

Infectious Diseases in South Dakota, 2016

The South Dakota Department of Health (SDDOH) strives to promote healthy living and to protect the health of all South Dakotans. A core public health function is the surveillance of infectious diseases in the state.

Infectious disease surveillance monitors patterns of disease occurrence and assesses the health status of South Dakota's population. Surveillance can detect sudden changes in disease occurrence, such as an outbreak, or identify long-term disease trends or new and emerging diseases. Surveillance activities are linked to public health actions, such as investigation, control and prevention, evaluation, or planning and allocating resources to address the diseases affecting the population.

SDDOH 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.

This report provides an overview of disease surveillance conducted by SDDOH in 2016. It highlights important statistics and shows key trends on selected reportable diseases in the state.

Table 1. Reportable Diseases in South Dakota, 2007-2016 (Calendar years)

Reportable diseases	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Babesiosis	0	0	0	0	0	0	1	1	0	0	2
Botulism	0	0	0	0	0	0	0	0	0	0	0
Brucellosis	0	0	0	0	0	0	1	0	0	0	1
Campylobacteriosis	231	262	300	297	301	276	296	307	346	450	3066
Carbapenem-resistant Enterobacteriaceae (CRE)	NR	NR	NR	NR	NR	NR	12	3	37	58	110
Chicken Pox (Varicella)	82	55	53	62	67	32	43	23	27	32	476
Chlamydia	2612	2919	3015	3187	3412	3925	3947	4129	3967	4336	35449
Coccidioidomycosis	NR	5	5								
Cryptosporidiosis	169	88	137	108	143	113	175	151	248	158	1490
Cyclosporiasis	0	1	0	0	0	0	1	0	0	3	5
Ehrlichiosis and Anaplasmosis	0	1	0	0	4	1	1	0	0	1	8
Giardiasis	103	137	113	102	110	144	111	131	129	116	1196
Gonorrhea	254	382	345	467	602	707	789	880	1055	1271	6752
Hantavirus pulmonary syndrome	1	0	0	0	1	1	0	0	0	0	3
Hepatitis A	7	3	3	1	2	0	4	3	2	1	26
Hepatitis B, chronic	36	48	33	51	51	51	80	58	52	60	520
Hepatitis B, acute	6	0	4	2	2	2	5	3	2	2	28
Hepatitis C, chronic	309	364	384	350	356	392	406	516	570	714	4361
Hepatitis C, acute	0	0	1	0	0	4	1	0	0	22	28
Haemophilus influenzae type b	0	0	0	0	1	0	3	0	1	1	6
Hemolytic uremic syndrome	1	3	3	2	0	0	0	1	1	1	12
HIV and AIDS	25	34	21	35	21	29	36	31	25	47	304
Legionellosis	4	3	2	9	2	9	8	9	10	9	65
Leprosy	0	1	0	0	0	0	0	0	0	0	1
Listeriosis	2	1	1	3	1	0	0	0	0	0	8
Lyme disease	0	3	1	1	4	4	4	2	5	11	35

Reportable diseases	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Malaria	1	0	1	3	2	5	7	5	4	4	32
Measles	0	0	0	0	0	0	0	8	2	0	10
Meningococcal disease	3	3	5	0	3	0	4	2	1	1	22
Mumps	6	1	2	2	0	0	0	0	0	2	13
Pertussis	59	67	56	32	37	71	67	109	16	15	529
Q fever	1	1	9	4	1	2	4	5	5	4	36
Rabies, animal	27	24	53	32	40	60	28	21	29	27	341
Rocky Mountain spotted fever	5	3	0	0	1	1	7	3	2	6	28
Salmonellosis	173	154	197	186	162	170	183	164	230	305	1924
Shiga toxin-producing E. coli	47	53	71	35	41	48	42	41	62	84	524
Shigellosis	118	76	4	7	6	11	190	616	285	28	1341
Methicillin-resistant <i>Staph aureus</i> (MRSA), invasive	88	77	94	98	91	89	94	124	159	144	1058
Strep. pneumoniae, invasive	NR	NR	NR	NR	42	97	99	88	110	129	565
Syphilis (primary, secondary and early latent)	11	4	2	4	0	21	49	76	48	41	256
Syphilis, congenital	0	0	0	0	0	0	0	3	0	2	5
Toxic shock syndrome	0	1	0	0	0	0	0	0	3	1	5
Tularemia	7	10	5	11	8	5	7	5	25	14	97
Tuberculosis	13	16	18	15	15	19	9	8	17	12	142
Typhoid fever	0	2	2	1	0	0	3	0	1	2	11
West Nile fever	160	28	15	16	2	141	92	45	29	117	645
West Nile neuroinvasive	48	11	6	4	0	62	57	12	11	35	246
Vibriosis	NR	5	5								

*NR= not reportable

Source: South Dakota Department of Health, Office of Disease Prevention, Maven report by calendar year. Minor variances from past reports reflect differences between MMWR year and calendar year, cross-year deduplication and recategorization.

Table 2. Reportable diseases by county of residence, South Dakota, 2016 (Calendar years)

County of residence	Campylobacteriosis	Chlamydia	Cryptosporidiosis	Giardiasis	Gonorrhea	Hepatitis B, chronic	Hepatitis C, chronic	Legionellosis	MRSA, invasive	Pertussis	Salmonella	Shigellosis	Strep. Pneumo. invasive	Shiga Toxin-Prod E. coli	Tularemia	Varicella (Chicken pox)	West Nile disease
TOTAL	450	4,336	158	116	1,271	60	714	9	144	15	305	28	129	84	14	32	152
Incidence*	52.0	501.0	18.3	13.4	146.9	6.9	82.5	1.0	16.6	1.7	35.2	3.2	14.9	9.7	1.6	3.7	17.6
Aurora	4	≤2	≤2	0	≤2	0	≤2	0	0	0	≤2	0	0	0	0	0	3
Beadle	6	54	3	3	11	7	7	0	0	0	6	0	0	3	0	≤2	7
Bennett	3	38	0	≤2	17	0	3	0	≤2	0	0	0	0	0	0	0	≤2
BonHomme	10	16	4	0	0	0	13	0	0	0	≤2	0	0	4	0	0	3
Brookings	15	146	9	7	9	3	11	0	≤2	≤2	5	0	≤2	≤2	0	≤2	6
Brown	20	178	6	3	22	11	14	0	≤2	0	9	≤2	5	11	0	≤2	16
Brule	9	11	0	≤2	≤2	0	3	0	≤2	0	4	0	≤2	0	0	0	≤2
Buffalo	≤2	30	3	0	12	≤2	11	0	≤2	0	3	0	4	0	0	0	0
Butte	8	54	0	≤2	7	0	5	≤2	≤2	0	0	0	4	≤2	0	≤2	≤2
Campbell	0	0	0	0	0	0	0	0	0	0	0	0	0	≤2	0	0	≤2
CharlesMix	14	83	7	≤2	38	≤2	15	0	≤2	0	81	≤2	6	≤2	0	≤2	8
Clark	7	6	≤2	0	0	0	0	0	0	0	≤2	0	0	≤2	0	0	4
Clay	13	59	6	5	13	0	4	0	0	0	≤2	≤2	≤2	≤2	0	0	≤2
Codington	9	99	4	5	4	0	13	0	≤2	≤2	3	≤2	0	0	0	0	4
Corson	≤2	77	0	4	13	0	23	0	≤2	0	0	0	0	≤2	0	0	0
Custer	≤2	14	≤2	0	3	0	13	0	0	0	5	0	≤2	≤2	0	0	0
Davison	17	78	3	4	18	0	9	0	5	0	13	0	≤2	≤2	0	0	3
Day	3	20	≤2	≤2	7	0	≤2	0	3	0	3	0	≤2	≤2	0	0	≤2

