3	0	0	0	0	0	0	≤ 3	0	0
South Dakota	262	2942	88	53	136	370	47	365	77	67	152	76	16	55	39
Rate per 100,000	32.9	369.5	11.1	6.7	17.1	46.5	5.9	45.8	9.7	8.4	19.1	9.5	2.0	6.9	4.9
5-year median	231	2620	48	35	98	304	NA	NA	NA	61	156	116	14	NA	208
% change of median	5%	12%	83%	51%	39%	22%	NA	NA	NA	10%	-1%	-34%	14%	NA	-81%

In 2008 there were also: 23 cases of invasive Group A Streptococcal disease, 22 cases of invasive Group B Streptococcal disease; 13 cases of invasive *Streptococcus pneumoniae* in children less than 5 years of age, 9 cases of drug resistant, invasive *Streptococcus pneumoniae*; 10 cases of Tularemia; 4 cases of Hepatitis A; 3 cases each of Hemolytic Uremic Syndrome of unknown cause, Legionellosis, Lyme Disease, Meningococcal disease, and Rocky Mountain spotted fever; 2 cases of Typhoid fever; and one case each of Anaplasma, Cyclosporiasis, Hansen's disease, Listeriosis, Mumps, Q fever, Staphylococcal Toxic Shock Syndrome; and finally 3 asymptomatic West Nile positive blood donors.

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

Table 79
South Dakota Selected Notifiable Disease Summary by Gender, Race, and Age, 2008

Disease	Total	Gender*				Race*						Median age	Age group (in years)						
		Male (%)		Female (%)		White (%)		American Indian (%)		Other or unknown (%)			<1	1-4	5-14	15-24	25-39	40-64	≥65
Campylobacteriosis	262	162	62%	100	38%	235	90%	20	8%	7	3%	26.5	12	36	34	45	44	68	23
Chlamydia	2942	635	23%	2087	77%	1432	49%	1249	43%	257	9%	21	1	0	30	2115	743	40	2
Cryptosporidiosis	88	41	47%	47	53%	84	95%	1	1%	3	3%	18	3	21	16	11	16	19	2
Shiga-toxin producing E. coli	53	24	45%	29	55%	49	92%	1	2%	3	6%	7	0	17	16	5	6	6	3
Giardiasis	136	70	51%	66	49%	118	87%	14	10%	4	3%	11	6	52	14	4	28	25	5
Gonorrhea	370	125	34%	245	66%	112	30%	202	55%	56	15%	23	0	0	4	216	138	12	0
Hepatitis B, Chronic	47	28	60%	19	40%	9	19%	1	2%	37	79%	28	0	3	1	12	20	10	1
Hepatitis C, Chronic	365	239	65%	126	35%	245	67%	86	24%	34	9%	49	0	0	3	8	60	285	9
HIV/AIDS	34	26	76%	8	24%	13	38%	10	29%	11	32%	35.5	2	1	0	2	15	14	0
Methicillin-resistant <i>Staph. aureas</i> , invasive	77	46	60%	31	40%	53	69%	21	27%	3	4%	59	0	1	2	2	6	36	30
Pertussis	67	22	33%	45	67%	56	84%	10	15%	1	1%	14	13	4	19	11	8	10	2
Salmonellosis	152	62	41%	90	59%	131	86%	20	13%	1	1%	27	9	16	24	22	27	36	17
Shigellosis	76	39	51%	37	49%	11	14%	64	84%	1	1%	6	3	31	22	3	10	6	0
Streptococcus A, invasive	23	13	57%	10	43%	13	57%	10	43%	0	0%	52	1	1	0	0	7	6	8
Streptococcus B, invasive	22	14	64%	8	36%	19	86%	3	14%	0	10%	68.5	1	0	0	0	2	6	13
Tuberculosis	16	5	31%	11	69%	1	6%	4	25%	11	69%	11.5	2	4	2	2	4	0	2
Varicella	55	29	53%	26	47%	45	82%	7	13%	3	5%	8	12	10	25	8	0	0	0
West Nile virus disease	39	25	64%	14	36%	37	95%	2	5%	0	0%	44	0	0	0	6	9	22	2

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 2008, no cases of measles, rubella, diphtheria, tetanus, or polio were reported in South Dakota.

Sixty-seven cases of pertussis (whooping cough) were reported in South Dakota in 2008. Thirteen 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, meningoenzephalitis, 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 2008, a single case of mumps was reported which continues a decreasing trend.

A decreasing trend of *Haemophilus influenzae* type b is evident from the 54 cases reported in 1990 down to zero in 2008. 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:

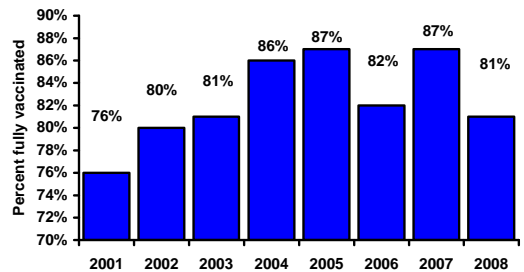
- a) 4 doses of diphtheria, tetanus, pertussis vaccine (DTaP or DTP), and
- b) 3 doses of poliovirus vaccine, and
- c) 2 doses of measles vaccine, and
- d) 2 doses of rubella vaccine, and
- e) 2 doses of mumps vaccine, and
- f) 2 doses of chicken pox vaccine.

