

# INFECTIOUS DISEASES IN SOUTH DAKOTA 2010

The South Dakota Department of Health 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, and to establish public health measures to control and prevent disease transmission.

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"> <li>• Methicillin-resistant <i>Staphylococcus aureus</i> (MRSA), invasive</li> <li>• Vancomycin-resistant and -intermediate <i>Staphylococcus aureus</i> (VRSA and VISA)</li> <li>• Drug resistant <i>Streptococcus pneumoniae</i> (DRSP), invasive</li> </ul>                     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  <i>Herpes simplex</i> 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 &amp; 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, (&lt;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.

**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](http://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"

**Table 66**  
**Reportable Diseases in South Dakota, 2000-2010**

Reportable Diseases	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Anthrax	0	0	1	0	0	0	0	0	0	0	0
Botulism	1	0	0	1	0	1	0	0	0	0	0
Brucellosis	0	0	0	1	0	0	0	0	0	0	0
Campylobacteriosis	143	162	196	190	273	241	216	232	264	298	297
Chlamydia trachomatis infections	1835	1821	2215	2606	2534	2701	2614	2616	2934	3009	3192
Cholera	0	0	1	0	0	0	0	0	0	0	0
Cryptosporidiosis	15	8	42	53	41	30	86	169	88	138	107
Dengue fever	0	0	1	0	0	1	0	3	0	0	1
Diphtheria	0	0	0	0	0	0	0	0	0	0	0
Giardiasis	108	102	84	89	87	115	97	103	139	112	103
Gonorrhea	277	289	263	226	304	351	363	254	384	343	468
Haemophilus influenzae type b	1	0	1	1	0	0	0	0	0	0	0
Hantavirus pulmonary syndrome	1	0	1	0	1	2	2	1	0	0	0
Hemolytic uremic syndrome	2	1	0	1	0	3	8	1	3	3	2
Hepatitis A	3	4	2	0	4	1	9	7	3	3	1
Hepatitis B, acute	3	0	3	4	1	8	6	6	0	4	2
Hepatitis B, chronic	NR	NR	NR	NR	26	34	17	36	46	37	51
Hepatitis C, chronic	NR	NR	NR	NR	NR	208	353	309	371	381	349
HIV and AIDS	20	22	19	25	19	33	34	25	34	21	35
Legionellosis	2	3	4	3	4	21	5	4	3	2	9
Leprosy	0	0	0	0	0	0	0	0	1	0	0
Listeriosis	0	0	1	0	1	0	2	2	1	1	3
Lyme disease	0	0	2	1	1	2	1	0	3	1	1
Malaria	1	0	2	3	1	1	0	1	0	1	3
Measles	0	0	0	0	0	0	0	0	0	0	0
Meningococcal disease	6	6	1	2	3	4	4	3	3	5	0
Methicillin-resistant <i>Staph aureus</i> , invasive	NR	NR	NR	NR	36	47	51	86	79	94	98
Mumps	0	0	0	0	0	0	295	6	1	2	2
Pertussis (whooping cough)	12	4	8	7	187	165	27	60	68	58	29
Plague	0	0	0	0	0	0	0	0	0	0	0
Q fever	NR	0	1	0	0	2	2	1	1	9	4
Rabies, animal	96	58	96	132	94	68	38	27	24	53	32
Rabies, human	0	0	0	0	0	0	0	0	0	0	0
Rocky Mountain Spotted Fever	2	2	1	5	4	5	0	5	3	0	0
Rubella and congenital rubella syndrome	0	0	0	0	0	0	0	0	0	0	0
St. Louis Encephalitis	0	0	0	2	0	0	0	0	0	0	0
Salmonellosis	104	149	120	133	153	162	132	174	154	197	186
Shiga-toxin producing E. coli, including	69	50	43	33	35	33	50	47	53	71	35
Shigellosis	10	744	127	18	12	133	388	118	76	4	7
Streptococcal disease, Group A, invasive	16	17	14	25	22	26	10	12	23	29	44
Streptococcal disease, Group B, invasive	NR	NR	20	14	10	26	13	20	22	27	37
<i>Streptococcus pneumoniae</i> , drug resistant	8	6	1	1	5	3	4	16	9	4	10
<i>Streptococcus pneumoniae</i> , invasive<5	7	4	0	1	4	1	8	11	13	9	9
Syphilis, Primary and Secondary, Early	0	1	0	5	0	2	19	11	4	3	4
Tetanus	0	0	0	0	0	0	0	0	0	0	0
Toxic shock syndrome	2	0	1	1	1	2	0	0	1	0	0
Tuberculosis	16	13	13	20	11	16	14	13	16	18	15
Tularemia	13	7	3	5	4	8	4	7	10	5	11
Typhoid fever	0	0	0	0	0	0	1	0	2	2	1
Varicella (chicken pox)	NR	NR	NR	NR	97	135	115	83	55	53	62
West Nile neuroinvasive disease	0	0	14	170	6	35	38	48	11	6	4
West Nile fever	0	0	23	869	45	194	74	160	28	15	16

\*NR= not reportable

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

**Table 67**  
**South Dakota Selected Notifiable Diseases by County, 2010**

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 (MRSA)	Pertussis	Q fever	Salmonellosis	Tuberculosis	Varicella	West Nile Disease
Aurora	8	≤3	0	0	0	0	0	0	0	0	0	≤3	0	0	0
Beadle	4	73	≤3	0	0	0	10	4	≤3	0	0	≤3	≤3	≤3	0
Bennett	0	18	0	0	0	8	0	≤3	0	0	0	0	≤3	0	0
Bon Homme	8	12	≤3	≤3	≤3	0	0	9	≤3	0	0	≤3	0	0	0
Brookings	13	85	4	0	6	5	≤3	4	≤3	4	0	6	≤3	≤3	0
Brown	21	159	≤3	0	4	7	≤3	10	≤3	0	0	36	0	≤3	≤3
Brule	4	18	≤3	0	≤3	0	≤3	≤3	0	≤3	0	≤3	0	0	0
Buffalo	0	25	0	0	≤3	≤3	0	≤3	0	0	0	0	0	≤3	0
Butte	≤3	20	0	0	≤3	0	0	4	0	0	0	≤3	0	≤3	≤3
Campbell	≤3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Charles Mix	7	47	≤3	≤3	≤3	0	0	10	≤3	0	≤3	≤3	6	≤3	0
Clark	≤3	0	≤3	0	≤3	0	0	0	0	0	0	0	0	0	0
Clay	≤3	41	5	≤3	≤3	4	0	≤3	≤3	≤3	0	4	≤3	0	≤3
Codington	≤3	100	22	0	10	4	0	9	0	0	0	≤3	0	≤3	≤3
Corson	≤3	60	0	0	0	12	0	11	5	0	0	≤3	0	0	0
Custer	≤3	35	≤3	≤3	≤3	≤3	0	6	0	0	0	≤3	0	≤3	0
Davison	17	68	5	5	≤3	≤3	0	5	4	≤3	0	≤3	0	0	0
Day	≤3	10	0	≤3	≤3	0	0	0	0	0	0	4	0	≤3	0
Deuel	6	4	0	0	0	0	0	≤3	0	0	0	≤3	0	0	0
Dewey	4	119	0	0	0	17	0	≤3	≤3	0	0	6	0	≤3	≤3
Douglas	9	5	0	0	0	0	0	≤3	0	0	0	≤3	0	0	≤3
Edmunds	≤3	≤3	≤3	0	0	0	0	0	0	0	0	0	0	0	≤3
Fall River	0	8	0	0	0	≤3	0	≤3	0	≤3	0	≤3	0	0	≤3
Faulk	≤3	≤3	≤3	0	0	0	0	0	≤3	0	0	≤3	0	0	0
Grant	6	5	≤3	0	0	0	0	0	0	0	0	≤3	0	0	0
Gregory	5	7	≤3	0	0	0	0	0	0	0	0	0	0	0	0
Haakon	4	≤3	0	0	≤3	0	0	0	0	0	0	≤3	0	0	0
Hamlin	≤3	6	≤3	0	≤3	0	0	0	0	≤3	0	≤3	0	0	≤3
Hand	≤3	≤3	0	0	0	0	0	0	0	0	0	0	0	0	0
Hanson	≤3	≤3	≤3	0	0	0	0	0	0	0	0	≤3	≤3	≤3	0
Harding	0	0	≤3	≤3	≤3	0	0	0	0	≤3	0	0	0	0	0
Hughes	4	60	0	0	≤3	≤3	0	5	≤3	0	≤3	6	0	≤3	≤3
Hutchinson	6	≤3	0	5	≤3	0	0	≤3	0	0	0	≤3	0	0	0
Hyde	0	≤3	0	0	0	0	0	0	0	0	0	0	0	0	0
Jackson	≤3	15	0	0	0	4	0	0	0	0	0	0	0	0	0
Jerauld	≤3	≤3	≤3	0	0	0	0	≤3	0	0	0	0	0	0	0