County of residence	Campylobacteriosis	Chlamydia	Cryptosporidiosis	Giardiasis	Gonorrhea	Hepatitis B, chronic	Hepatitis C, chronic	Legionellosis	MRSA, invasive	Pertussis	Salmonella	Shigellosis	Strep. Pneumo, invasive	Shiga Toxin-Prod E. coli	Tularemia	Varicella (Chicken pox)	West Nile disease
Deuel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dewey	10	148	0	0	64	0	18	0	5	0	7	0	0	0	0	0	0
Douglas	13	≤2	≤2	0	≤2	0	0	0	≤2	0	≤2	0	≤2	3	0	0	3
Edmunds	9	4	≤2	0	≤2	0	≤2	0	≤2	0	≤2	0	≤2	≤2	0	0	≤2
Fall River	≤2	23	0	7	3	0	6	0	≤2	0	≤2	0	0	≤2	0	0	0
Faulk	≤2	≤2	0	0	≤2	0	0	0	0	0	≤2	0	≤2	0	0	0	≤2
Grant	≤2	11	≤2	0	0	0	≤2	0	≤2	≤2	≤2	0	0	≤2	0	0	≤2
Gregory	10	9	3	≤2	0	0	≤2	0	≤2	0	9	≤2	≤2	0	0	0	0
Haakon	≤2	3	0	0	≤2	0	≤2	0	0	0	0	0	0	0	0	0	0
Hamlin	6	10	≤2	≤2	0	0	4	0	0	0	≤2	0	≤2	0	0	0	4
Hand	0	3	4	0	0	0	≤2	0	0	0	≤2	0	0	≤2	0	0	0
Hanson	≤2	6	≤2	0	0	0	0	0	0	0	≤2	0	0	0	0	0	≤2
Harding	0	≤2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hughes	7	82	0	4	20	0	35	0	8	0	≤2	≤2	3	0	0	0	≤2
Hutchinson	6	13	≤2	0	≤2	0	0	0	≤2	0	≤2	0	≤2	≤2	0	0	5
Hyde	0	≤2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jackson	0	28	≤2	0	6	0	0	0	0	0	0	0	0	0	0	0	0
Jerauld	≤2	0	0	0	0	0	4	0	0	0	0	0	≤2	0	≤2	0	≤2
Jones	3	≤2	≤2	4	0	0	0	0	0	0	0	0	0	0	0	0	0
Kingsbury	7	8	0	0	≤2	0	0	0	0	0	≤2	0	≤2	0	≤2	0	≤2
Lake	9	18	0	0	≤2	0	4	≤2	≤2	0	≤2	0	0	4	0	0	4
Lawrence	7	117	≤2	3	7	≤2	16	0	3	0	3	≤2	≤2	≤2	≤2	5	≤2
Lincoln	20	113	7	5	14	0	15	≤2	≤2	≤2	13	4	7	≤2	0	0	10
Lyman	7	39	0	≤2	25	0	15	0	≤2	0	5	0	3	0	0	0	0
Marshall	4	7	≤2	0	3	0	0	0	≤2	0	3	0	0	≤2	0	0	3
McCook	≤2	9	≤2	0	4	0	≤2	0	≤2	0	4	0	0	≤2	0	0	3
McPherson	6	≤2	≤2	0	0	0	≤2	0	0	0	0	0	0	≤2	0	0	≤2
Meade	6	96	0	≤2	12	0	11	≤2	5	0	5	0	6	5	0	≤2	0
Mellette	≤2	22	0	0	10	0	≤2	0	≤2	0	0	0	≤2	0	0	0	0
Miner	≤2	3	≤2	0	0	0	≤2	0	≤2	0	≤2	0	≤2	≤2	0	0	0
Minnehaha	53	1089	21	19	357	30	226	3	27	5	33	10	27	14	≤2	5	20
Moody	3	13	6	≤2	3	≤2	4	0	3	0	≤2	0	0	0	0	≤2	0
OglalaLakota	≤2	346	≤2	≤2	118	0	26	0	10	0	3	0	10	0	≤2	0	0
Pennington	22	629	4	18	284	3	101	0	23	4	19	≤2	19	≤2	≤2	≤2	≤2
Perkins	≤2	≤2	0	0	0	0	≤2	0	0	0	≤2	0	0	0	0	0	0
Potter	0	≤2	≤2	≤2	≤2	0	≤2	0	≤2	0	≤2	0	0	0	0	0	3
Roberts	9	119	≤2	≤2	13	0	9	0	7	0	≤2	0	≤2	0	0	0	0
Sanborn	≤2	≤2	4	≤2	0	0	0	0	≤2	0	≤2	0	0	≤2	0	0	≤2
Spink	10	7	3	0	0	0	≤2	0	0	≤2	≤2	0	0	≤2	0	0	9
Stanley	3	11	0	≤2	0	0	≤2	0	0	0	0	0	0	0	0	0	0
Sully	≤2	0	0	0	≤2	0	0	0	0	0	≤2	0	0	0	0	0	0
Todd	≤2	201	≤2	≤2	108	0	23	0	6	0	8	0	≤2	≤2	6	0	≤2
Tripp	9	10	≤2	0	0	0	3	0	0	0	5	≤2	0	0	0	≤2	0
Turner	5	13	≤2	0	0	0	0	≤2	4	0	4	0	3	0	0	≤2	3
Union	6	22	3	≤2	6	0	5	0	≤2	≤2	3	0	≤2	≤2	0	≤2	≤2
Walworth	4	21	≤2	0	≤2	0	5	0	0	0	≤2	0	≤2	≤2	0	0	≤2
Yankton	23	76	22	3	5	≤2	15	0	4	0	10	0	≤2	≤2	0	0	≤2
Ziebach	0	26	0	0	18	0	≤2	0	≤2	0	≤2	0	≤2	0	0	0	0

*Incidence: cases per 100,000 population.
Individual county events of 1 or 2 are published as ≤2.

Table 3. Reportable diseases by gender, race and age, South Dakota, 2016 (Calendar years)

	Campylobacteriosis	Chlamydia	CRE	Cryptosporidiosis	Giardiasis	Gonorrhea	Hepatitis B, chronic	Hepatitis C, chronic	HIV and AIDS	MRSA, invasive	Pertussis	Salmonellosis	Shiga Toxin Producing E. coli	Shigellosis	Strep. pneumo. invasive	Syphilis (P, S, EL)	Tuberculosis	Tularemia	Varicella (Chicken pox)	West Nile Disease	
Total	450	4336	58	158	116	1271	60	714	47	144	15	305	84	28	129	41	12	14	32	152	
Incidence*	52.0	501.0	6.7	18.3	13.4	146.9	6.9	82.5	5.4	16.6	1.7	35.2	9.7	3.2	14.9	4.7	1.4	1.6	3.7	17.6	
Gender																					
Female	177	3077	34	83	61	758	21	309	12	54	10	168	47	12	60	8	4	5	14	64	
Male	273	1259	24	75	55	513	39	405	35	90	5	137	37	16	69	33	8	9	18	88	
Race																					
White	394	1766	43	145	85	327	12	375	19	96	14	169	74	21	77	24	≤2	5	23	146	
Am.Indian	32	1757	13	7	15	765	≤2	257	5	44	0	125	5	≤2	37	7	4	8	3	4	
Black	5	236	≤2	≤2	4	138	26	19	16	0	0	≤2	≤2	3	3	6	5	0	3	0	
Asian	≤2	24	0	0	3	6	14	≤2	≤2	0	0	≤2	0	0	0	≤2	≤2	0	0	0	
Other	10	105	0	≤2	8	12	5	16	6	≤2	0	5	≤2	≤2	6	3	0	≤2	≤2	0	
Unknown	8	448	0	4	≤2	23	≤2	45	0	0	≤2	3	≤2	0	6	0	0	0	≤2	≤2	
Age group																					
<1 yr	6	≤2	≤2	≤2	4	0	0	0	≤2	≤2	≤2	7	4	≤2	5	0	0	0	3	0	
1-4 yrs	62	0	0	33	29	0	0	0	0	3	≤2	19	18	4	6	0	0	3	13	0	
5-14 yrs	39	26	≤2	26	14	5	≤2	0	≤2	3	6	34	14	≤2	4	0	0	3	11	5	
15-24 yrs	67	2794	0	26	3	577	7	63	4	≤2	≤2	45	14	3	≤2	14	≤2	0	≤2	14	
25-39 yrs	109	1357	≤2	31	22	603	25	258	19	14	0	71	13	7	16	17	4	≤2	≤2	24	
40-64 yrs	114	153	18	30	38	84	21	357	21	51	3	93	12	≤2	57	10	6	6	≤2	85	
≥65 yrs	53	4	35	10	6	≤2	5	36	≤2	71	3	36	9	8	39	0	≤2	0	0	24	

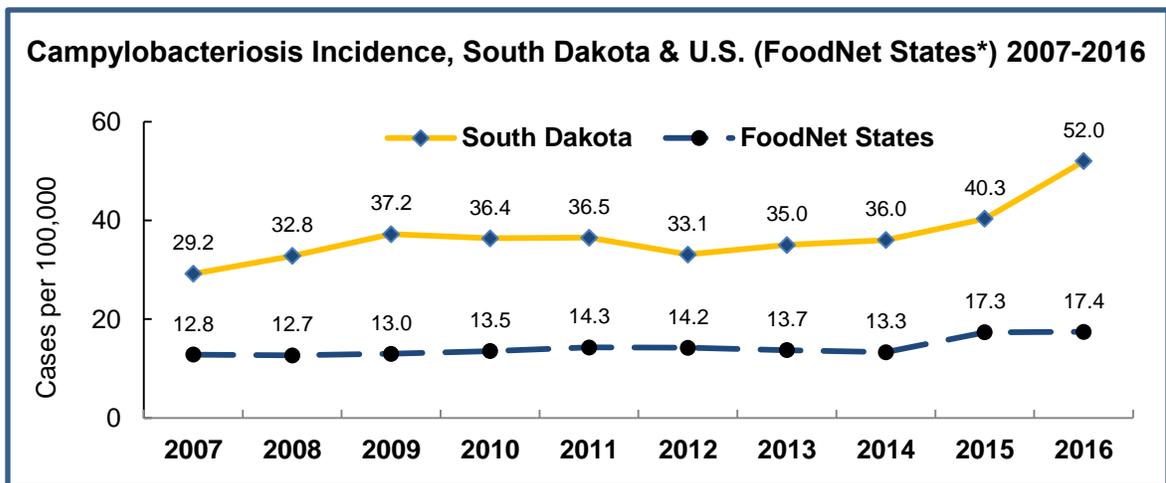
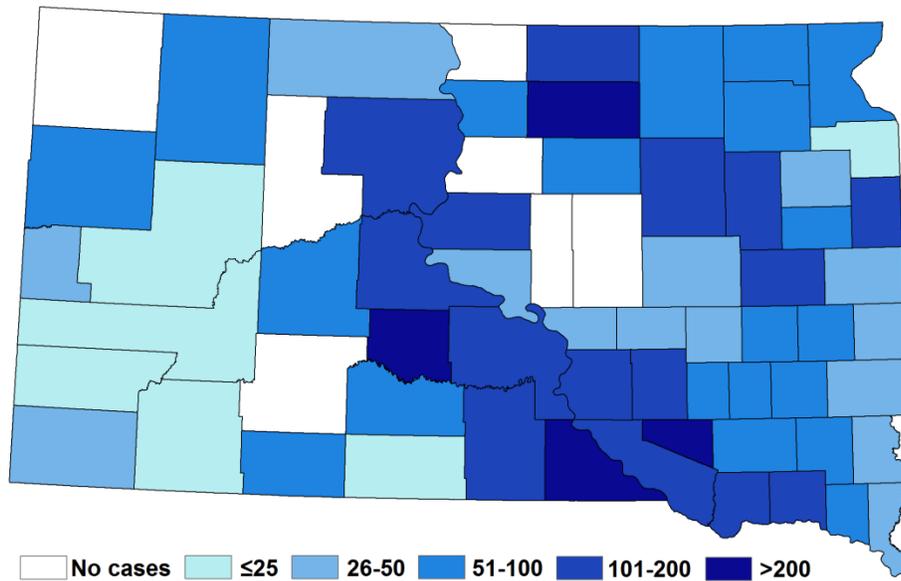
Individual events of 1 or 2 are published as ≤2.

Campylobacteriosis

Campylobacter is a bacterium 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% of patients. Complications may include convulsions, neonatal septicemia, extra-intestinal infection, arthritis, and one in 1,000 campylobacteriosis cases leads to Guillain-Barré syndrome. *Campylobacter*-associated deaths are rare.