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 2008, 81 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 – 2008
 (National Immunization Survey 4:3:1:3:3)

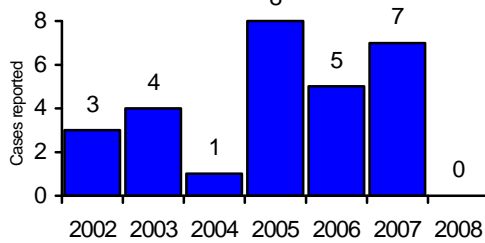


Immunization rates of children 19-35 months old immunized with 4 doses of DTaP, 3 doses polio, 1 dose of MMR, 3 doses of *Haemophilus influenzae* b, and 3 doses of hepatitis B vaccine.
 Source: South Dakota Department of Health, Office of Disease Prevention

Viral Hepatitis There were no cases of acute hepatitis B reported in 2008 (Figure 31). The year 2004 marked the first year that chronic hepatitis B infections became reportable. There were 47 cases of chronic hepatitis B infections reported in South Dakota in 2008. 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.

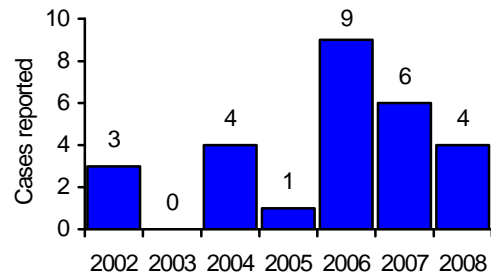
Figure 31
Acute Hepatitis B in South Dakota,
2002 – 2008



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

In 2008, there were four 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 – 2008



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.

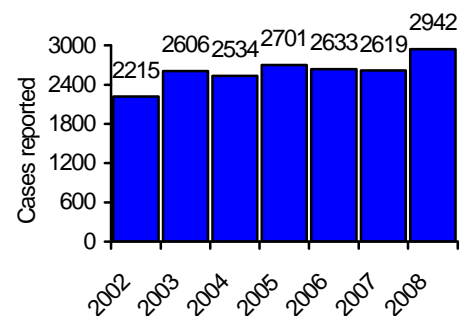
SEXUALLY TRANSMITTED DISEASES

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.

STDs in South Dakota primarily affect young people between the ages of 15 and 24 years, and minority populations. In South Dakota, Syphilis and lymphogranuloma venereum have become rare, and chancroid is almost unheard of.

Chlamydia Chlamydia is the most commonly reported STD in South Dakota. During 2008, the DOH received 2,942 case reports (Figure 33), which was an incidence rate of 369.5 cases per 100,000 population.

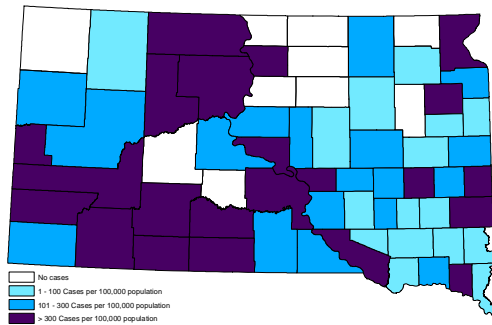
Figure 33
Chlamydia in South Dakota,
2002 – 2008



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

Counties with the highest incidence (cases per 100,000 population) included Dewey (2310), Shannon (2178), Todd (1544), Buffalo (1354) and Corson (1233) (Figure 34).

Figure 34
Chlamydia Incidence Rates by County, South Dakota, 2008



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

Nationally, the incidence of chlamydia in 2007 was 370.2 cases per 100,000 population. South Dakota ranked 27th that year with an incidence of 335.1.

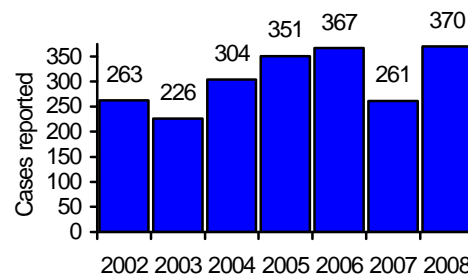
Screening for chlamydia infection has become standard practice for many health care providers in the state. Indian Health Service, family planning clinics, and many private providers have incorporated chlamydia screening as part of the routine health examination for sexually active young women. Screening 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 77 percent of chlamydia cases were female in 2008.

Young people between 15 and 24 years old accounted for 72 percent of the chlamydia cases reported in 2008. Although American Indians comprise 9 percent of the state's population, a disproportionate share, 42 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 2008 the DOH received 370 reports of Gonorrhea (Figure 35), which was an incidence of 46.5 cases per 100,000 population. This is a 22 percent increase over the 5-year median.

Figure 35
Gonorrhea in South Dakota, 2002 – 2008



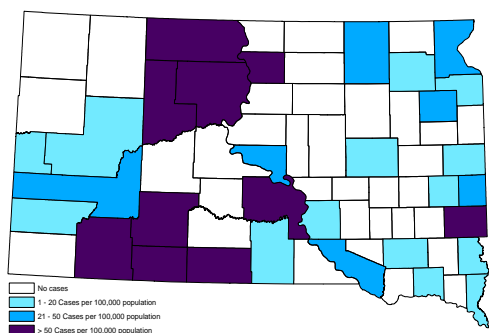
Source: South Dakota Department of Health, Office of Disease Prevention

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 (540), Shannon (359), Lyman (262), Todd (216) and Ziebach (118), (Figure 36).

Sexually active adolescents and young adults are the population most at risk with 58 percent of the gonorrhea cases reported being 15 to 24 years old. The American Indian population was disproportionately affected with 55 percent of the reported cases.

Figure 36
Gonorrhea Incidence Rates by County,
South Dakota, 2008



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

Nationally the incidence of gonorrhea was 118.9 cases per 100,000 population in 2007. South Dakota ranked 42nd that year with an incidence of 33.4. In 2008, the incidence increased to 46.5.