Continued

**Table 67 (continued)**  
**South Dakota Selected Notifiable Diseases by County, 2010**

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 (MRSA)	Pertussis	Q fever	Salmonellosis	Tuberculosis	Varicella	West Nile Disease
Jones	0	0	0	0	0	0	0	≤3	0	0	0	0	0	0	0
Kingsbury	4	≤3	0	0	≤3	0	0	4	≤3	≤3	0	0	0	0	0
Lake	5	18	0	0	≤3	0	0	≤3	≤3	≤3	0	≤3	0	0	≤3
Lawrence	≤3	58	0	0	≤3	≤3	≤3	10	≤3	0	0	≤3	0	4	0
Lincoln	8	49	≤3	≤3	7	5	≤3	7	≤3	≤3	0	9	0	≤3	≤3
Lyman	≤3	28	0	0	≤3	≤3	0	≤3	0	0	0	0	0	0	0
Marshall	≤3	5	0	0	0	0	0	≤3	≤3	0	0	0	0	0	0
McCook	≤3	8	≤3	≤3	0	0	0	0	0	0	≤3	0	0	0	0
McPherson	≤3	0	≤3	0	0	0	0	≤3	≤3	0	0	0	0	0	0
Meade	4	44	0	0	≤3	10	0	≤3	≤3	0	0	≤3	0	23	0
Mellette	0	7	≤3	0	0	≤3	0	0	0	0	0	0	0	0	0
Miner	≤3	8	0	0	≤3	0	0	≤3	0	0	0	0	0	0	0
Minnehaha	38	728	11	5	22	120	27	124	25	9	0	36	≤3	8	≤3
Moody	5	13	0	0	4	0	0	≤3	0	0	0	≤3	0	0	0
Pennington	8	486	≤3	0	10	118	4	51	18	≤3	0	15	0	6	≤3
Perkins	5	≤3	0	≤3	0	0	0	0	0	0	0	0	0	0	0
Potter	≤3	≤3	0	0	0	0	0	≤3	≤3	0	0	0	0	0	0
Roberts	10	71	5	0	0	6	≤3	4	5	0	0	0	0	≤3	0
Sanborn	0	7	≤3	0	≤3	0	0	≤3	0	0	0	0	0	0	0
Shannon	≤3	284	0	0	≤3	97	0	11	5	0	0	5	≤3	0	0
Spink	5	6	≤3	0	≤3	0	0	≤3	≤3	0	0	5	0	0	≤3
Stanley	≤3	8	0	≤3	0	0	0	≤3	0	0	0	≤3	0	0	0
Sully	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Todd	≤3	197	0	0	0	23	0	7	≤3	0	0	4	≤3	0	0
Tripp	6	16	0	≤3	0	≤3	0	0	≤3	0	0	≤3	0	0	0
Turner	5	11	0	0	≤3	≤3	0	≤3	0	0	0	≤3	0	0	0
Union	4	14	≤3	≤3	≤3	4	0	≤3	≤3	0	0	≤3	0	≤3	0
Walworth	6	18	≤3	0	0	≤3	0	≤3	≤3	0	0	0	0	0	0
Yankton	5	61	15	≤3	≤3	6	≤3	8	≤3	0	0	5	0	≤3	0
Ziebach	0	22	0	0	0	≤3	0	0	≤3	0	0	≤3	0	0	0
<b>South Dakota</b>	<b>297</b>	<b>3192</b>	<b>107</b>	<b>35</b>	<b>103</b>	<b>468</b>	<b>51</b>	<b>349</b>	<b>98</b>	<b>29</b>	<b>4</b>	<b>186</b>	<b>15</b>	<b>62</b>	<b>20</b>
Rate per 100,000	36.4	392.1	13.1	4.3	12.7	57.5	6.3	42.9	12.0	3.6	.5	22.8	1.8	7.6	24
5-year median	244	2701	88	50	118	351	39	355	77	60	2	160	16	84	112
% change of median	21%	18%	22%	-30%	-13%	33%	31%	-2%	27%	-52%	100%	16%	-6%	-26%	-82%

In 2010 there were also: 44 cases of invasive Group A Streptococcal disease, 37 cases of invasive Group B Streptococcal disease; 11 cases of Tularemia; 10 cases of drug resistant, invasive *Streptococcus pneumoniae*; 9 cases of each invasive *Streptococcus pneumoniae* in children less than 5 years of age and Legionellosis; 7 cases of Shigellosis; 3 cases each of Listeriosis and Malaria; 2 cases of each Mumps, Acute Hepatitis B and Hemolytic uremic syndrome; and one case each of Lyme disease, Hepatitis A, Typhoid Fever and Dengue Fever.

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

**Table 68**  
**South Dakota Selected Notifiable Disease Summary by Gender, Race, and Age, 2010**

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	<b>297</b>	206 (69%)	91 (31%)	257 (87%)	20 (7%)	20 (7%)	28	8	36	37	41	82	68	25
Chlamydia	<b>3192</b>	888 (28%)	2304 (72%)	928 (29%)	1219 (38%)	1045 (33%)	21	0	0	32	2314	797	46	1
Cryptosporidiosis	<b>107</b>	55 (51%)	52 (49%)	95 (89%)	7 (6%)	5 (5%)	17	3	20	27	12	22	9	14
Shiga-toxin producing E. coli	<b>35</b>	20 (57%)	15 (43%)	34 (97%)	0 (0%)	1 (3%)	14	4	5	9	3	6	6	2
Giardiasis	<b>103</b>	59 (57%)	44 (43%)	86 (83%)	8 (8%)	9 (9%)	24	2	27	14	10	20	23	7
Gonorrhea	<b>468</b>	178 (38%)	290 (62%)	111 (24%)	286 (61%)	71 (15%)	23	0	0	3	274	168	22	1
Hepatitis B, Chronic	<b>51</b>	29 (57%)	22 (43%)	7 (14%)	1 (2%)	43 (84%)	33	0	0	1	10	20	16	4
Hepatitis C, Chronic	<b>349</b>	207 (59%)	142 (41%)	187 (54%)	78 (22%)	84 (24%)	48	0	0	0	16	93	227	13
HIV/AIDS	<b>35</b>	23 (66%)	12 (34%)	15 (43%)	5 (14%)	15 (43%)	35	0	0	1	4	18	12	0
Methicillin-resistant <i>Staph. aureas</i> , invasive	<b>98</b>	48 (49%)	50 (51%)	63 (64%)	26 (27%)	9 (9%)	63	1	1	2	2	7	40	45
Pertussis	<b>29</b>	12 (41%)	17 (59%)	27 (93%)	1 (3%)	1 (3%)	15	7	2	5	6	2	3	4
Q fever	<b>4</b>	4 (100%)	0 (0%)	4 (100%)	0 (0%)	0 (0%)	67	0	0	0	0	1	1	2
Salmonellosis	<b>186</b>	92 (49%)	94 (51%)	162 (87%)	19 (10%)	5 (3%)	26	7	13	39	30	33	42	22
Streptococcus A, invasive	<b>44</b>	20 (45%)	24 (55%)	20 (45%)	21 (48%)	3 (7%)	54	0	3	0	1	6	23	11
Streptococcus B, invasive	<b>37</b>	17 (46%)	20 (54%)	21 (57%)	14 (38%)	2 (5%)	51	4	0	0	1	4	15	13
Syphilis	<b>12</b>	10 (83%)	2 (17%)	7 (58%)	0 (0%)	5 (42%)	30	0	0	0	3	5	4	0
Tuberculosis	<b>15</b>	7 (47%)	8 (53%)	2 (13%)	11 (73%)	2 (13%)	30	1	0	3	2	3	3	3
Varicella	<b>62</b>	36 (58%)	26 (42%)	48 (78%)	12 (19%)	2 (3%)	10	5	11	30	13	3	0	0
West Nile virus disease	<b>20</b>	13 (65%)	7 (35%)	18 (90%)	2 (10%)	0 (0%)	47	0	0	0	2	7	6	5

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; 86% White, 9% American Indian and 5% 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 20<sup>th</sup> 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 two-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 over 550 health clinics, public schools, colleges, universities, tribal colleges and head start facilities across the state. The DOH strives to enroll all children in South Dakota in SDIIS. Adult vaccination records may also be kept in SDIIS.