Campylobacteriosis has been the most commonly reported enteric bacterial pathogen in South Dakota since 2001. In 2016, there were 450 cases of *Campylobacter* infection, which was the most ever reported in one year. Counties with the highest incidence (cases per 100,000 population) included Sully (1,618), Corson (1,283), Faulk (935), and Potter (740). Children in the 1-4 year age group had the highest rate of disease. South Dakota's campylobacteriosis rate ranks high nationally, usually double the FoodNet states.

Incidence of Campylobacteriosis by County of Residence: South Dakota, 2016
(cases per 100,000)



*FoodNet states include CA, CO, CT, GA, MD, MN, NM, NY, OR, and TN.

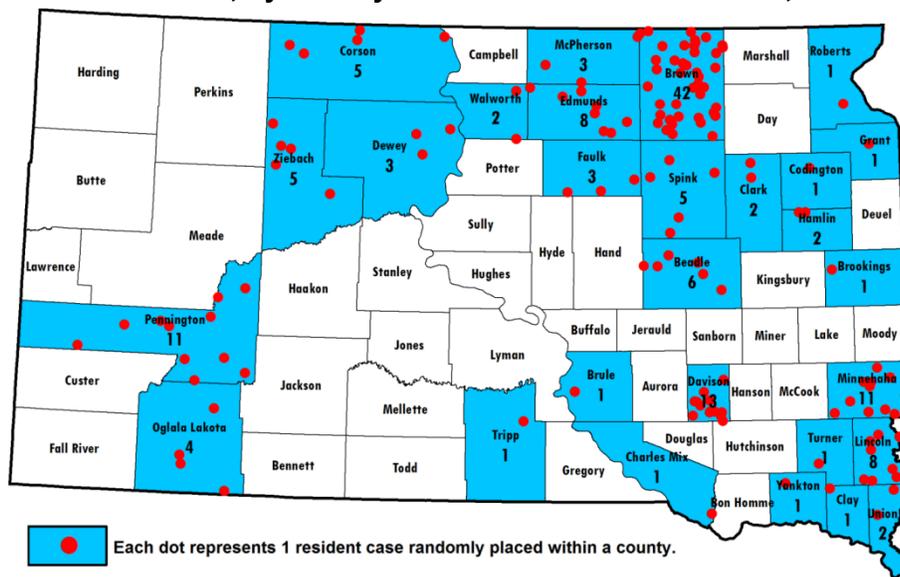
Carbapenem-resistant *Enterobacteriaceae* (CRE)

Carbapenem-resistant *Enterobacteriaceae* (CRE) are a family of bacteria that are difficult to treat because they are highly resistant to antibiotics. CRE are an important emerging threat to public health. Common *Enterobacteriaceae* include *Klebsiella* species, *Enterobacter* species, and *Escherichia coli*. These bacteria are typically found in the human gastrointestinal tract. However, they can spread outside the gut and cause serious infections, such as urinary tract infections, bloodstream infections, wound infections and pneumonia. *Enterobacteriaceae* can cause infections in people in both healthcare and community settings.

Carbapenems are a group of antibiotics that are usually reserved to treat serious infections, particularly when these infections are caused by bacteria that are highly resistant to other antibiotics. Sometimes carbapenems are considered antibiotics of last resort for some infections. Some *Enterobacteriaceae* can no longer be treated with carbapenems because they have developed resistance to these antibiotics (i.e., CRE), making antibiotics ineffective in killing the resistant organism.

In South Dakota, 58 cases of CRE were reported in 2016. The statewide incidence was 6.7 cases per 100,000 population.

Cumulative Cases of CRE, by County of Residence: South Dakota, 2013-2016 (n=145)

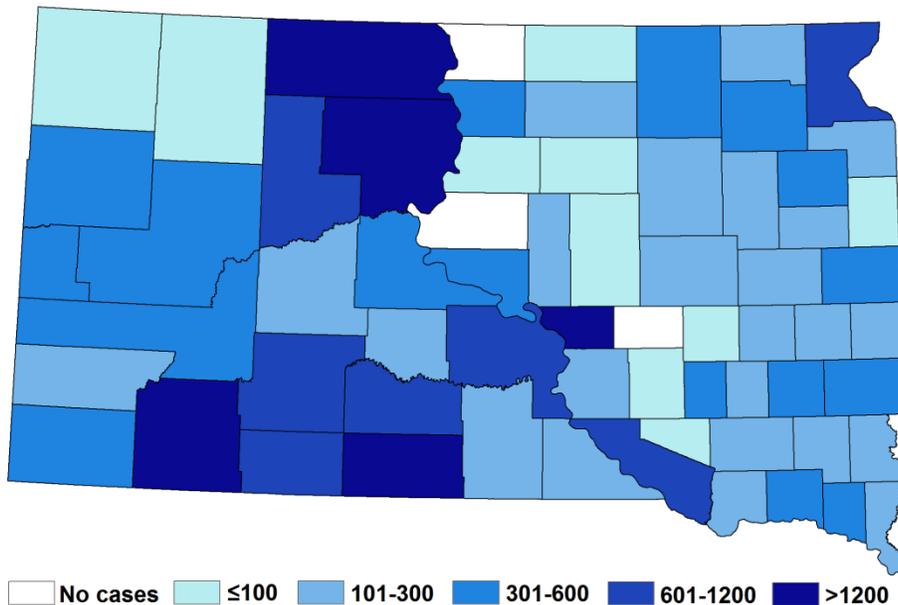


Chlamydia

Chlamydia is a common STD caused by the bacterium *Chlamydia trachomatis* that can infect both men and women. Chlamydia transmission occurs during contact with mucus membrane secretions of infected individuals – almost always during sexual activity. Neonatal transmission occurs when an infant is born to an infected mother, and may then cause pneumonia or conjunctivitis in the newborn. Most female infections are asymptomatic or mild, but can cause mucus-pus discharges, pelvic inflammatory disease, infertility and ectopic pregnancy. Men experience urethral discharge, epididymal pain and sexually reactive arthritis.

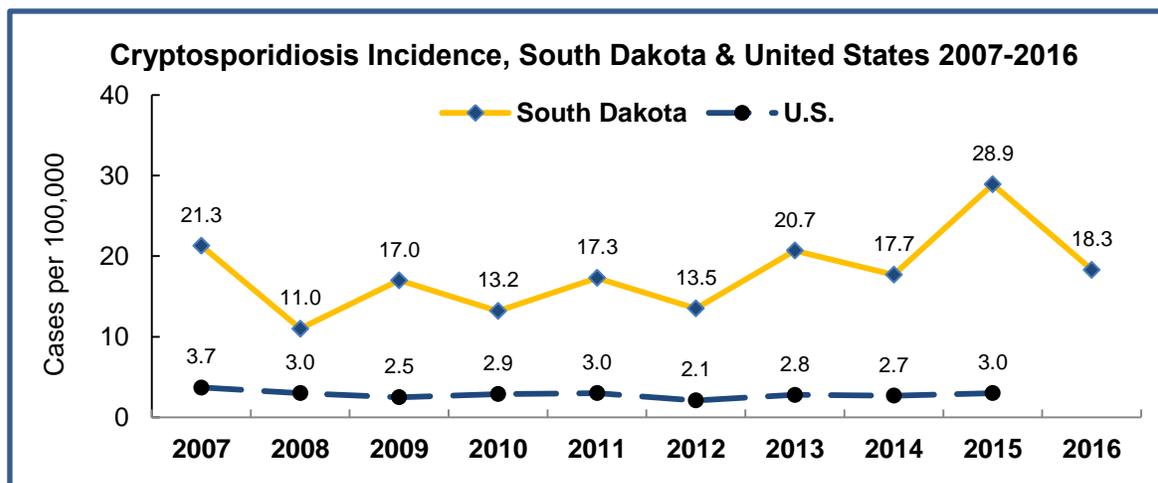
The number of chlamydia cases has been increasing over the past decade in South Dakota. In calendar year 2016, there were 4,336 cases reported. Youth in 15-24 year age group had the highest rate.

Incidence of Chlamydia by County of Residence: South Dakota, 2016
(cases per 100,000)

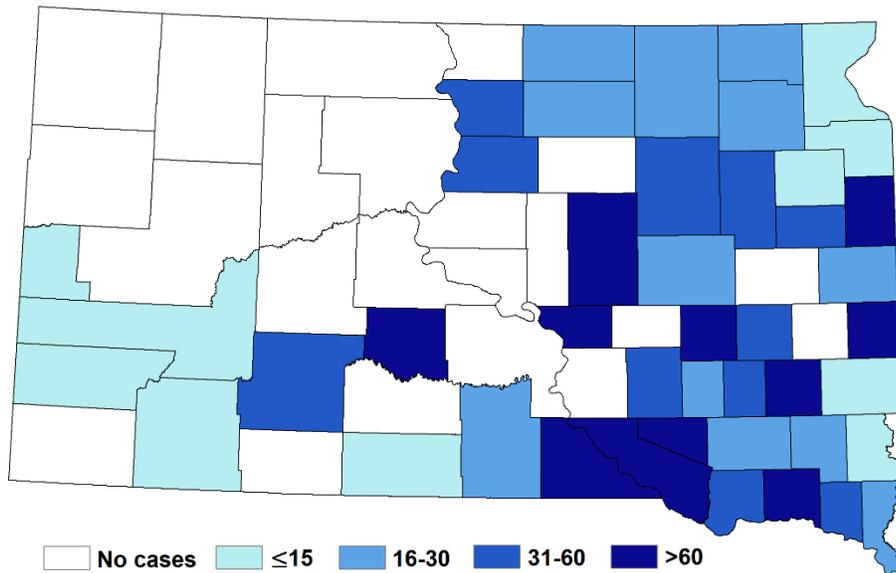


Cryptosporidiosis

Cryptosporidiosis is a diarrheal disease caused by a chlorine-tolerant protozoan parasite transmitted by cattle or human feces through contaminated food or water or by direct person-to-person or animal-to-person contact. In 2016, there were 158 cases (18.3 per 100,000 population) reported in South Dakota. Children in the 1-4 year age group had the highest rate of disease, accounting for 21% of cases. South Dakota's cryptosporidiosis rate has been consistently higher than the national rate over the past decade.