Syphilis After many years of sporadic and very low syphilis rates in South Dakota, the disease made a resurgence in 2006. There were 19 cases of infectious syphilis (primary and secondary, and early latent cases) reported in South Dakota in 2006. In 2008 there were 4 cases (Table 80) which was an incidence of 0.6 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 80
Syphilis in South Dakota, 1992-2008

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	7
2007	7	0	4	1
2008	1	0	3	2
Total	31	2	21	27

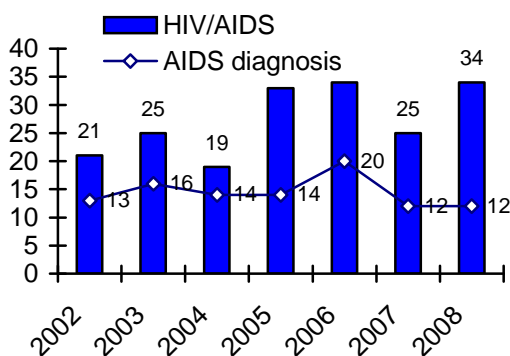
Source: South Dakota Department of Health, Office of Disease Prevention

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 2008, there were 588 cases of HIV/AIDS reported in the state (338 AIDS cases and 250 HIV cases). In 2008, there were an estimated 365 people living with HIV/AIDS, including 34 new cases of HIV reported and 12 new cases of AIDS diagnosed. Figure 37 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 37
HIV/AIDS in South Dakota, 2002 – 2008



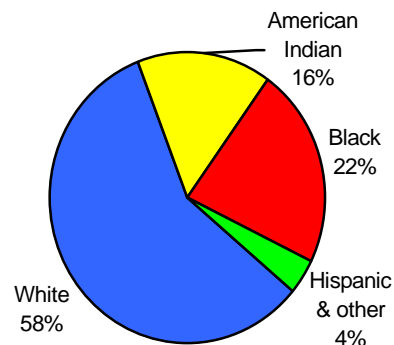
Source: South Dakota Department of Health, Office of Disease Prevention

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, 30 percent cumulative as of December 2008, 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 38). Blacks made up 22 percent of the HIV/AIDS cases in the state, but comprise less than 1 percent of the total population. Americans Indians comprised 16 percent of the state's HIV/AIDS cases, but 9 percent of the population; and Hispanic 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 55 percent of the HIV/AIDS cases.

Figure 38
HIV/AIDS by Race or Ethnic Group, South Dakota, 1985-2008 (n=588)



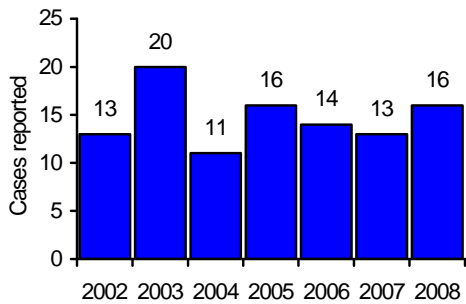
Source: South Dakota Department of Health, Office of Disease Prevention

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 1-800-232-4636.

TUBERCULOSIS

During calendar year 2008, 16 cases of active tuberculosis were reported (Figure 39) to the DOH, including one white (6%) and four American Indians (25%).

Figure 39
Tuberculosis in South Dakota,
2002 – 2008



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

The overall incidence rate was 2.1 per 100,000; with an incidence of 5.9 for American Indians, 0.1 for whites, 161.3 for blacks and 17.4 for Asians. Of the cases reported in 2008, 11 were female (69 percent), 5 were male (31 percent). Fifty-eight percent of cases were foreign born.

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.

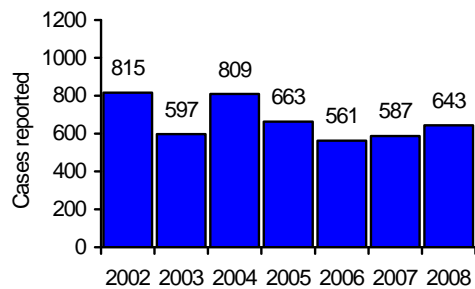
The occurrence of tuberculosis in young children is of special concern. Each child case represents a failure to stop transmission of infection and a failure to prevent the emergence of disease in an unexposed person. There were 9 cases of child

tuberculosis (56%) reported in South Dakota in 2008.

There were three drug resistant tuberculosis cases reported in 2008. In 2007, there were no cases of tuberculosis reported with single drug resistance.

In 2008, there were 643 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 40
Latent Tuberculosis Infection (Positive
Skin Tests) in South Dakota,
2002-2008



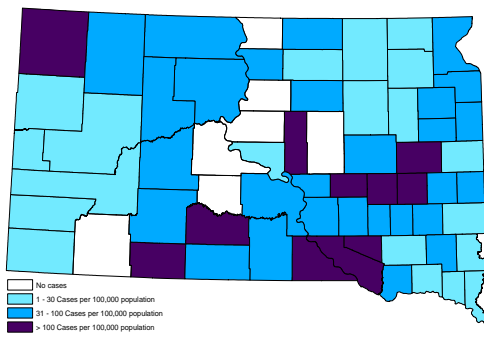
Source: South Dakota Department of Health, Office of Disease Prevention

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.

FOODBORNE and DIARRHEAL DISEASES

Campylobacteriosis *Campylobacter* has been the most commonly isolated enteric pathogen in South Dakota since 1999 (Table 79). In 2008, there were 262 cases of campylobacteriosis, which is an incidence of 32.9 cases per 100,000 population. This was a small increase over the five-year median. Eighteen percent of the cases were in children less than five years old. Counties with the highest incidence (cases per 100,000 population) included Harding (524), Hyde (211), Douglas (204), Mellette (202), and Bennett (177), (Figure 41).