During 2010, no cases of measles, rubella, diphtheria, Hib, tetanus, or polio were reported in South Dakota. Twenty-nine cases of pertussis (whooping cough) were reported in South Dakota in 2010 which is down 50 percent from 2009. Seven of this year's cases were in a child less than one year of age.

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. In 2010 two cases of mumps were reported in South Dakota.

A decreasing trend of *Haemophilus influenzae* type b is evident from the 54 cases reported in 1990 down to zero in 2004 and has remained at zero since then. Invasive Hib disease can cause meningitis, pneumonia, osteomyelitis, epiglottitis, cellulitis and pericarditis. This preventable disease has a case-fatality rate of two to five percent.

Immunization requirements for entrance into South Dakota schools since 2000 include:

- a) 4 doses of diphtheria, tetanus, pertussis vaccine (DTaP or DTP), and
- b) 4 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.

The NIS uses random telephone sampling 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 2010, 87 percent of children 24-35 months old in South Dakota were adequately immunized (Figure 41, on the right). We are still short of our 90 percent immunization coverage objective.

### Viral Hepatitis

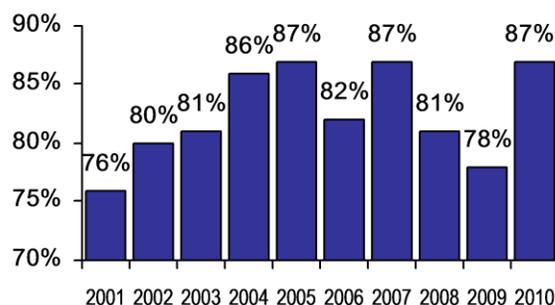
Two cases of acute hepatitis B and 51 cases of chronic hepatitis B were reported in 2010 (Figure 42, on the right). Hepatitis B is caused by a virus transmitted by blood and other body fluids. It can cause lifelong infection, liver cirrhosis, liver cancer, liver failure, and death.

Hepatitis B vaccine is now recommended at birth 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.

### Pertussis

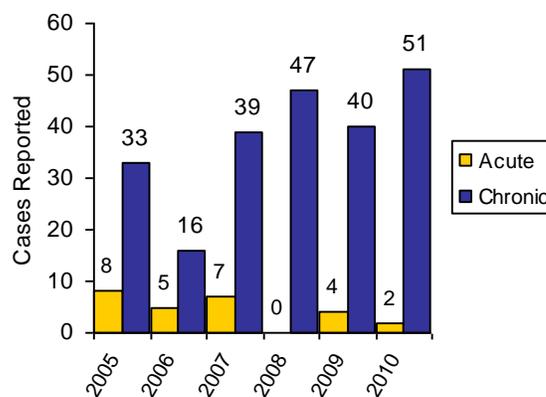
Pertussis, commonly called whooping cough, is an acute infectious bacterial

**Figure 41**  
**South Dakota immunization rates, children 19-35 months, 2002 – 2010**  
**(2010 in children 24-35 months)**  
 (National Immunization Survey 4:3:1:3:3:1)



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

**Figure 42**  
**Acute and Chronic Hepatitis B in South Dakota, 2005-2010**



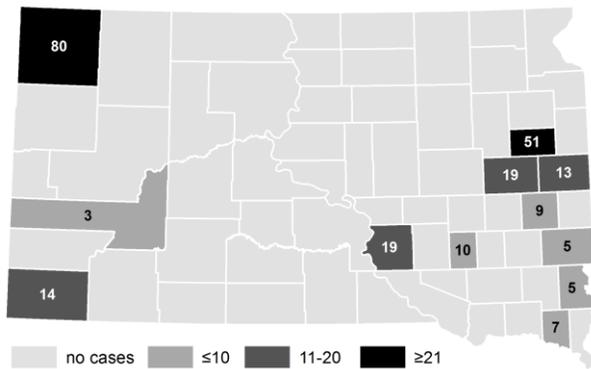
Source: South Dakota Department of Health, Office of Disease Prevention

There was also one case of Hepatitis A and 349 cases of chronic Hepatitis C reported in 2010 in South Dakota.

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. During the first half of the 20th 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. During 2010, 29 (3.6 cases per 100,000 population) cases of pertussis were reported in South Dakota, which is 52 percent below the five year median baseline. Figure 43, below, shows incidence (per 100,000 population) by county in South Dakota in 2010. No deaths were reported due to pertussis complications.

**Figure 43**  
**Pertussis Incidence Rates by County,**  
**South Dakota, 2010**



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

Individuals who are directly 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.

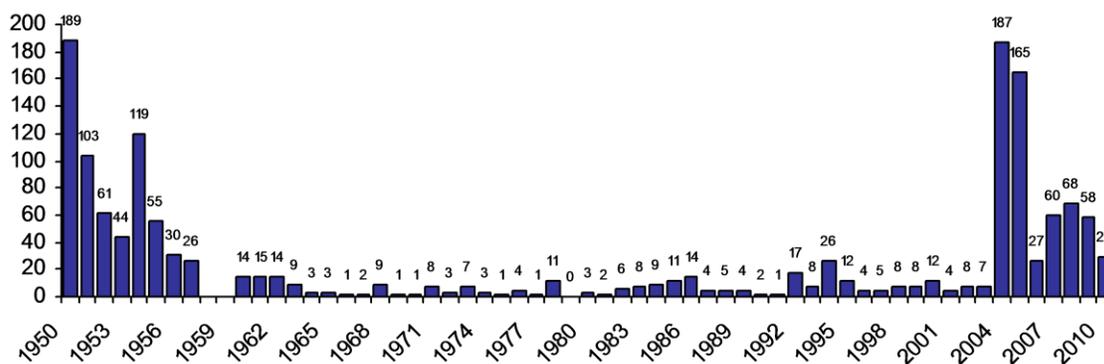
Infants and young children are at higher risk of pertussis-associated complications, hospitalization and death. The most common complication is secondary bacterial pneumonia. Thirty-one percent of the 2010 cases were less than five years old, and 48 percent were less than 15 years old. Pertussis infected 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. Since 2005 pertussis vaccine has been licensed in the United States for adolescents and adults. Figure 44, on the next page, shows the number of cases per year in South Dakota since 1950.

The current pertussis vaccine has a reported efficacy of 80-85 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 is available at the South Dakota Public Health Laboratory. The PCR method is more sensitive than the traditional culture method. 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.

**Figure 44**  
**Pertussis Cases Reported in South Dakota, 1950 – 2010**



No data available for 1958 and 1959.

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

## **Influenza**

### **National Influenza Surveillance Data**

In comparison to the last three seasons, the 2010-2011 influenza season was less severe than both the pandemic year (2009-2010) and the 2007-2008 season, but more severe than the 2008-2009 influenza season, as determined by the percentage of deaths resulting from pneumonia or influenza, the number of influenza-associated pediatric deaths reported, adult and pediatric hospitalization rates, and the percentage of visits to outpatient clinics for influenza-like illness (ILI).

Flu seasons are unpredictable in a number of ways, including when they begin, how severe they are, how long they last, which viruses will spread, and whether the viruses in the vaccine match flu viruses that are circulating. During the 2010-2011 influenza season, the most commonly reported viruses were influenza A (H3N2), but 2009 influenza A (H1N1) viruses and influenza B viruses circulated as well. The 2010-2011 influenza season had a substantial health effect on every age group.

During the 2010-2011 influenza season, overall influenza activity peaked in early

February. Flu season most often peaks in January or February in the United States.

The weekly percentage of outpatient visits for influenza-like illness (ILI), as reported by the U.S. Outpatient ILI Surveillance Network (ILINet), peaked in mid-February at 4.6 percent. This is comparable to the peaks seen in the two seasons prior to the 2009 H1N1 pandemic, which ranged from 3.5 to 6.0 percent and occurred in mid-to-late February. During the pandemic year, ILI peaked in late October at 7.7 percent.