Incidence of Cryptosporidiosis by County of Residence: South Dakota, 2016
(cases per 100,000)



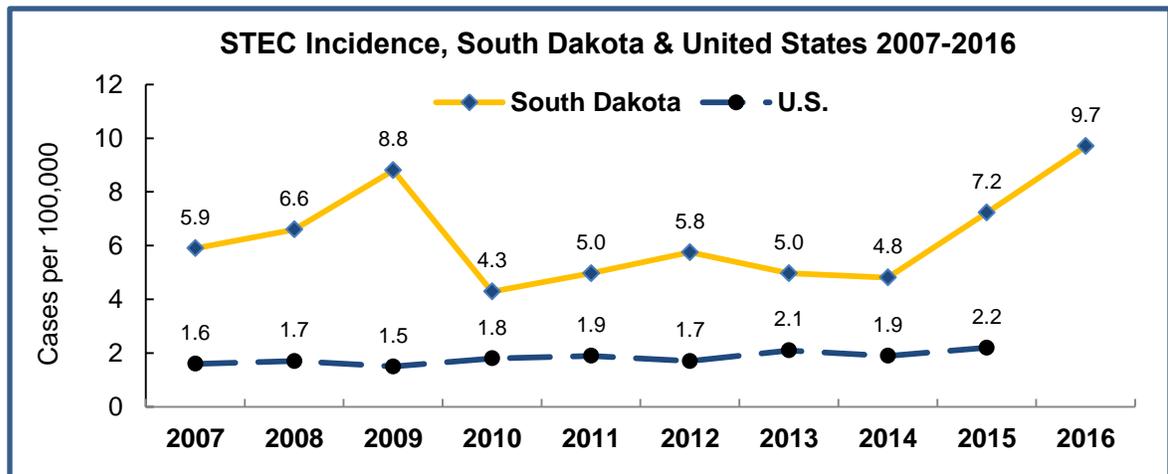
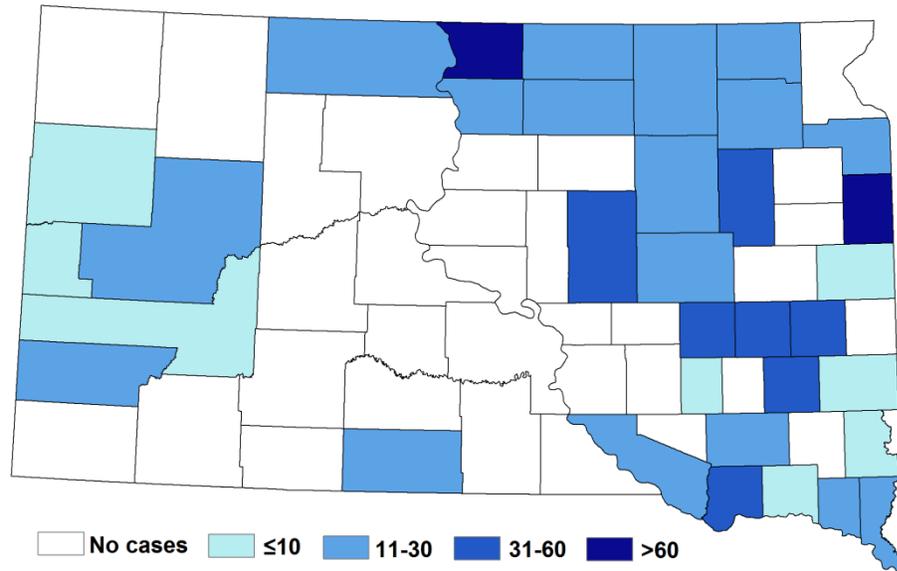
***Escherichia coli*, shiga toxin-producing (STEC)**

Shiga-toxin producing *E. coli* (STEC) often causes severe bloody diarrhea and abdominal pain. The illness usually resolves in five to 10 days. In some individuals, however, complications may involve severe hemorrhagic colitis, hemolytic uremic syndrome, thrombotic thrombocytopenic purpura, and even death. STEC 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 and processing methods, adequate cooking of meats, proper kitchen hygiene, pasteurization of dairy products and fruit juices, and hand-washing after contact with cattle or manure. Individuals with STEC infections are restricted from commercial food handling, child day care, or patient health care until two successive negative fecal samples are produced.

In 2016, 84 cases of STEC were reported, representing a 100% increase above the five-year median (median, 42; range, 41 to 62). The incidence rate was 9.7 cases per 100,000 population. South Dakota's STEC rate has been greater than two times the national rate over the past decade. There were 36 cases (43%) that occurred in children less than 15 years of age. Four cases of hemolytic uremic syndrome (HUS) associated with STEC infection were reported.

In addition to *E. coli* O157:H7, there are several other STEC serotypes. The following serotypes were identified in South Dakota cases in 2016: 33 cases of O157:H7; 11 cases of O111; 7 cases of O103; 4 cases each of O121, O145, and O26; 3 cases of O118; and 1 case each of O18, O45, O98, and O5:NM.

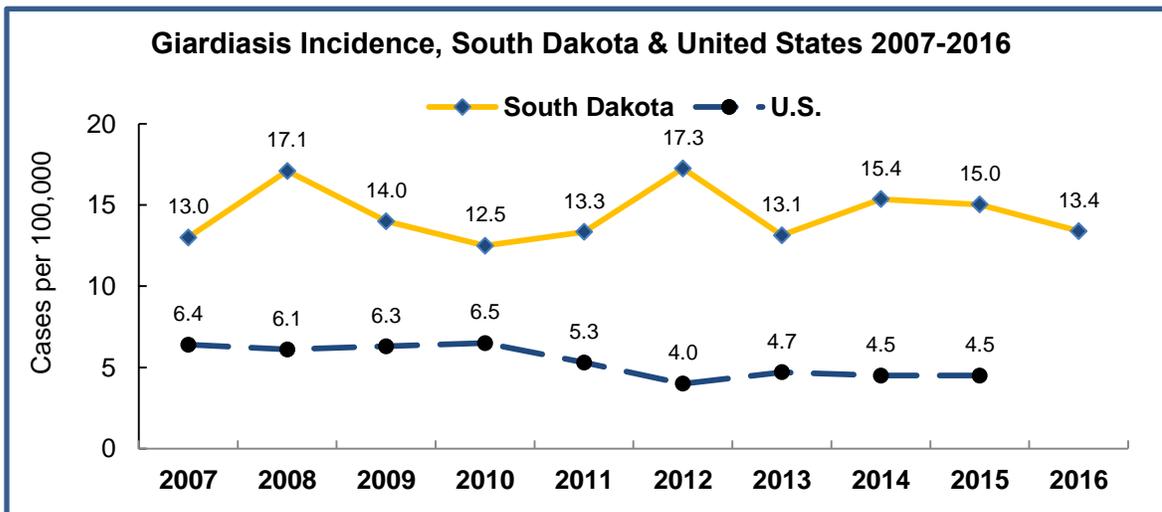
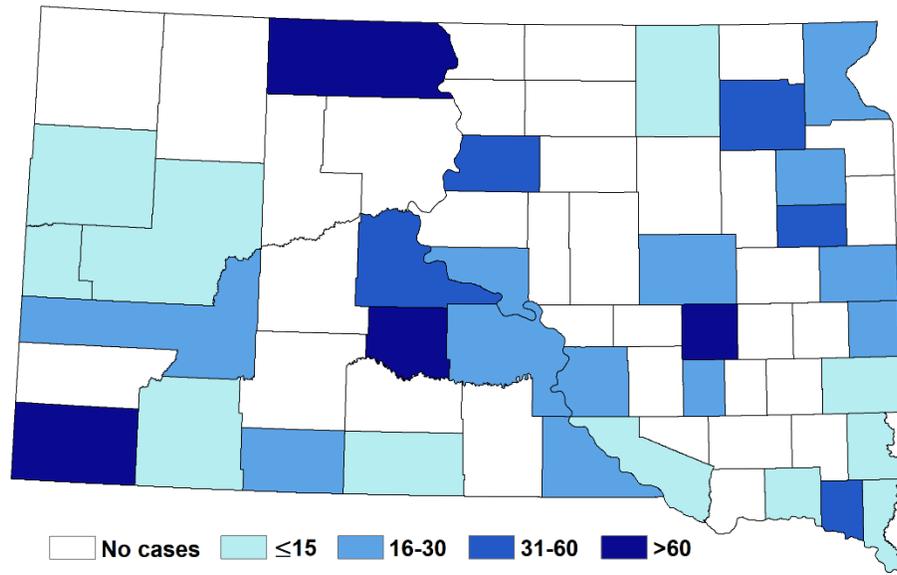
Incidence of STEC by County of Residence: South Dakota, 2016
(cases per 100,000)



Giardiasis

Giardiasis is a gastrointestinal disease involving diarrhea and abdominal cramps that is caused by a protozoan parasite called *Giardia lamblia* (*G. intestinalis*, *G. duodenalis*), which is transmitted person-to-person or by contaminated water, or in some cases animal-to-human. In 2016, 116 cases of *Giardia* infection were reported in South Dakota residents (13.4 cases per 100,000 population). This represented a 10% decrease from the five-year median (median, 129; range, 110 to 144). South Dakota's giardiasis rate has been more than double the national rate over the past decade.