Figure 41
Campylobacteriosis Incidence Rates by County, South Dakota, 2008



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

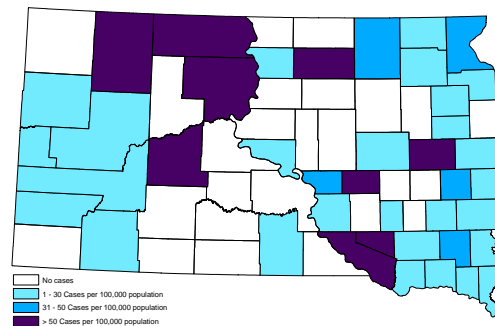
Campylobacter is a spiral-shaped Gram negative bacteria that can cause diarrhea, often bloody, abdominal pain, vomiting, fever, nausea, and malaise. Most cases of campylobacteriosis are relatively mild, lasting one to two days. Some cases, however, are more severe and relapses occur in about 20 percent 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 152 culture-confirmed cases of salmonellosis reported in South Dakota in 2008, which was an incidence of 19.1 cases per 100,000 population. This was a 1 percent increase from the five-year median. Sixteen percent of the cases were reported among children less than five years old. Counties with the highest incidence (cases per 100,000 population) included Perkins (138), Jerauld (101), Edmunds (99), Charles Mix (79) and Corson (73), (Figure 42).

Figure 42
Salmonellosis Incidence Rates by County, South Dakota, 2008



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

Table 81 shows the most commonly isolated serotypes of *Salmonella* over the past decade year in South Dakota. *S. typhimurium*, *S. enteritidis* and *S. heidelberg* were the most commonly isolated serotypes in 2008.

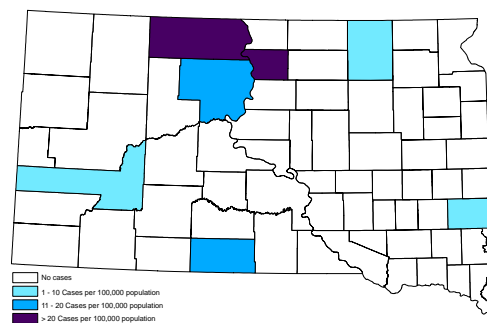
Table 81
Most Common Salmonella Serotypes, South Dakota, 1997-2008

Salmonella serotype	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total	Percent
Agona	2	2	0	2	0	0	0	0	0	1	2	3	9	1%
Bovismorbificans	0	2	1	0	1	0	0	0	0	0	1	0	5	0%
Braenderup	1	0	3	3	2	0	3	1	6	0	0	2	19	1%
Brandenburg	0	0	0	0	0	0	0	0	1	0	0	0	1	0%
Enteritidis	8	8	8	9	12	14	15	20	24	17	29	26	164	10%
Hadar	4	4	0	7	5	0	7	1	1	2	3	2	34	2%
Heidelberg	1	6	6	11	22	10	3	6	6	5	4	10	80	5%
Infantis	1	0	0	1	2	1	1	0	9	6	1	3	22	1%
Litchfield	0	1	2	1	0	2	1	0	3	0	2	1	12	1%
Montevideo	3	2	2	1	1	4	3	6	5	5	7	6	39	2%
Muenchen	3	2	4	2	1	3	2	5	2	3	8	3	35	2%
Muenster	0	2	1	2	1	2	0	0	0	0	1	0	9	1%
Newport	9	8	8	5	6	11	9	9	10	11	23	9	109	7%
Oranienburg	1	3	2	0	1	1	2	5	5	2	2	3	24	2%
Paratyphi A	0	1	0	1	0	0	0	0	0	0	0	0	2	0%
Paratyphi B	0	4	2	1	4	0	5	3	3	3	2	1	27	2%
Poona	0	0	1	0	0	0	0	1	1	0	0	2	3	0%
Reading	0	2	0	0	0	0	0	1	0	2	0	0	5	0%
Saint Paul	0	1	3	1	1	1	5	1	0	3	1	3	17	1%
Senftenberg	0	0	0	1	1	0	0	0	0	0	0	0	2	0%
Thompson	3	3	2	1	2	2	0	1	2	2	1	1	19	1%
Typhimurium	43	64	42	33	48	36	50	61	49	45	41	35	578	36%
Other serotypes	11	17	13	18	41	34	25	35	33	28	46	32	301	19%
Total	90	132	100	100	151	121	131	156	160	135	174	142	1592	100%

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

Shigellosis In 2008 there were 76 cases of shigellosis reported which represents a 34 percent decrease over the five-year median. This was an incidence rate of 9.5 cases per 100,000 population. Figure 43 shows shigellosis incidence rates (cases per 100,000 population) by county in South Dakota for 2008.

Figure 43
Shigellosis Incidence Rates by County, South Dakota, 2008



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

Shigella sonnei was the most common species isolated since 1997 while *S. flexneri* was the second most common (Table 82). 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 82
Most Common Shigella Serotypes,
South Dakota, 1997-2008

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
2008	1	36	0	38	76
Total	59	1120	11	519	1710
Percent	3%	65%	1%	30%	100%

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

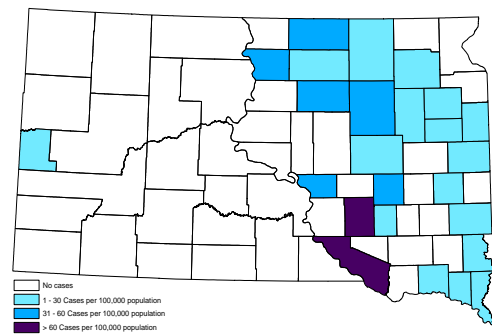
Shigella is transmitted by the fecal-oral route (human feces), with a very small dose (10 organisms) sufficient to cause illness. Following exposure, illness usually follows after a one to four day incubation period. Transmission is typically person-to-person within families, child day care centers, and residential living services for the developmentally disabled. Food may 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 2008 there were 53 cases of shiga toxin-producing *E. coli* (STEC) reported, representing a 51 percent increase over the five-year median.