The number of states reporting widespread or regional influenza activity peaked at 49 at the end of February and decreased to zero by the middle of April. The peak number of states reporting widespread or regional activity during the previous three seasons has ranged from 49 to 50 states.

The influenza vaccine for the 2010-2011 influenza season was considered to be a good match. Almost all of the 2,494 influenza viruses submitted to CDC for antigenic characterization were found to be similar to the components of the 2010-2011 influenza vaccine. Of the viruses tested,

99.8 percent of the influenza A (H1N1) viruses, 96.8 percent of the influenza A (H3N2) viruses, and 94 percent of the influenza B viruses were similar to the components of the 2010-2011 season's vaccine.

CDC routinely collects viruses through a domestic and global surveillance system to monitor for changes in influenza viruses and to check for antiviral resistance. By the end of the 2010-2011 season, almost all (99.1%) of the 2009 H1N1 influenza viruses tested for antiviral resistance were susceptible to oseltamivir (Tamiflu), and 99.8 percent of the H3N2 viruses tested were susceptible to Tamiflu. All of the influenza B viruses tested were susceptible to Tamiflu. All virus types and subtypes were susceptible to Zanamivir (Relenza) by the end of the 2010-2011 season.

There were five reports of human infections with swine origin influenza A (H3N2) viruses that occurred during the 2010-2011 influenza season. These cases were identified in Minnesota, Pennsylvania and Wisconsin. No epidemiologic links between these cases have been identified and the viruses from all five cases have genetic differences indicating different sources of infection. All five patients fully recovered from their illnesses.

CDC publishes a weekly influenza summary on the CDC website: <http://www.cdc.gov/flu/weekly/>.

The United States Food and Drug Administration has chosen the three influenza viruses for inclusion in the 2011-2012 seasonal flu vaccine. The vaccine will contain the following three vaccine viruses: an A/California/7/2009 (H1N1)-like virus; an A/Perth/16/2009 (H3N2)-like virus; and a B/Brisbane/60/2008-like virus. These are the same viruses that were selected for the Northern Hemisphere for the 2010-2011 influenza vaccine.

## South Dakota Influenza Epidemiology and Laboratory Surveillance

The South Dakota Department of Health (SD DOH) and South Dakota 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 2010-2011 season included 66 laboratory sentinel sites; 21 Influenza Like Illness Network (ILINet) 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: [doh.sd.gov/Flu/](http://doh.sd.gov/Flu/).

Table 69, below, shows that a total of 860 confirmed influenza cases, A-H1N1 40 (5%), A-H3N2 275 (32%), A-not subtyped 133 (15%) and 412 (48%) influenza B, were reported to SD DOH. Additionally, 33,799 rapid antigen influenza tests were performed with 6,893 positive, 3,219 (10%) positive for influenza A and 3,674 (11%) positive for influenza B.

**Table 69**  
**Age Distribution of Reported Influenza Cases, South Dakota, 3 Oct 2010 – 31 July 2011 Influenza Season**

Age Group	Lab Confirmed Influenza Cases (by DFA, PCR, or culture)		Influenza Associated Hospitalizations		Influenza Associated Deaths
	# Cases	%	# Hosp	%	# Deaths
0-4	226	26%	75	26%	1
5-24	329	38%	39	13%	3
25-49	136	16%	33	11%	1
50-64	60	7%	34	12%	1
>64	109	13%	109	38%	14
<b>Total</b>	<b>860</b>		<b>290</b>		<b>20</b>

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

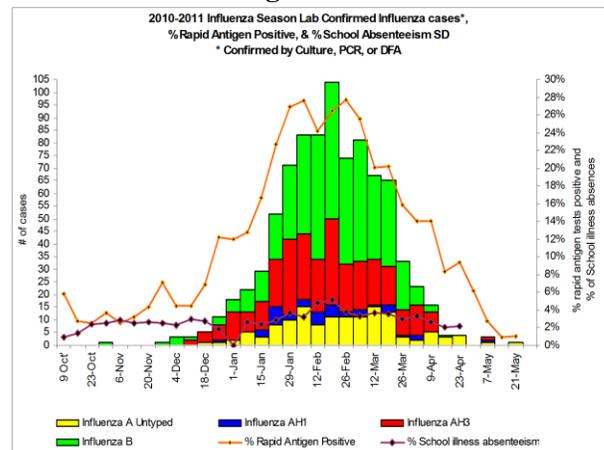
Other viral respiratory pathogen reports included 119 adenovirus, 218 hMPV, 4 parainfluenza-1, 30 parainfluenza-2, 203 parainfluenza-3, 18 parainfluenza-4 and 315 respiratory syncytial virus.

The 2010-2011 influenza viruses had a substantial impact on all age groups. The median age of confirmed influenza cases was 14 years with an age range of 3 weeks to 97 years.

The first confirmed case of influenza was reported the last week of October 2010 and the last case reported mid-May 2011. The predominant virus in South Dakota was influenza B. The peak of the season was mid-February 2011 with AH1N1, AH3N2 and Influenza B viruses co-circulating. (Figure 45, on the right).

There were 290 individuals reported hospitalized during the 2010-2011 influenza season. The first hospitalization was identified mid-October 2010 and the last was reported mid-May. Hospitalizations peaked mid-March. For patients who were hospitalized with influenza, the age range

**Figure 45**



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

was 1 month to 95 years with a median age of 49 years.

Twenty individuals died due to influenza and its complications during the 2010-2011 influenza season. Gender breakdown was 40 percent male and 60 percent female. The median age was 87 years, with an age range of 1 - 105 years. Eighty percent of the influenza-associated deaths were white, 15 percent were American Indian, and 5 percent were Asian.

## 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

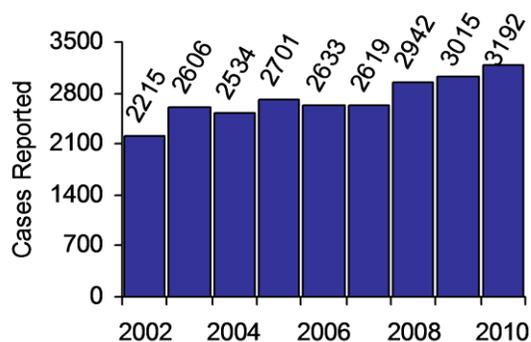
partner monogamy, and proper use of condoms. Genital human papillomavirus (HPV) is the only vaccine preventable STD.

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 2010, the DOH received 3,192 case reports (Figure 46, below), which was an incidence rate of 392.1 cases per 100,000 population. This is an increase of 171 cases from 2009, making this year the most chlamydia cases ever reported in one year in South Dakota.

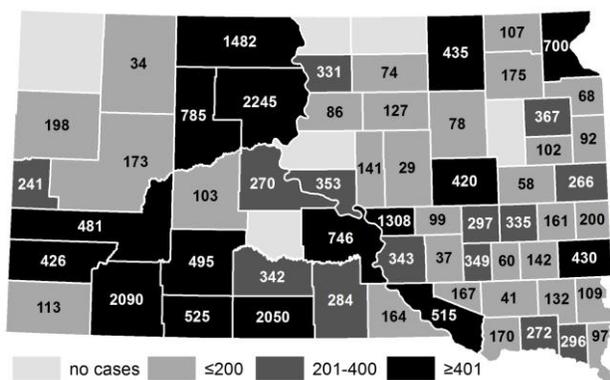
**Figure 46**  
**Chlamydia in South Dakota,**  
**2002-2010**



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

Counties with the highest incidence (cases per 100,000 population) included Dewey (2245), Shannon (2090), Todd (2050), Corson (1481) and Buffalo (1308), (Figure 47, below).

**Figure 47**  
**Chlamydia Incidence Rates by County, South**  
**Dakota, 2010**



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

Nationally, the incidence of chlamydia in 2009 was 409.2 cases per 100,000 population. By state, South Dakota ranked 28<sup>th</sup> with an incidence of 374.9 that year. Chlamydia has increased by 4.6 percent to an incidence rate of 392.1 in 2010.

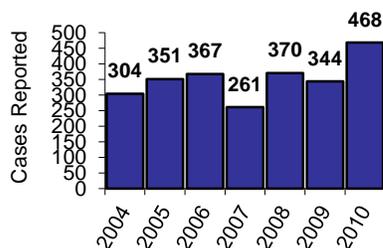
Screening for chlamydia infection has become standard practice for many health care providers in the state. Family planning clinics, Indian Health Service and many private providers have incorporated chlamydia screening as part of the routine health examination for sexually active young women. Screening follow-up encompasses treatment and partner referral. Because screening efforts are focused on women, female infections are more likely to be identified than males. In 2010, 72 percent of chlamydia cases were female.