Incidence of Giardiasis by County of Residence: South Dakota, 2016
(cases per 100,000)

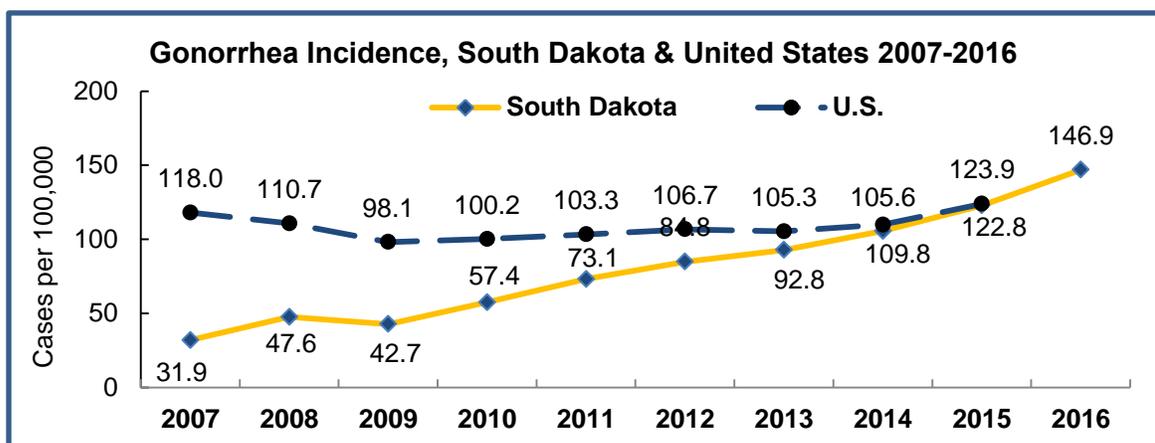
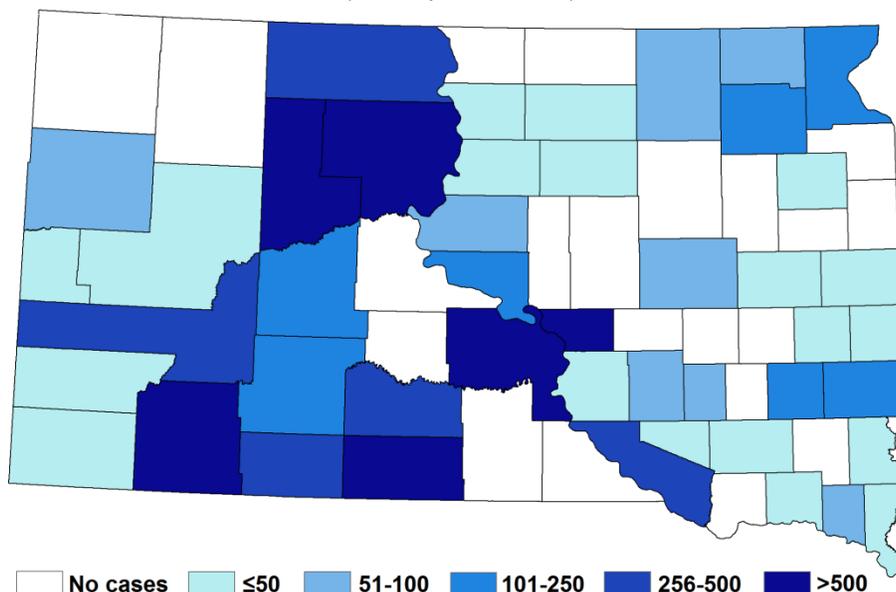


Gonorrhea

Gonorrhea is a sexually transmitted disease (STD) that can cause infections in the genitals, rectum, and throat, and in some cases invasive, disseminated disease. Gonorrhea is most common among young people ages 15-24 years. Although gonorrhea may be asymptomatic, untreated gonorrhea can cause serious and permanent health problems in both women and men. In women, untreated gonorrhea can cause pelvic inflammatory disease with complications such as scar tissue in fallopian tubes, ectopic pregnancy, infertility and long-term pelvic/abdominal pain. In men gonorrhea may infect the tubes attached to the testicles which may cause sterility.

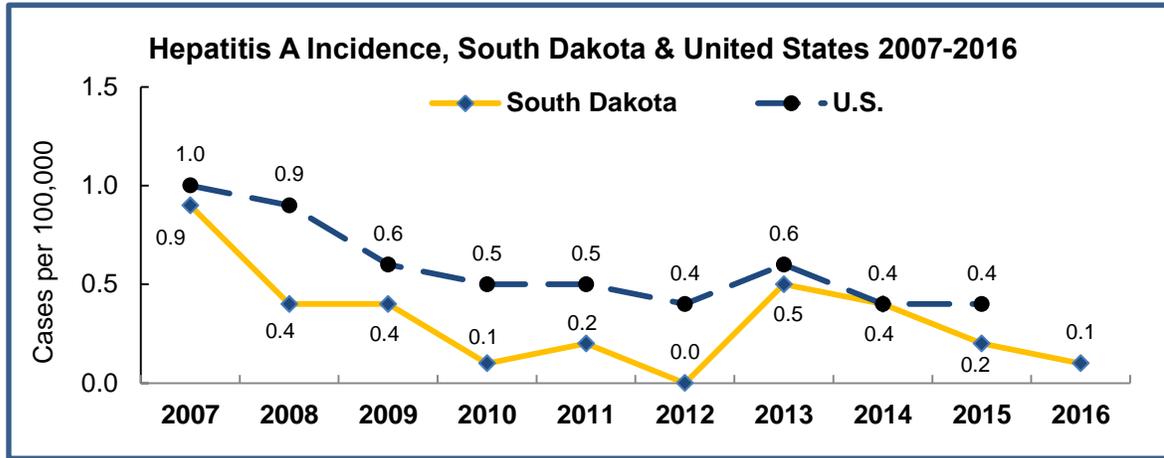
Gonorrhea has been increasing over the past decade in South Dakota. In 2016, there were 1,271 cases, which is a rate of 146.9 cases per 100,000 population. The median age for gonorrhea cases was 25 years old (range, 13 to 68). Females accounted for 60% of cases.

Incidence of Gonorrhea by County of Residence: South Dakota, 2016
(cases per 100,000)



Hepatitis A, acute

Hepatitis A is a liver disease caused by the hepatitis A virus (HAV), which infects humans through fecal-oral transmission. Since the licensure of the hepatitis A vaccine in 1995–1996, rates of infection have declined significantly. In South Dakota, one case of hepatitis A was reported in 2016 in an unvaccinated person who acquired the infection outside the United States.



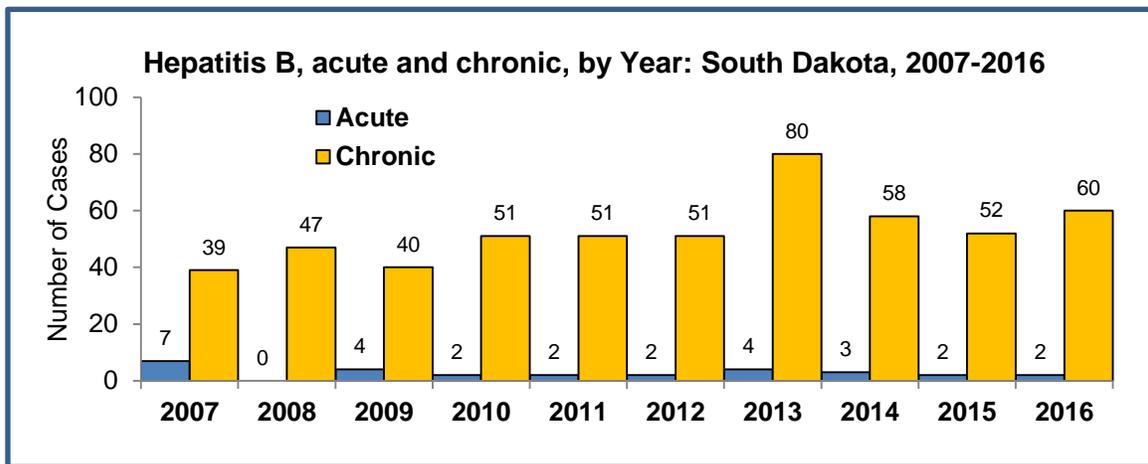
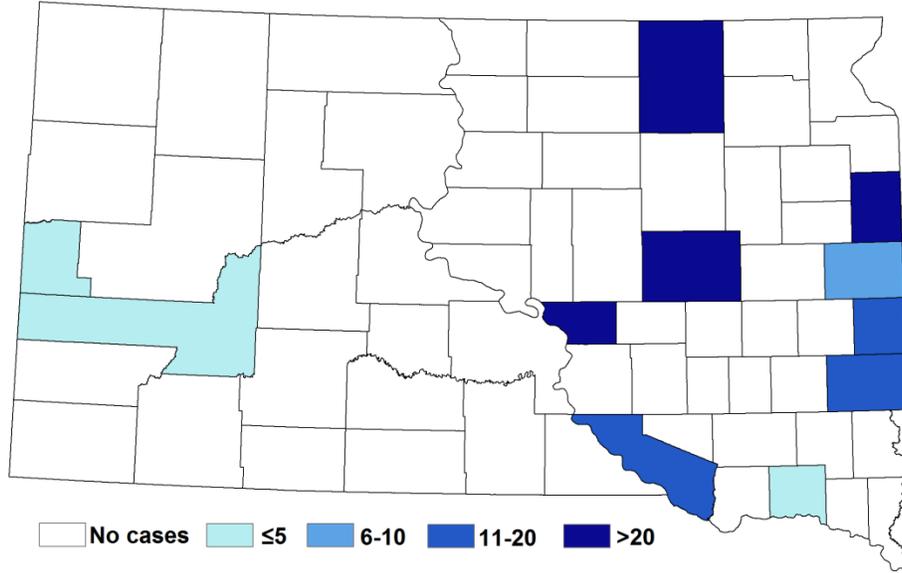
Hepatitis B, acute and chronic

Hepatitis B is a liver disease caused by the hepatitis B virus (HBV). This virus is transmitted when blood and other body fluid from an infected person enters the body of someone who is not infected during sexual contact; sharing needles, syringes, or other drug-injection equipment; or from mother to baby at birth. For some individuals, hepatitis B is an acute, or short-term, illness but for others, it can become a long-term, chronic infection. Risk for HBV chronic infection is related to age at infection: approximately 90 percent of infected infants become chronically infected, compared with 2%-6% of adults. Chronic hepatitis B can lead to serious health issues, like cirrhosis or liver cancer.

The best way to prevent Hepatitis B is by getting vaccinated. HBV vaccine is now recommended at birth and for children and adolescents who did not complete vaccination as infants. HBV vaccination is not mandatory for school entry in South Dakota. Adults who should consider HBV 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.

In South Dakota, there were 2 cases of acute hepatitis B and 60 cases of chronic hepatitis B reported in 2016. The median age of cases was 34 years old (range, 10 to 87), and 65% were male.