This was an incidence rate of 6.7 cases per 100,000 population. Figure 44 shows STEC incidence rates (cases per 100,000 population) by county in South Dakota for 2008. Seventy-five percent of the cases were in children less than 15 years of age. There were three cases of hemolytic uremic syndrome (HUS) associated with *E. coli* infection.

Figure 44
STEC Incidence Rates by County, South Dakota, 2008



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

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.

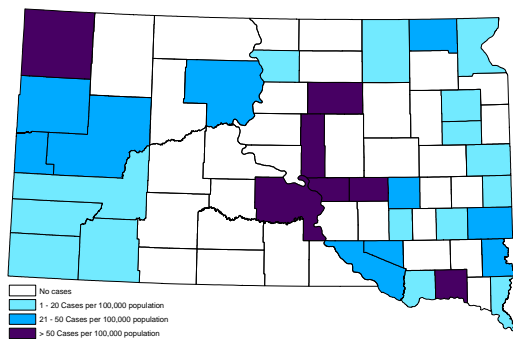
Shiga-toxin producing *E. coli* often causes severe bloody diarrhea and abdominal cramps. The illness usually resolves in five to 10 days. In some individuals, however, complications may involve severe hemorrhagic colitis, HUS, thrombotic thrombocytopenic purpura, and even death.

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 2008, 136 cases of giardiasis were reported. This represents a 39 percent increase from the five-year median. Fifty-three percent of the cases were from children less than 15 years of age. Figure 45 shows giardiasis incidence rates (cases per 100,000 population) by county in South Dakota for 2008.

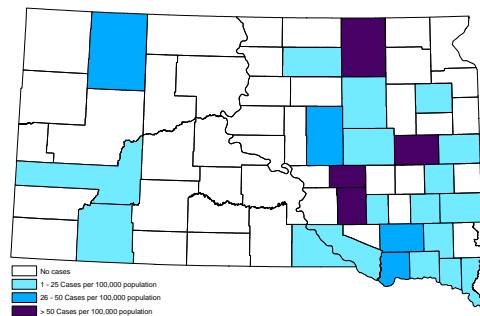
Figure 45
Giardiasis Incidence Rates by County, South Dakota, 2008



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, 668 cases have been reported statewide. In 2008 there were 88 cases reported representing a 83 percent increase over the five-year median. Forty-five 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 2008.

Figure 46
Cryptosporidiosis Incidence Rates by County, South Dakota, 2008

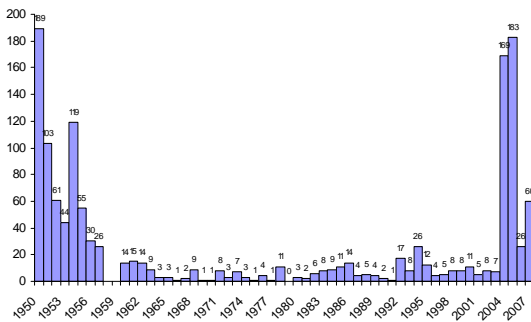


Source: South Dakota Department of Health, Office of Disease Prevention

PERTUSSIS

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 had a median of eight cases per year. During 2005, South Dakota experienced an outbreak of pertussis with 183 cases reported, the highest number since 1950. During 2008, 67 (8.4 cases per 100,000 population) cases of pertussis were reported in South Dakota. No deaths were reported due to pertussis complications.

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

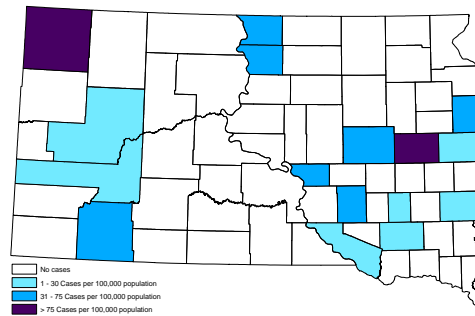


No data available for 1958 and 1959.
Source: South Dakota Department of Health, Office of Disease Prevention

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 16 of 66 South Dakota counties during 2008.

Figure 48
Pertussis Incidence Rates by County, South Dakota, 2008



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-five percent of cases were less than five years old, and 54 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

The 2008-09 influenza season was of mild severity and 30 week duration. A total of 525 laboratory confirmed influenza cases, 439 influenza A and 86 influenza B, were reported to the South Dakota Department of Health (SD DOH) from the beginning of the influenza season starting October 4th 2008 through season’s end on June 27th. 2009. The peak of the influenza season occurred during the 1st week of March. There were 131 influenza hospitalizations and 4 influenza deaths reported for the season.

Results from the 2008 BRFSS survey showed South Dakota ranking 6th in the nation with 77% of individuals aged ≥ 65 years receiving influenza vaccination. The survey also showed the state ranking 38th in pneumococcal vaccination coverage with 65% 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 2008-09 season included 36 sentinel sites; seven Influenza Like Illness Network Providers; 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/.