Young people between 15 and 24 years old accounted for 72 percent of chlamydia cases reported in 2010. Although American Indians comprise 9 percent of the state's population, a disproportionate share, 38 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 2010 the DOH received 468 reports of Gonorrhea (Figure 48, below), this is the highest number reported in South Dakota in the past 10 years. This was an incidence of 57.5 cases per 100,000 population and is 33 percent above the 5-year median.

**Figure 48**  
**Gonorrhea in South Dakota 2004-2010**



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

Twenty-four percent of the gonorrhea case reports occurred in the white population, and 62 percent were female. The Healthy People 2010 objective is 19 new cases of gonorrhea per 100,000 population.

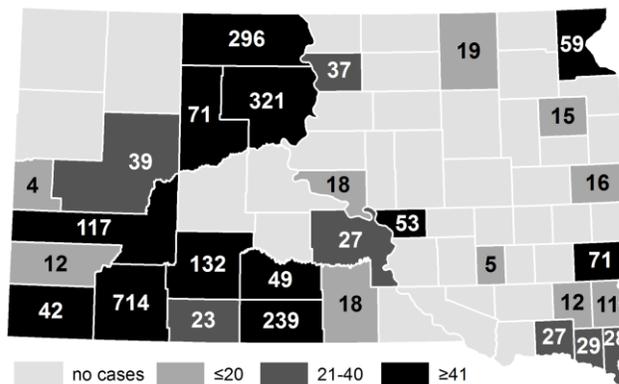
Counties with the highest incidence (cases per 100,000 population) included Shannon (714), Dewey (321), Corson (296), Todd (239), and Bennett (233), (Figure 49, on the right).

Sexually active adolescents and young adults are the population most at risk with

## Syphilis

In 2010 there were 4 cases of syphilis (Figure 50 and Table 70, next page). This was nearly unchanged since 2008 with an incidence of 0.5 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

**Figure 49**  
**Gonorrhea Incidence Rates by County, South Dakota, 2010**



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

59 percent of the gonorrhea cases reported being 15 to 24 years old. The American Indian population was disproportionately affected with 61 percent of the reported cases.

Nationally the incidence of gonorrhea was 99.1 cases per 100,000 population in 2009, a decrease of 10.5 percent from the 2008 with an incidence of 111.6 per 100,000 population. South Dakota ranked 37<sup>th</sup> that year with an incidence of 42.8 per 100,000 population. In 2010, the incidence increased by 34 percent to an incidence of 57.5 per 100,000 population.

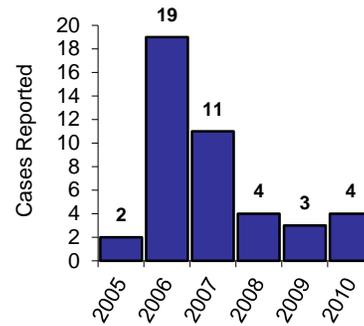
expedited case management, partner referral, and interstate coordination of outbreak investigations. The national rate of Syphilis in 2009 was 14.7 cases per 100,000 population with a five year median of 13.6. The incidence of Syphilis in South Dakota is very low compared to national data.

**Table 70**  
**Syphilis in South Dakota, 2001-2010**

Year	Primary and Secondary	Early Latent	Late Latent	Congenital
2001	1	0	0	0
2002	0	0	0	0
2003	2	3	0	0
2004	0	0	0	0
2005	2	0	0	0
2006	13	6	7	0
2007	7	4	1	0
2008	1	3	0	0
2009	1	2	0	0
2010	4	0	0	0
<b>Total</b>	<b>30</b>	<b>24</b>	<b>16</b>	<b>0</b>

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

**Figure 50**  
**Syphilis in South Dakota 2005-2010**



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

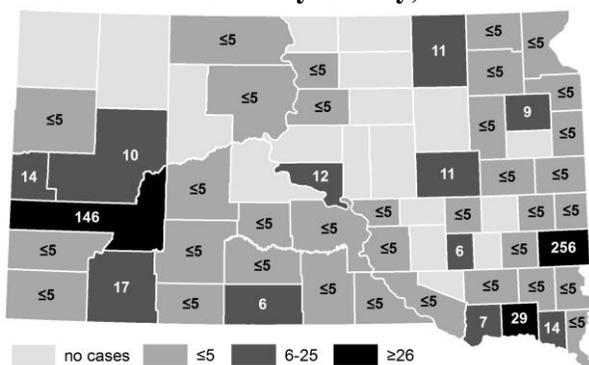
## HIV and AIDS

Acquired immunodeficiency syndrome (AIDS) is caused by an infection of human immunodeficiency virus (HIV). AIDS became a reportable disease in South Dakota in 1985 and HIV infection became reportable in 1988. From 1985 through December 2010, 644 South Dakota residents were reported as infected with HIV to the Department of Health (489 male, 155 female) and 357 of those were also diagnosed with AIDS. Cases have been

reported from 48 of the state's 66 counties (Figure 51, below).

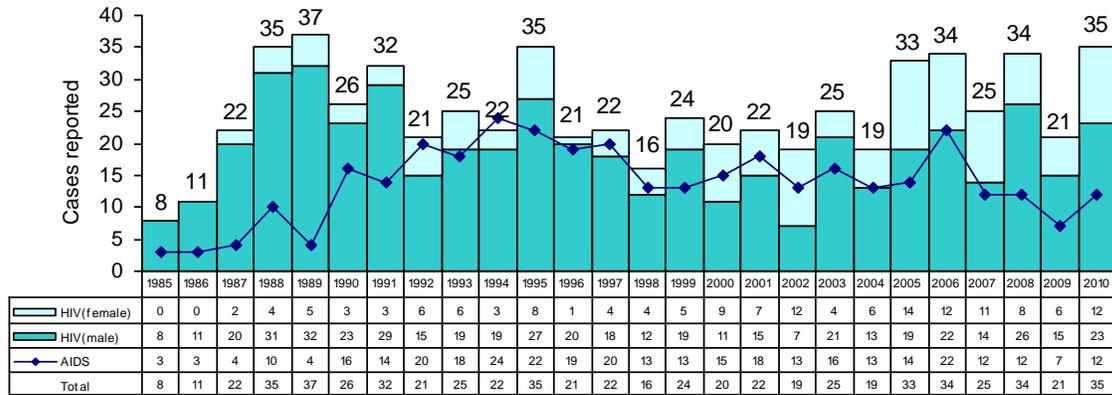
Thirty-five new HIV/AIDS cases were reported in 2010 (Figure 52, next page). Twenty-three of these cases were male and 12 cases were female. There are an estimated 400 people living with HIV/AIDS in South Dakota, 71 percent male and 29 percent female. Blacks and American Indians are disproportionately affected by HIV/AIDS with blacks comprising 24 percent of the living cases and American Indians 15 percent. The DOH coordinates a statewide HIV/AIDS prevention and control program. Counseling and testing sites are located in Aberdeen, Dupree, Pierre, 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 hotline number is 1-800-232-4636.

**Figure 51**  
**South Dakota Residents Reported Infected with HIV/AIDS**  
**Cumulative Cases by County, 1985-2010**



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

**Figure 52**  
**South Dakota Residents Diagnosed by Gender with HIV and AIDS, 1985-2010**



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

## TUBERCULOSIS

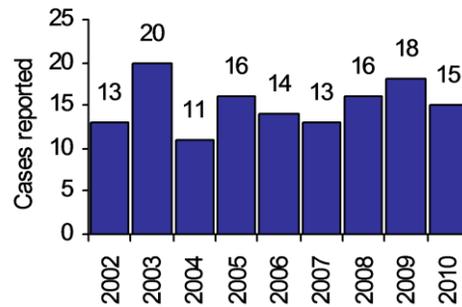
During calendar year 2010, 15 cases of active tuberculosis were reported (Figure 53, on the right) to the DOH.

The overall incidence rate was 1.8 per 100,000; with an incidence of 15.0 for American Indians, 0.3 for whites, 24.6 for blacks and 0 for Asians. Of the cases reported in 2010, 8 were female (53%), 7 were male (47%). Thirteen percent of cases were foreign-born. The DOH's goal is the elimination of tuberculosis transmission in South Dakota. The Healthy People 2015 target is 1.0 new case of tuberculosis per 100,000 per year.