Incidence of Hepatitis B, chronic, by County of Residence: South Dakota, 2016
(cases per 100,000)

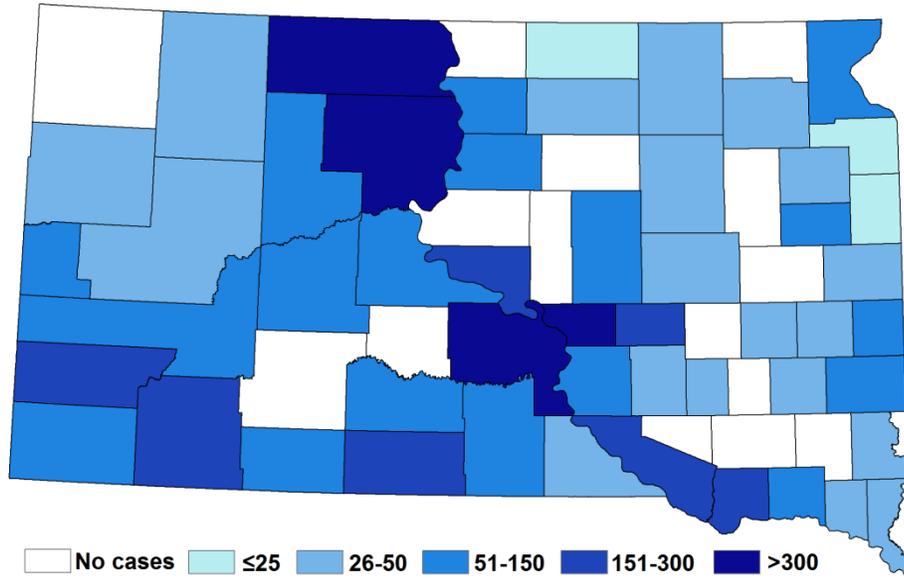


Hepatitis C, acute and chronic

Hepatitis C causes liver disease. For most people Hepatitis C is a long-term, chronic infection and may cause long-term health problems, and can be fatal. The majority of infected persons might not be aware of their infection because they are not clinically ill. There is no vaccine available for Hepatitis C. Hepatitis C is a blood-borne virus and best way to prevent infection is by not injecting illegal or misused drugs.

There were 736 cases of Hepatitis C (22 acute, 714 chronic) reported during 2016 in South Dakota, which are the most cases ever reported in a single year in the state. The counties with the highest incidence (cases per 100,00 population) were Corson (557), Buffalo (538), Lyman (385), Dewey (313), and Todd (227).

Incidence of Hepatitis C, chronic, by County of Residence: South Dakota, 2016
(cases per 100,000)

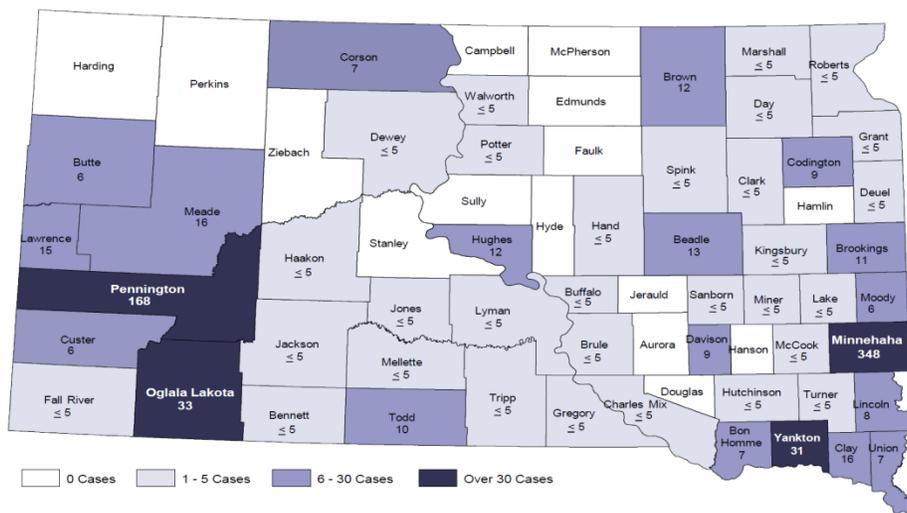


HIV and AIDS

Human immunodeficiency virus (HIV) infection may lead to acquired immunodeficiency syndrome, or AIDS. HIV is spread mainly by having sex with or sharing drug injection needles and syringes with someone who is already infected with HIV. The only way to know for sure if you have HIV infection is to get tested.

In 2016, 47 new HIV/AIDS cases were reported in South Dakota. It is estimated that 594 people are currently living with HIV/AIDS in the state.

Cumulative Cases of HIV/AIDS, by County of Residence: South Dakota, 1985-2016



Influenza

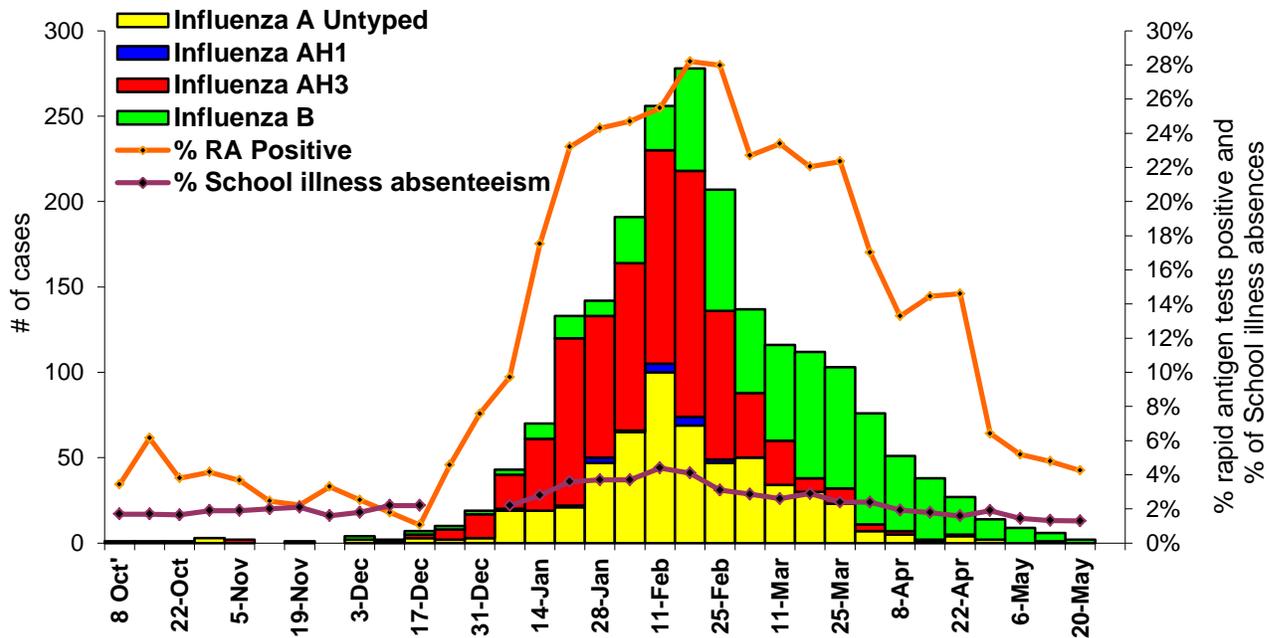
During the 2016-2017 influenza season the predominant virus was influenza A(H3N2). The peak of the season was mid-February 2017 with A(H3N2) and Influenza B viruses circulating. In South Dakota, there were 2,070 confirmed influenza cases reported during the 2016-2017 season, including A(H3N2) 837 (40%), A(H1N1) 20 (1%), A-not subtyped 537 (26%) and 675 (33%) influenza B. Additionally, 74,720 rapid antigen influenza tests were reported with 16,397 positive (22%), 10,614 (14%) positive for influenza A and 5,783 (8%) positive for influenza B.

Lab Confirmed Influenza Cases (by DFA, PCR, or culture)		Influenza Associated Hospitalizations		Influenza Associated Deaths	
Age Group	# Cases (%)	# Hosp (%)	Deaths (%)		
0-4	319 (15%)	77 (8%)	0	-	
5-18	395 (19%)	27 (3%)	0	-	
19-49	387 (19%)	94 (10%)	2	(5%)	
50-64	289 (14%)	171 (18%)	3	(7%)	
> 64	680 (33%)	591 (62%)	3	8 (88%)	
Total	2070	960	43		

There were 960 individuals reported hospitalized during the 2016-2017 influenza season and 43 influenza-associated deaths reported.

Other viral respiratory pathogen reports included 183 adenovirus, 271 corona virus OC43, 135 corona virus 229E, 4 chlamydia pneumonia, 30 human metapneumo virus, 522 parainfluenza-1, 180 parainfluenza-2, 6 parainfluenza-3, 53 parainfluenza-4, 259 respiratory syncytial virus, and 918 rhino/enterovirus.

2016-2017 Influenza Season Lab Confirmed Influenza cases, % Rapid Antigen Positive, & % School Absenteeism SD
* Confirmed by Culture, PCR, or DFA



Lyme disease

Lyme disease is caused by the spirochete *Borrelia burgdorferi* and is transmitted to humans by bites from *Ixodes scapularis*, commonly known as the blacklegged tick or deer tick. Currently, *I. scapularis* has only ever been found and documented in a few locations in eastern South Dakota,

so the risk of being exposed to Lyme disease in-state is low. In 2016, 11 cases of Lyme disease were reported in South Dakota residents. Eight (73%) cases reported travel to other states in the Midwest and Northeast where they were exposed to ticks.

Methicillin-resistant *Staphylococcus aureus* (MRSA), invasive

Methicillin-resistant *Staphylococcus aureus* (MRSA) is a bacterium resistant to most commonly used antibiotics. Most MRSA infections are skin infections, but may cause life-threatening bloodstream infections, pneumonia and surgical site infections.

In 2016, there were 144 cases of invasive MRSA reported in South Dakota, a slight decrease from the prior year. The highest rate of disease was among the elderly, ages 65 years and older.