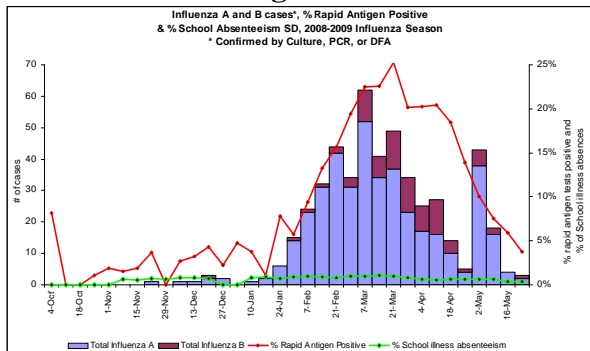
**Table 83,
Age Distribution of Reported Influenza
Cases, South Dakota, 2008-2009
Influenza Season**

Lab Confirmed Influenza Cases (by DFA, PCR, or culture)			Influenza Associated Hospitalizations		Influenza Associated Deaths
Age Group	# Cases	%	# Hosp	%	# Deaths
0-9	213	41%	53	40%	0
10-18	95	18%	5	4%	0
19-29	86	16%	7	5%	0
30-39	48	9%	13	10%	0
40-49	41	8%	14	10%	0
50-59	19	4%	12	9%	0
60-69	6	1%	10	7%	0
70+	17	3%	20	15%	4
Total	525		134		4

South Dakota’s first confirmed case of influenza was identified during the third

week of November, 2008 (Figure 49). The case, a 59 year-old male from Minnehaha County, was positive for influenza A by DFA at Sanford Laboratories.

Figure 49



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

Following the first positive detection, influenza activity remained low until mid February. 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 second peak during early May 2009 occurred due to the heightened public and physician awareness during the early days of the AH1N1 pandemic.

A total of 525 confirmed influenza cases, 439 (84%) influenza A and 86 (16%) influenza B, were reported to SD DOH. Additionally, 32,690 rapid antigen influenza tests were accomplished with 5,269 positive, 3,791 (12%) positive for influenza A and 1,478 (5%) positive for influenza B. Other viral respiratory pathogen reports included 40 adenovirus, 23 enterovirus, 95, hMPV, 16, parainfluenza - 1, 21 parainfluenza - 2, 65 parainfluenza - 3, 5 parainfluenza - 4, and 172, respiratory syncytial virus (RSV).

The median age of confirmed influenza cases (Table 85) was 15 years of age with an age range of 51 days to 93 years. There were 134 individuals reported hospitalized during the 2008-09 influenza season (Table 85). The first hospitalization was identified

during the week ending October 5th. Hospitalizations peaked during week ending March 7 when 20 patients were hospitalized for influenza.

For patients who were hospitalized with influenza, the age range was 26 days to 92 years with a median age of 29 years.

Four individuals died due to influenza and its complications (Table 85) during the 2008-09 influenza season. Gender breakdown was 75% male and 25% female. The median age was 85.5, with an age range of 83 - 94 years.

Novel Swine Influenza Investigation January 2009

On January 13, 2009, SD DOH was notified of a case of a human case of novel swine influenza. The case patient was a 19 year old from Brookings County. On December 1st he had onset of fever, cough, runny nose and headache. He was seen in the Brookings Hospital Emergency Department (ED); rapid antigen testing for influenza was positive for influenza A. He was discharged from the ED on oseltamivir and has since fully recovered. His specimen was sent on to the SDPHL for confirmatory testing. The isolate was identified as influenza A/H1 by HI testing but was not sub-typable by PCR. Therefore, the isolate was sent to the CDC for further analysis and found to be AH1N1 swine influenza virus. The CDC assisted the SD DOH Office of Disease Prevention with the investigation. The outcome of the investigation was one confirmed case and eight suspected cases for whom serum samples were collected. This is not the same swine influenza virus associated with the current pandemic.

National Influenza Surveillance Data

During the 2008-09 season, influenza A (H1), A (H3), and B viruses have co-circulated in the United States. Influenza A (H1) viruses have predominated during the season overall; however, the most

commonly reported influenza virus has varied by week and by region.

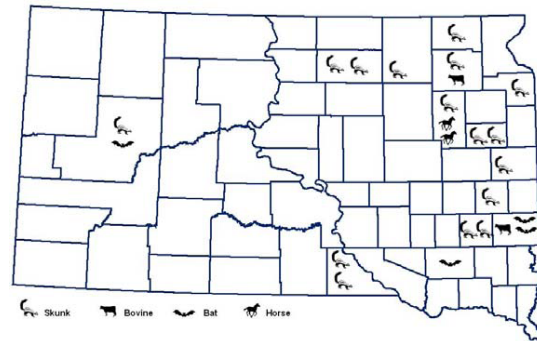
The antiviral medications recommended for chemoprophylaxis or treatment of influenza (oseltamivir or zanamivir) have changed for the 2008-2009 influenza season.

This change is due to AH1N1 resistance to Oseltamivir. The full report can be found at <http://www.cdc.gov/flu/professionals/antivirals/index.htm>.

RABIES

Rabies is a fatal viral disease and a serious enzootic public health concern in South Dakota. In 2008, 679 animals were submitted for rabies testing with 24 animals testing positive. This is a decrease of -11% from last year, the fifth consecutive year of decreasing rabies and the lowest number of rabid animals reported since at least 1960. The 24 rabid animals included 20 wild animals (16 skunks and 4 bats) and 4 domestic animals (2 cattle and 2 horses). The last human rabies case in South Dakota was in 1970.

Figure 50
Animal Rabies in South Dakota, 2008



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

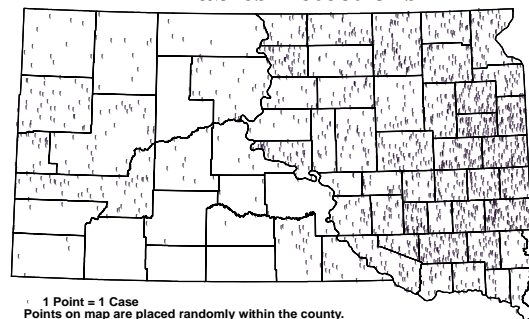
Animals testing negative in 2008 include 241 cats, 138 dogs, 120 bats, 61 cattle, 24 raccoons, 18 skunks, 11 squirrels, 7 muskrats, 6 horses, 5 coyotes, 3 deer, 3 sheep, 3 mice, 2 each ferrets, fox and goats, and 1 each beaver, elk, gopher, ground squirrel, mole, opossum, rat, weasel and woodchuck.