There were four cases of tuberculosis in children less than 15 years old reported in South Dakota in 2010. 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 was one drug resistant tuberculosis case reported in 2010 which

**Figure 53**  
**Tuberculosis in South Dakota, 2002 – 2010**

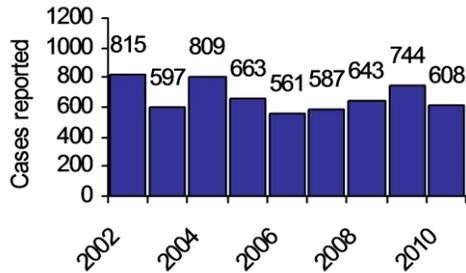


Source: South Dakota Department of Health, Office of Disease Prevention

was resistant to isoniazid and streptomycin.

In 2010, there were 608 reports of positive skin tests for tuberculosis infection (Figure 54, next page). Since no data is collected on negative tests, it is not known how many people were skin tested overall. A positive skin test indicates that the person has been exposed to active tuberculosis and an evaluation must follow.

**Figure 54**  
**Latent Tuberculosis Infection (Positive Skin Tests) in South Dakota, 2002-2010**



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

The DOH has an aggressive tuberculosis control strategy that includes contact investigations and oversight of patient treatment adherence. The elimination of 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

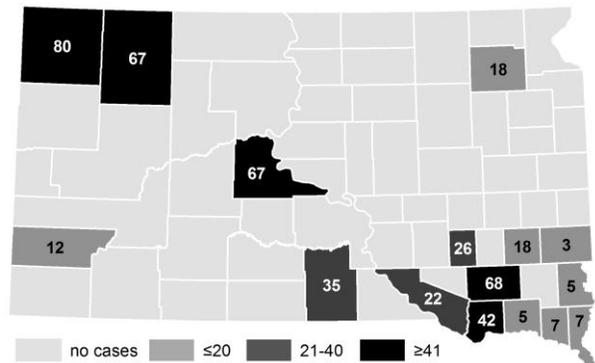
### Escherichia coli, shiga toxin-producing

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

*Escherichia coli* O157:H7 infection has been legally reportable since 1996 and all shiga-toxin-producing *E. coli* have been reportable since 2005. During 2010 there were 35 cases of shiga toxin-producing *E. coli* (STEC) reported, representing a 51 percent decrease from 2009 and a 30 percent decrease below the five-year median. This was an incidence rate of 8.7 cases per 100,000 population. Figure 55, on the right, shows STEC incidence rates by county in South Dakota for 2010. Fifty-one percent of the cases were in children less than 15 years of age. There were two 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 24 cases of *E. coli* O157:H7, 2 cases of *E. coli* O103, 2 cases of *E. coli* O145, and also 7 cases of other shiga toxin-producing *E. coli* (unknown serotype) reported.

**Figure 55**  
**STEC Incidence Rates by County, South Dakota, 2010**



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

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. Person-to-person transmission can also occur. Human infection can be prevented by proper slaughtering methods, adequate cooking of meats, proper

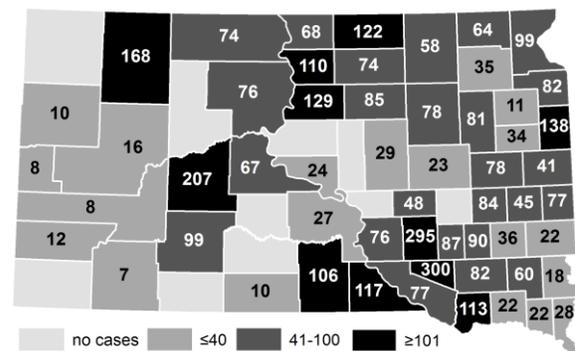
kitchen hygiene, pasteurization of fruit juices and dairy products, and hand-washing after contact with cattle or manure. Individuals with shiga toxin-producing *E. coli* infections are restricted from commercial food handling, child day care, or patient care until two successive negative fecal samples are produced.

### **Campylobacteriosis**

*Campylobacter* is the most commonly reported enteric pathogen in South Dakota since 2000 (Table 66). In 2010, there were 297 cases of campylobacteriosis, which is an incidence of 36.4 cases per 100,000 population. This was a 21 percent increase over the five-year median baseline. Twenty-eight percent of the cases were in adults ages 25-39. Counties with the highest incidence (cases per 100,000 population) included Douglas (300), Aurora (295), Haakon (207), Perkins (168), and Deuel (137), (Figure 56, on the right).

Complications may include convulsions, neonatal septicemia, extraintestinal infection, arthritis, and one in 1,000 campylobacter cases leads to Guillain-Barré syndrome. *Campylobacter* associated deaths are rare.

**Figure 56**  
**Campylobacteriosis Incidence Rates by County, South Dakota, 2010**



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

*Campylobacter* is a 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.

### **Salmonellosis**

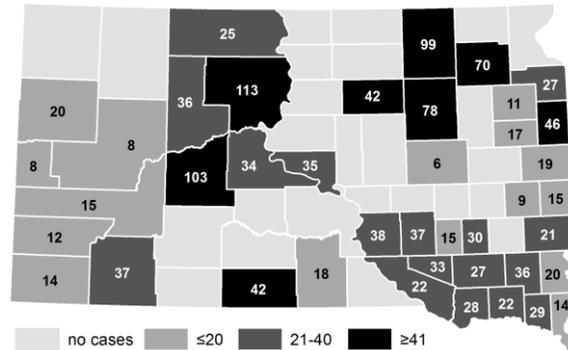
There were 186 culture-confirmed cases of salmonellosis reported in South Dakota in 2010, which was an incidence of 22.8 cases per 100,000 population and showed a 16 percent increase over the five-year median. Twenty-one percent

of the Salmonella cases were reported among children ages five to 14.

There was also one case of Typhoid fever (*Salmonella typhi*) in 2010.

There were two notable Salmonellosis outbreaks in South Dakota in 2010. The first outbreak was in Minnehaha County and was linked to a cancer gala event. There were five confirmed cases and the probable cause was smoked sausage served at the event. The second outbreak was in Brown County with 39 cases including two hospitalizations. The probable cause of this outbreak was raw chicken in a biology class with further spreading to close contacts.

**Figure 57**  
**Salmonellosis Incidence Rates by County, South Dakota, 2010**



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

Counties with the highest incidence (cases per 100,000 population) included Dewey (113), Haakon (103), Brown (99), Spink (78), and Day (70), (Figure 57, on the right).

Table 71, below, shows the most commonly isolated serotypes of *Salmonella* since the year 2000 by year in South Dakota.

*S. typhimurium*, *S. enteritidis*, *S. saintpaul* and *S. newport* were the most commonly isolated serotypes in 2010.

**Table 71**  
**Most Common Salmonella Serotypes, South Dakota, 2000-2010**

Salmonella serotype	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total	Percent
Agona	2	0	0	0	0	0	1	2	3	2	5	15	1%
Braenderup	3	2	0	3	1	6	0	0	2	2	2	21	2%
Enteritidis	9	12	14	15	20	24	17	29	26	22	29	217	13%
Hadar	7	5	0	7	1	1	2	3	2	2	1	31	2%
Heidelberg	11	22	10	3	6	6	5	4	10	6	1	84	5%
Infantis	1	2	1	1	0	9	6	1	3	2	1	27	2%
Litchfield	1	0	2	1	0	3	0	2	1	2	2	14	1%
Montevideo	1	1	4	3	6	5	5	7	6	6	5	49	3%
Muenchen	2	1	3	2	5	2	3	8	3	3	2	34	2%
Muenster	2	1	2	0	0	0	0	1	0	0	0	6	0%
Newport	5	6	11	9	9	10	11	23	9	19	14	126	8%
Oranienburg	0	1	1	2	5	5	2	2	3	2	1	24	1%
Paratyphi A	1	0	0	0	0	0	0	0	0	0	0	1	0%
Paratyphi B	1	4	0	5	3	3	3	2	1	1	0	23	1%
Poona	0	0	0	0	1	1	0	0	2	1	0	5	0%
Saint Paul	1	1	1	5	1	0	3	1	3	38	13	67	4%
Thompson	1	2	2	0	1	2	2	1	1	3	1	16	1%
Typhimurium	33	48	36	50	61	49	45	41	35	44	44	486	29%
Other serotypes	19	42	34	25	36	34	30	47	42	43	65	417	25%
Total	100	151	121	131	156	160	135	174	152	198	186	1664	100%

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

**Shigellosis**

In 2010 there were seven cases of shigellosis reported which represents a 94 percent decrease below the five-year median. This was an incidence rate of 0.9 cases per 100,000 population. Table 72, on the right, shows the most common shigellosis serotypes in the last 10 years in South Dakota.