Pertussis (whooping cough)

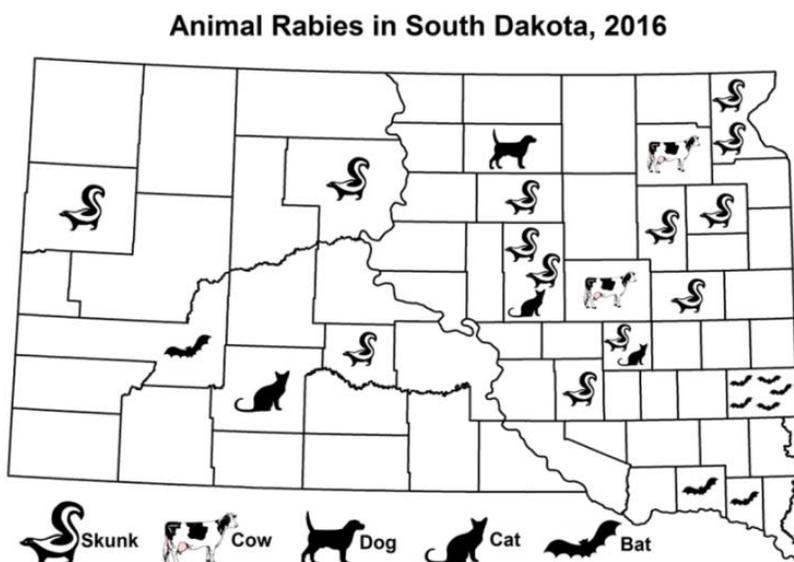
Pertussis, commonly called whooping cough, is an acute infectious bacterial disease caused by *Bordetella pertussis*. The bacteria produce toxins that inflame and paralyze respiratory cilia causing severe coughing. Pertussis is transmitted by aerosolized droplets of respiratory secretions from infected individuals. Infants and young children are at higher risk of pertussis-associated complications, hospitalization and death. The most common complication is secondary bacterial pneumonia. Pertussis infected youth and adults may expose unprotected infants who are at risk of severe disease and complications. During 2016, 15 cases of pertussis were reported in South Dakota. Eight (53%) cases were less than 15 years old.

Rabies, animal

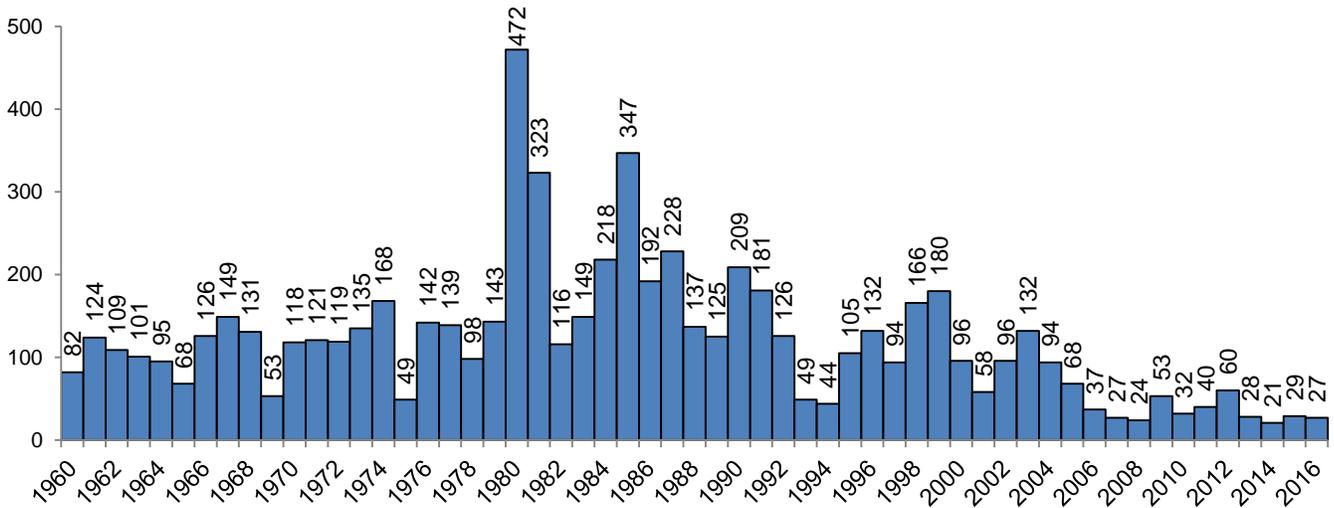
A total of 27 animals tested positive for rabies in 2016, a -7% decrease from the previous year. The 27 rabid animals included 6 domestic animals (3 cats, 2 cattle, 1 dog) and 21 wild animals (13 striped skunks, 8 bats). No human rabies was reported. South Dakota's last human rabies case was in 1970.

Rabid animals during 2016 were from the following counties: Aurora 1, Beadle 1, Butte 1, Clay 1, Clark 1, Codington 1, Day 1, Dewey 1, Edmunds 1, Faulk 1, Hand 3, Jackson 1, Jones 1, Kingsbury 1, Minnehaha 5, Pennington 1, Roberts 2, Sanborn 2, and Yankton 1.

Skunks (*Memphitis mephitis*) are the primary rabies reservoir in South Dakota. Over the past decade 48% of skunks tested have been rabid. Bat rabies is also enzootic in South Dakota with 3% of bats tested being positive.



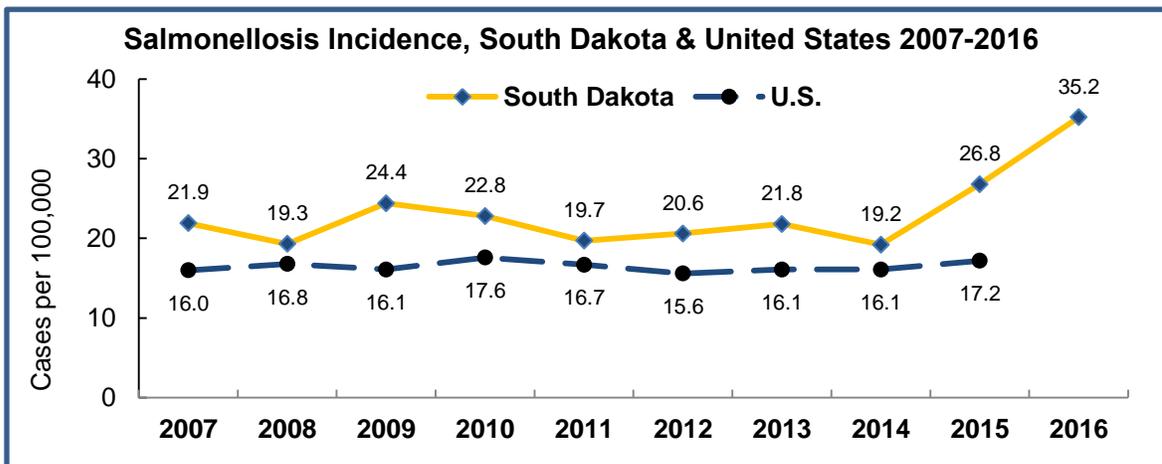
Animal rabies, South Dakota 1960 - 2016



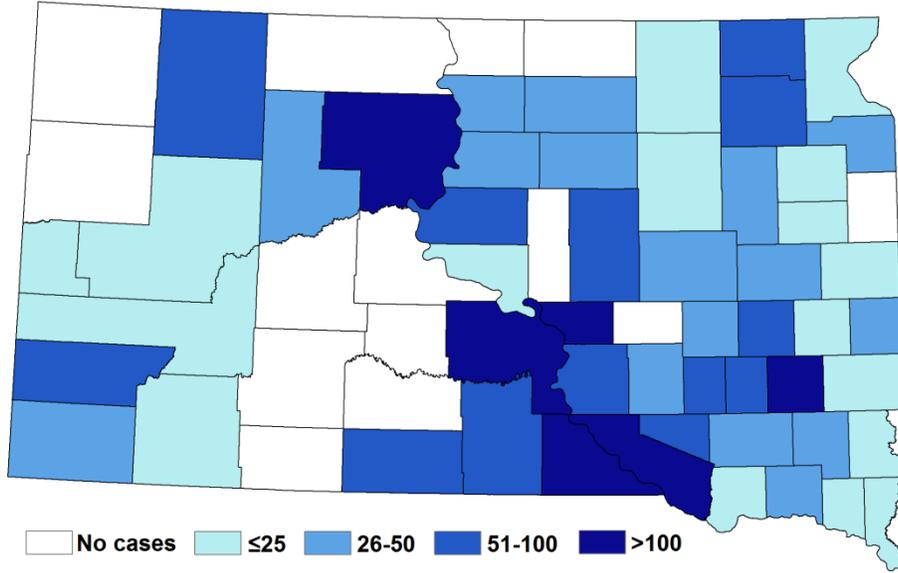
Salmonellosis

Salmonella causes diarrhea, fever, and abdominal cramps between 12 and 72 hours after infection. The illness usually lasts four to seven days, and most individuals recover without treatment, but in some with diarrhea infection may spread from the intestines to the blood stream, and then to other body sites. In severe cases, infection may cause death. The elderly, infants, and those with impaired immune systems are more likely to have a severe illness.

In 2016, 305 cases of salmonellosis were reported in South Dakota (incidence of 35.2 cases per 100,000 population). This represented a 79% increase over the five-year median (median, 170; range, 162 to 230). The highest rate was in Charles Mix County where a large outbreak of 109 cases was linked to contaminated food served at a powwow. The *Salmonella* serotype found in the powwow outbreak was *S. Javiana* – which is a rare serotype in South Dakota. Historically, *S. Typhimurium* and *S. Enteritidis* are the two most commonly reported serotypes.