During 2008 rabid animals were detected in 14 South Dakota counties (see map and table). Animals were submitted for testing from all counties except Bennett, Buffalo, Campbell, Corson, Dewey, Harding, Jones, Mellette, Shannon, Todd and Ziebach.

Animal	2008		1999 - 2008		
	Pos	Total tested	Pos	Total tested	% Pos
Skunk	16	34	525	781	67%
Bat	4	124	62	2169	3%
Cat	0	241	46	2562	2%
Dog	0	138	46	1687	3%
Cattle	2	63	92	1055	9%
Goat	0	2	3	19	16%
Raccoon	0	24	1	426	0%
Horse	2	8	34	276	12%
Rodents*	0	7	0	89	0%
Deer/elk/donkey/llama	0	4	0	76	0%
Fox	0	2	2	46	4%
Weasel/ferret/mink	0	3	0	34	0%
Opossum	0	1	0	40	0%
Sheep	0	3	0	68	0%
Badger	0	0	1	6	17%
Coyote/wolf	0	5	0	28	0%
Mountain lion	0	0	0	3	0%
Rabbits/hares	0	0	0	13	0%
Squirrel/chipmunk	0	11	0	77	0%
Woodchuck	0	1	1	21	5%
Bison	0	0	0	5	0%
Bobcat/bear	0	0	0	1	0%
Muskrat	0	7	0	29	0%
Pig	0	0	0	6	0%
Shrew/mole	0	1	0	4	0%
Other animals	0	0	0	9	0%
TOTAL	24	679	813	9530	9%

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

Figure 51
1998-2008 South Dakota Animal Rabies Detections



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

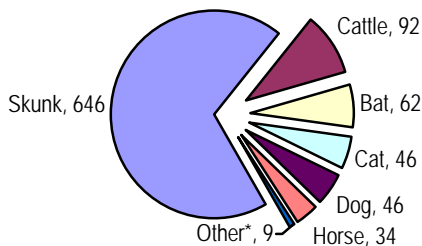
During the 10-year period (1999-2008) 813 of 9,530 (9%) animals tested were positive

for rabies (Table 84). 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 and Ziebach submitted the fewest.

Since 1999, 27% of rabies cases in South Dakota have been domestic animals. There were 46 rabid dogs and 46 rabid cats, many of which were unvaccinated strays. Rabid livestock included 92 cattle, 34 horses and 3 goats.

The common skunk (*Mephitis mephitis*) is the enzootic rabies reservoir in South Dakota. Since 1999, 67% of skunks tested have been rabid. Bat rabies is also enzootic in South Dakota with 62 of 2,107 (3%) bats testing positive over the past ten years.

Figure 52
Rabid Animals, South Dakota
1998-2008



*Other includes goat 3, fox 2, 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 1999 rabies has been detected in 2 foxes, 1 badger, 1 raccoon and 1 woodchuck. These other animals are likely spillover rabies following exposure to rabid skunks.

Table 85
Animal Rabies Cases by County, 1998 – 2008

County	2008		1998 – 2007		
	Pos	Neg	Pos	Neg	% Pos
Aurora	0	1	9	41	18%
Beadle	0	9	23	123	16%
Bennett	0	0	0	4	0%
Bon Homme	0	2	9	49	16%
Brookings	1	29	43	416	9%
Brown	2	31	47	307	13%
Brule	0	7	10	64	14%
Buffalo	0	0	1	5	17%
Butte	0	16	13	180	7%
Campbell	0	0	4	16	20%
Charles Mix	0	15	23	144	14%
Clark	3	9	22	72	23%
Clay	0	5	8	90	8%
Codington	0	22	15	208	7%
Corson	0	0	2	6	25%
Custer	0	4	3	32	9%
Davison	0	25	18	265	6%
Day	2	9	28	77	27%
Deuel	0	9	21	126	14%
Dewey	0	0	3	19	14%
Douglas	0	6	5	33	13%
Edmunds	1	6	10	56	15%
Fall River	0	9	2	95	14%
Faulk	0	2	8	33	20%
Grant	1	3	15	95	14%
Gregory	2	3	12	63	16%
Haakon	0	3	4	30	12%
Hamlin	2	6	32	116	22%
Hand	0	7	8	52	13%
Hanson	0	3	7	26	21%
Harding	0	0	2	13	13%
Hughes	0	18	13	201	6%
Hutchinson	1	21	24	180	12%
Hyde	0	1	7	68	9%
Jackson	0	6	1	35	3%
Jerauld	0	1	6	34	15%
Jones	0	0	3	8	27%
Kingsbury	0	11	30	143	17%
Lake	1	13	21	173	11%
Lawrence	0	11	6	99	6%
Lincoln	0	11	5	149	3%
Lyman	0	4	1	37	3%
Marshall	1	4	20	71	22%
McCook	2	7	22	113	16%
McPherson	0	3	9	60	13%
Meade	2	9	11	142	7%
Mellette	0	0	1	6	14%
Miner	0	4	13	65	17%
Minnehaha	3	175	62	2316	3%
Moody	0	2	31	111	22%
Pennington	0	40	12	799	1%
Perkins	0	1	4	15	21%
Potter	0	1	1	11	8%
Roberts	0	11	13	142	8%
Sanborn	0	4	15	40	27%
Shannon	0	0	0	38	0%
Spink	0	8	11	75	13%
Stanley	0	1	2	14	13%
Sully	0	1	4	4	50%
Todd	0	0	0	50	0%
Tripp	0	4	12	81	13%
Turner	0	18	16	184	8%
Union	0	6	5	72	6%
Walworth	0	15	17	233	7%
Yankton	0	6	8	104	7%
Ziebach	0	0	0	1	0%
South Dakota	24	655	813	8717	9%

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

In 2008 there was a human rabies death in the state of Missouri. Nationally there have been 26 human rabies cases in the United States since 2000. Nineteen of the human cases (73%) were associated with bat-rabies virus, 6 (23%) had dog rabies virus (all foreign imports) and 1 (4%) was a raccoon virus variant. These 26 human rabies cases were from Arkansas, California (6), Florida, Georgia, Indiana, Iowa, Minnesota (2), Mississippi, Missouri, New York, Oklahoma, Puerto Rico, Tennessee, Texas (4), Virginia and Wisconsin (2).