*Shigella sonnei* has been the most common species isolated since 2000 while *S. flexneri* has been the second most common (Table 72). Shigellosis is an intestinal infection causing diarrhea, fever, nausea, vomiting, and abdominal cramps. Complications, such as severe dehydration or seizures, may occur, especially among infants.

*Shigella* is transmitted by the fecal-oral route (human feces), with a very small dose sufficient to cause illness. Following exposure, illness usually follows a one to four day incubation period. Transmission is typically person-

to-person within families, child day care centers, and adult residential living situations.

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.

**Table 72**  
**Most Common Shigella Serotypes,**  
**South Dakota, 2000-2010**

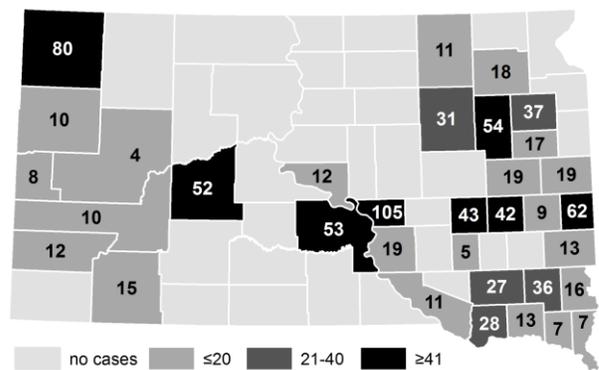
Year	S. flexn	S. sonnei	S. boydii	Species Unk	Total
2000	2	2	0	4	8
2001	6	508	1	201	716
2002	5	113	0	39	157
2003	3	9	0	5	17
2004	0	6	4	2	12
2005	1	70	5	55	131
2006	0	268	1	120	389
2007	0	75	0	47	122
2008	1	36	0	38	76
2009	1	2	0	1	4
2010	3	4	0	0	7
<b>Total</b>	<b>22</b>	<b>1,093</b>	<b>11</b>	<b>512</b>	<b>1,639</b>
<b>Percent</b>	<b>1%</b>	<b>67%</b>	<b>1%</b>	<b>31%</b>	<b>100%</b>

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

**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 2010, 103 cases of giardiasis were reported which is a 13 percent decrease below the five-year baseline. Forty-two percent of the cases were from children less than 15 years of age. Figure 58, on the right, shows giardiasis incidence rates (cases per 100,000 population) by county in South Dakota for 2010.

**Figure 58**  
**Giardiasis Incidence Rates by County, South Dakota, 2010**

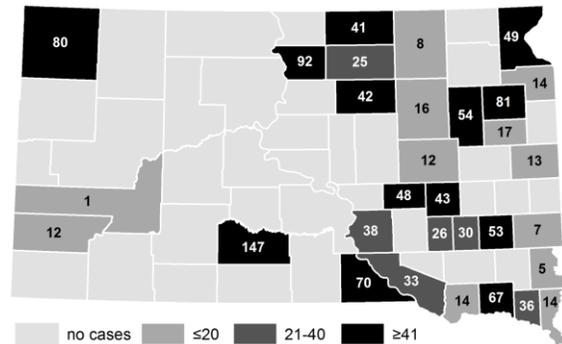


Source: South Dakota Department of Health, Office of Disease Prevention

## Cryptosporidiosis

Cryptosporidiosis is a protozoan diarrheal disease transmitted by cattle and human feces, often waterborne. In 2010 there were 107 cases reported representing a 22 percent increase over the five-year median. Forty-seven percent of the cases were from children less than 15 years of age. Generally, an increase in reported cases has been occurring nationally with outbreaks often traced to outdoor recreational water sources and contaminated swimming pools. Figure 59, on the right, shows cryptosporidiosis incidence rates (cases per 100,000 population) by county in South Dakota for 2010. Counties with the highest incidence rates (cases per 100,000 population) included Mellette (146), Walworth (92),

**Figure 59**  
**Cryptosporidiosis Incidence Rates by**  
**County, South Dakota, 2010**



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

Codington (81), Harding (80), Gregory (70). East River counties accounted for 92 percent of the cases.

## ZOONOTIC DISEASES

### Rabies

Rabies is an enzootic fatal viral disease and a serious public health concern in South Dakota. In 2010, 671 animals were tested for rabies with 32 animals testing positive (Table 73, on the right). This is a 40 percent decrease from the previous year. The 32 rabid animals included 23 wild animals (20 skunks and 3 bats) and 9 domestic animals (5 cattle 3 cats and 1 dog). South Dakota's last human rabies case was in 1970.

In 2010, 639 animals tested negative for rabies, including 199 cats, 138 dogs, 107 bats, 68 cattle, 31 skunks, 28 raccoons, 13 horses, 10 deer, 8 squirrels, 5 sheep, 5 goats, 5 muskrats, 3 gophers, 2 each elk, donkeys, fox, moles, rabbits and rats, and 1 each badger, coyote, ferret, hamster, mouse, pig and woodchuck.

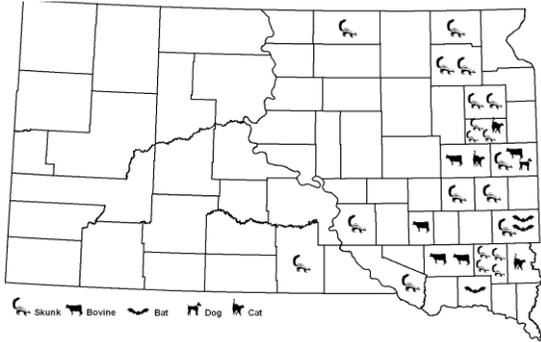
During 2010 rabid animals were detected in 18 South Dakota counties (Figure 60, on the next page). Animals were submitted for testing from all counties except Bennett, Campbell, Lyman, Mellette, Sully and Ziebach.

During the 10-year period (2001-2010) 622 of 8,462 (7%) animals tested were positive for rabies (Figure 61, on the next page). During the decade animals were tested from all counties, except Ziebach, and rabid animals were found in all counties except Bennett, Haakon, Shannon, Todd, and Ziebach. The most animals were submitted for testing from Minnehaha County.

Animal	2010		2001 - 2010	
	Pos	Total tested	Pos	Total tested
Skunk	20	51	396	647
Cattle	5	73	71	909
Bat	3	110	51	1792
Cat	3	202	37	2381
Dog	1	139	36	1615
Horse	0	13	24	250
Goat	0	5	4	25
Raccoon	0	28	1	351
Fox	0	2	1	32
Woodchuck	0	1	1	17
Deer, elk, donkey, llama	0	14	0	86
Squirrel, chipmunk	0	8	0	80
Rodents, other*	0	7	0	71
Sheep	0	5	0	51
Muskrat	0	5	0	35
Opossum	0	0	0	29
Coyote, wolf	0	1	0	26
Weasel, ferret, mink	0	1	0	25
Rabbit, hare	0	2	0	13
Pig	0	1	0	6
Badger	0	1	0	4
Bison	0	0	0	4
Shrew, mole	0	2	0	4
Mountain lion	0	0	0	3
Bobcat, bear	0	0	0	1
Other animals	0	0	0	5
<b>TOTAL</b>	<b>32</b>	<b>671</b>	<b>622</b>	<b>8462</b>
*Rodents: rat, mouse, prairie dog, gopher, ground squirrel, hamster, beaver, porcupine, vole				

In the 10 years since 2001, 28 percent of rabies cases in South Dakota have been domestic animals. There were 37 rabid cats and 36 rabid dogs many of which were unvaccinated strays or barn cats. Rabid livestock since 2010 included 71 cattle, 24 horses and 4 goats.