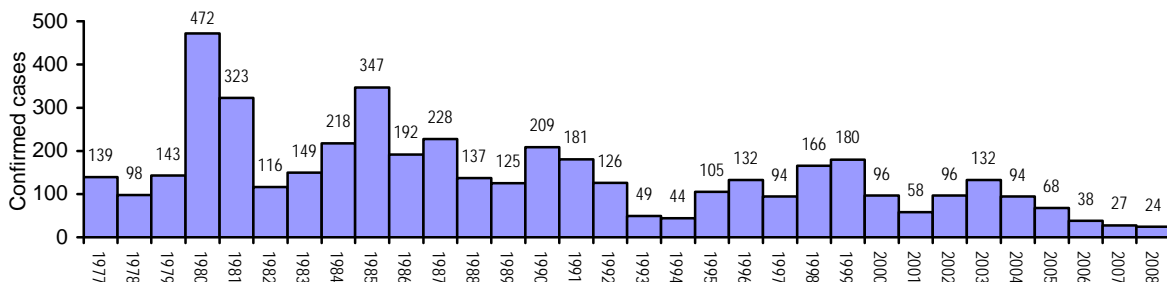
The latest national animal rabies surveillance data reported are for year 2007. Nationally, there was a 2% increase over the previous year with 7,060 cases of animal rabies reported (93% wild animals and 7% domestic animals). Nationally, rabid domestic animals included 262 cats, 93 dogs, 57 cattle, 41 horses/mules, 13 goats/sheep, and 3 swine. Nationally, wild animals testing positive for rabies included 2,549 raccoons, 1,935 bats, 1,476 skunks, 462 foxes, 46 groundhogs, 35 bobcats, 33 coyotes, 32 mongooses, 6 deer, 6 otters, 4

beavers, 2 opossums, 1 bear, 1 fisher, 1 wolf and 1 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 413 rabies tests on South Dakota animals in 2008 with 15 being positive (4%); and the SDPHL performed 301 tests in 2008 with 9 being positive (3%). 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 53
Animal Rabies in South Dakota, 1977-2008



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

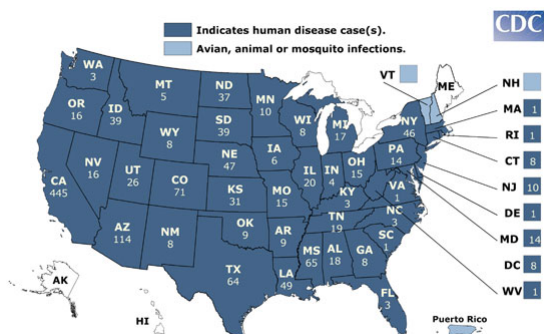
West Nile Virus

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.

2008 was the 10th year of WNV transmission in North America and the 7th 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 2008 there were 1,356 human WNV cases reported, with 44 deaths (Figure 54). The WNV cases included 687 NID cases (encephalitis or meningitis).

Figure 54
West Nile Human Deaths/Cases, United States, 2008



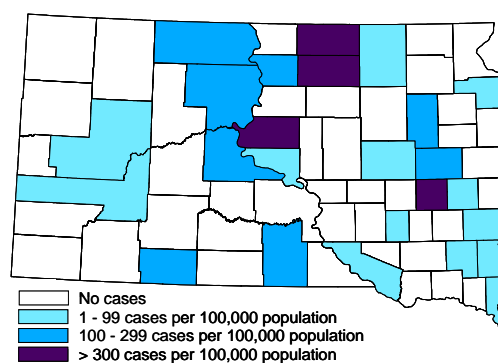
Source: Centers for Disease Control and Prevention

In South Dakota, there were 39 human cases of WNV disease and no deaths reported in 2008. Of these cases, 11 were diagnosed with neuro-invasive disease (NID 28 percent) and 28 had West Nile fever (72 percent), a milder form of the disease. 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 2008 was 4.9 cases per 100,000 population. Figure 55 shows the incidence by county. The overall statewide incidence of WNV NID was 1.4 cases per 100,000.

Figure 55
Human West Nile Disease Incidence Rates by County, South Dakota, 2008



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 3 viremic blood donations were detected and removed from the blood supply in 2008.

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 2008. 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 2008 included ten cases of tularemia and three cases of Rocky Mountain spotted fever. Although detections of plague in prairie dogs were reported in southwest South Dakota, there were no human cases detected in 2008. There were also 3 cases of imported Lyme Disease reported.

Other Infectious Diseases There were 23 cases of invasive Group A *Streptococcus*, 22 cases of invasive Group B *Streptococcus*, 13 cases of *Streptococcus pneumoniae* in children less than 5 years of age, and 9 cases of invasive drug resistant *Streptococcus pneumoniae* in 2008. There were 55 cases of chicken pox and 77 cases of invasive Methicillin-Resistant *Staphylococcus aureus* (MRSA). Additionally, 4 cases of hepatitis A, 3 cases of legionellosis, 3 cases of Hemolytic Uremic Syndrome of unknown cause, 2 cases of Typhoid fever, and one case each of anaplasmosis, cyclosporiasis, imported leprosy, listeriosis, mumps, Q fever-acute, and Staphylococcal Toxic Shock Syndrome were reported in 2008.