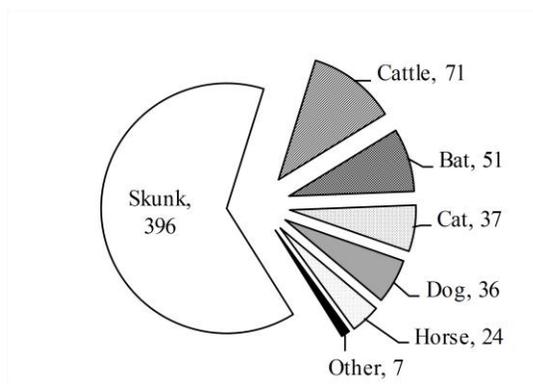
**Figure 60**  
**Animal Rabies in South Dakota, 2010**



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

Although rabies is not enzootic in other wild animals in South Dakota, during the past 10 years rabies has been detected in 1 fox, 1 raccoon, and 1 woodchuck. These other wild animals are likely spillover rabies following exposure to rabid skunks. Although raccoon rabies is common in eastern United States, rabid raccoons are rare in South Dakota. Since 1990, 998 raccoons have been tested for rabies in South Dakota and 3 of these were positive (0.3%).

**Figure 61**  
**Rabid Animals in South Dakota, 2001-2010**



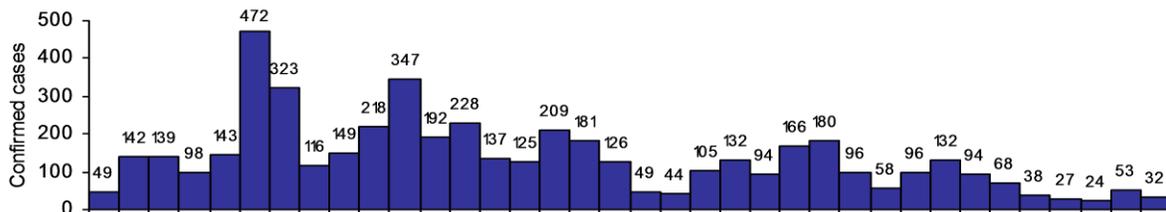
Source: South Dakota Department of Health, Office of Disease Prevention

During the past 50 years animal rabies has been reported every year in South Dakota (Figure 62, below). The most cases were reported in 1980 with 472 rabid animals and the fewest were reported in 2008 with 24 rabid animals.

Nationally from 2000 through 2009, there were 31 human rabies cases, including 29 deaths and 2 survivals. Twenty-two of the human cases (71%) were associated with bat-rabies virus, 7 (23%) had dog rabies virus (all foreign imports) and 1 each raccoon and fox exposure. These 27 human rabies cases were from Arkansas, California (7), Florida, Georgia, Indiana (2), Iowa, Michigan, Minnesota (2), Mississippi, Missouri, New York, Oklahoma, Puerto Rico, Tennessee, Texas (5), Virginia (2) and Wisconsin (2).

Skunks (*Mephitis mephitis*) are the enzootic rabies reservoir in South Dakota. Since 2001, 61 percent of tested skunks have been rabid. Bat rabies is also enzootic in South Dakota with 51 of 1,741 (3%) bats testing positive over the past 10 years.

**Figure 62**  
**Animal Rabies in South Dakota, 1975-2010**



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

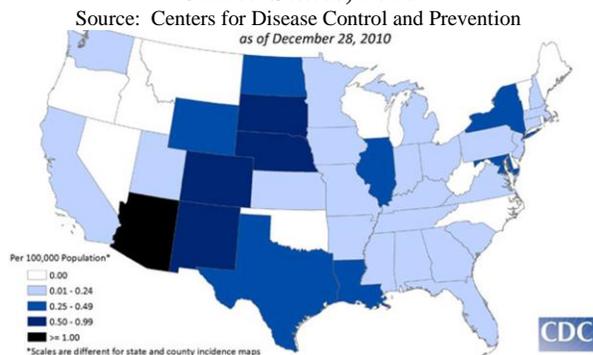
## West Nile Virus

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.

2010 was the 12th year of WNV transmission in North America and the 9th 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 2010 there were 981 human WNV cases reported, of these 601 were neuroinvasive, (Figure 63, below), and 380 were nonneuroinvasive. Forty-five deaths were reported with 117 presumptive viremic donors, although South Dakota did not have either of these instances.

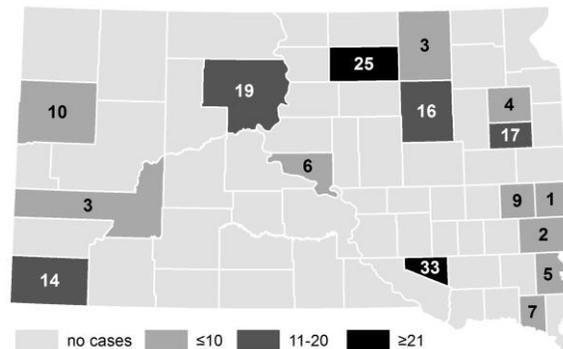
**Figure 63**  
**West Nile Virus Neuroinvasive Disease Incidence, Reported to ArboNET, by State, United States, 2010**



In South Dakota, there were 20 human cases of WNV disease and no deaths reported in 2010. Of these cases, four were diagnosed with neuro-invasive disease (NID 20%) and 16 had West Nile fever (80%), a milder form of the disease. By contrast, in 2003 there were 1,039 human WNV cases, including 170 cases of NID (16%) and 869 cases of WN fever (84%) in South Dakota.

Of these cases, 19 were reported with acute flaccid paralysis and 14 died of WNV-associated illness.

**Figure 64**  
**Human West Nile Disease Incidence Rates by County, South Dakota, 2010**



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

The overall incidence of West Nile disease in 2010 was 2.4 cases per 100,000 population which is down 82 percent from the five year median. Figure 64, above, shows the incidence by county. The overall statewide incidence of WNV NID was 0.5 cases per 100,000. The screening of donated blood has enhanced the safety of the blood supply and prevented many cases of WNV disease.

During the summer West Nile 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. In 2010 one case of Dengue Fever was reported which is another arbovirus and was acquired out of the country. Dengue is only transmitted by mosquitoes and cannot be transmitted person-to-person. Usual symptoms of Dengue include fever, rash and headache.

**Tularemia**

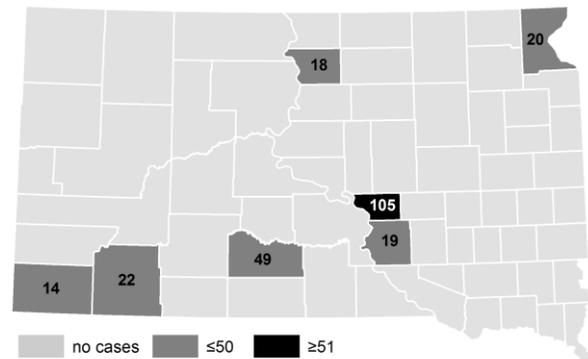
In 2010 there were 11 cases of Tularemia in South Dakota. This is an incidence rate of 1.4 for every 100,000 population. Figure 65, on the right, shows the incidence rates of Tularemia by county in South Dakota.

Tularemia is a bacterial disease caused by *Francisella tularensis* and is typically found in rodents but can infect insects as well. Infection can occur from an insect bite, handling sick or dead animals, eating contaminated food or inhaling airborne organisms.

Depending on how a person is infected symptoms can range from skin ulcers, inflamed eyes, sore throat and diarrhea to

fever, chills, headache and muscle aches. If left untreated Tularemia may lead to death.

**Figure 65  
Tularemia Incidence Rates by County, South Dakota, 2010**



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

**Lyme Disease**

In 2010 there was one case of lyme disease which is an incidence rate of 0.3 per 100,000 population.

Lyme disease is caused by the bacteria *Borrelia burgdorferi* and is transmitted to humans through the bite of an infected tick.

## OTHER INFECTIOUS DISEASES

There were 44 cases of invasive Group A *Streptococcus*, 37 cases of invasive Group B *Streptococcus*, nine cases of *Streptococcus pneumoniae* in children less than five years of age, and 10 cases of invasive drug resistant *Streptococcus pneumoniae* in 2010. There were 98 cases of invasive Methicillin Resistant *Staphylococcus aureus* (MRSA) and 62 cases of chicken pox. Additionally, nine

cases of Legionellosis were reported, four cases of Q Fever, three cases of each Listeriosis and Malaria, two cases of each acute Hepatitis B, Hemolytic Uremic Syndrome, and Mumps and one case of each Hepatitis A, Typhoid Fever, and Dengue Fever in 2010.