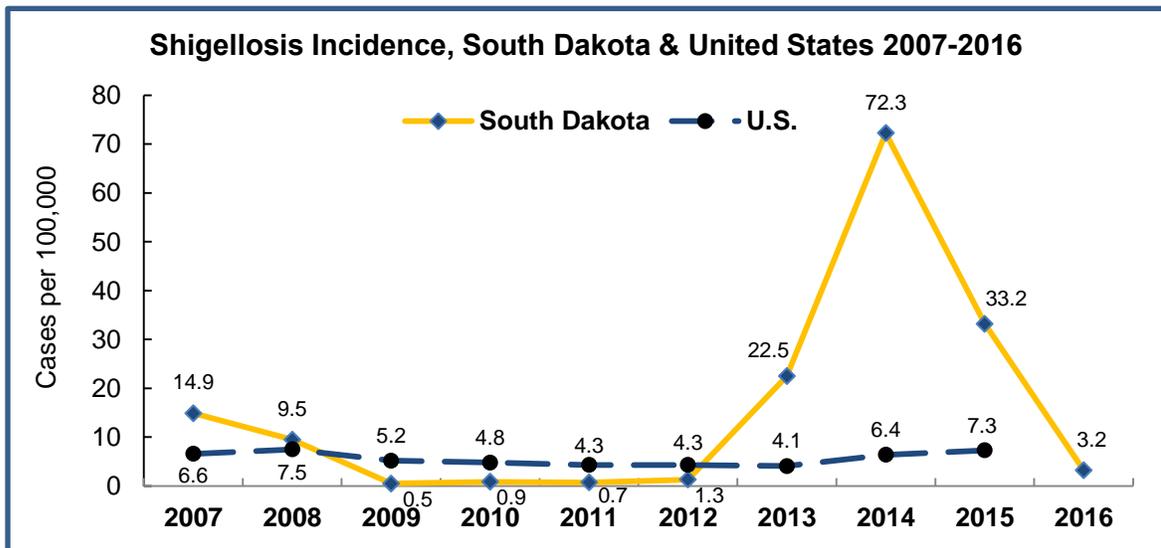
Incidence of Salmonellosis by County of Residence: South Dakota, 2016
(cases per 100,000)



Shigellosis

Shigellosis is an intestinal infection causing diarrhea, fever, nausea, vomiting, and abdominal cramps. Complications, such as severe dehydration or seizures, may occur, especially among young children. *Shigella* bacteria are transmitted by the fecal-oral route (human feces). 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.

In 2016, there were 28 cases of shigellosis reported in South Dakota – an 85% decrease from the five-year median (median, 190; range, 6 to 616). The median age of cases was 33 years (range, 0 to 91). South Dakota experienced a protracted multi-county outbreak from October 2013 to November 2015, largely in child care settings.



***Streptococcus pneumoniae*, invasive**

Pneumococcal disease is an infection caused by bacteria, also referred to as pneumococcus. Invasive *Streptococcus pneumoniae* can cause many types of illnesses, including ear infections and meningitis. There are vaccines to prevent pneumococcal disease in children and adults.

In 2016, 129 cases of invasive pneumococcal disease were reported in South Dakota.

Syphilis, Primary and Secondary, Early Latent (P, S, EL) and Congenital

Syphilis is a sexually transmitted disease that can cause long-term complications if not treated promptly and correctly. Symptoms in adults are divided into stages: primary, secondary, early latent and late latent syphilis. The primary, secondary and early latent stages are infectious to others. Syphilis is spread by direct contact with a syphilis sore during vaginal, anal or oral sex. Sores can be found on the penis, vagina, rectum, or on the lips and in the mouth. Syphilis can also be spread from an infected mother to her unborn baby, i.e., congenital syphilis.

In South Dakota, there were 41 cases of early syphilis (primary and secondary, early latent) and 2 congenital syphilis cases reported in 2016. During the five year period, 2012-2016, 26 of South Dakota's 66 counties reported cases of primary, secondary or congenital syphilis. Three counties (Minnehaha, Corson and Dewey) accounted for 74% of the state's cases.

Tuberculosis

Tuberculosis (TB) is caused by the *Mycobacterium tuberculosis* bacteria. *M. tuberculosis* usually infects the lungs, but can attack any part of the body such as the kidney, spine, and brain. If not treated properly, TB disease can be fatal. Tuberculosis is spread through the air from one person to another when an infectious person coughs, sneezes, speaks, talks or sings.

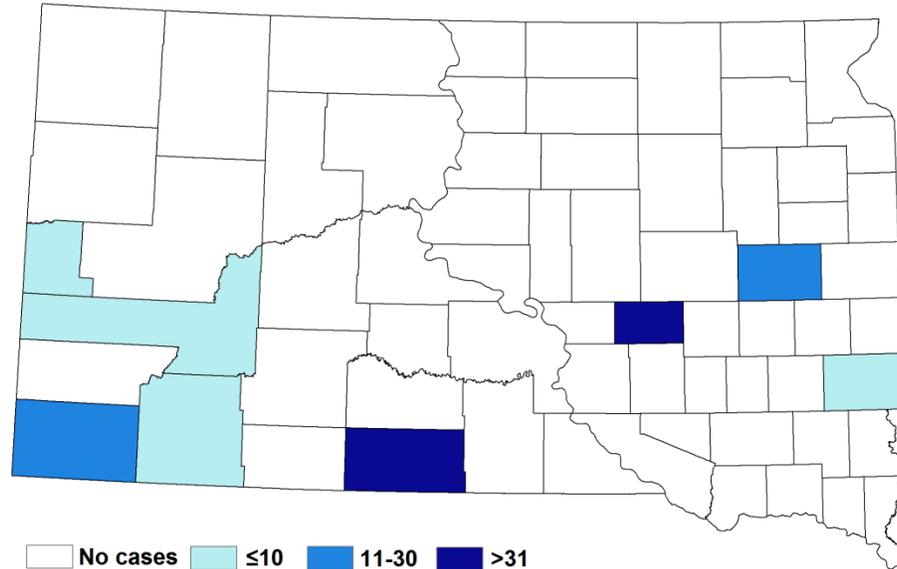
There were 12 cases of TB reported in South Dakota in 2016. The median age of cases was 47 years (range, 21 to 76). Native Americans have historically reported the highest percentage of TB cases by race; however, in 2016 they accounted for only 33% of the total TB cases reported. The majority of cases were foreign-born (58%).

Tularemia

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 a tick or deerfly 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. There are six main clinical forms of disease: ulceroglandular, glandular, pneumonic, oropharyngeal, oculoglandular, and typhoidal. If left untreated tularemia may be fatal.

There were 14 cases of tularemia reported in South Dakota in 2016 (7 ulceroglandular, 5 glandular, and 2 pneumonic). Todd County had the highest incidence at 59.1 cases per 100,000 population.

Incidence of Tularemia by County of Residence: South Dakota, 2016
(cases per 100,000)



Varicella (chicken pox)

Varicella (chicken pox) is a highly contagious disease of blistering rash, itching and fever caused by varicella-zoster virus. Chicken pox can be a serious disease, especially in babies and people with weakened immune systems. Varicella is spread through the air by coughing or sneezing. It can also be spread by touching or breathing in the virus particles that come from chicken pox blisters. The best way to prevent chicken pox is to get the varicella vaccine. Varicella vaccination is mandated for school entry in South Dakota.

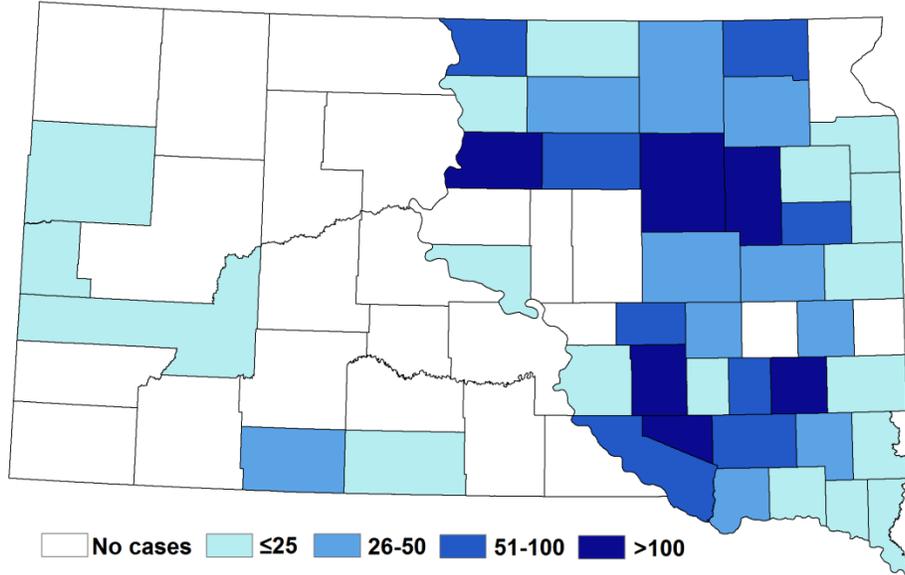
In 2016, 32 cases of chicken pox were reported and 52% were unvaccinated.

West Nile virus (WNV)

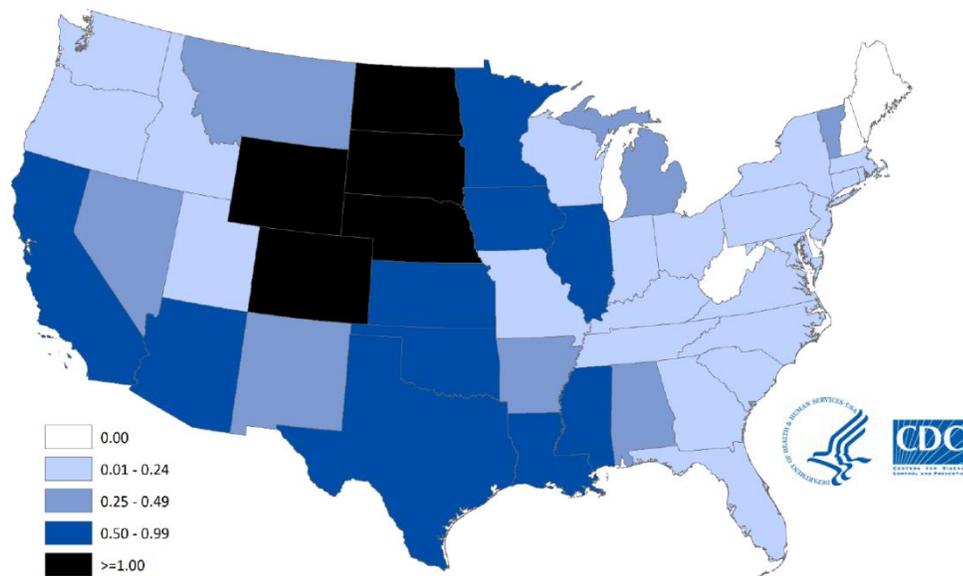
West Nile disease is a viral mosquito-borne illness that emerged in South Dakota in 2002. Less than 1% of people who are infected with WNV develop a serious neurologic illness such as encephalitis or meningitis. The symptoms of neurologic illness can include headache, high fever, neck stiffness, disorientation, coma, tremors, seizures, or paralysis. Recovery from neuroinvasive West Nile disease may take several weeks or months. Some of the neurologic effects may be permanent. The death rate for WNV neurologic disease is about 10%. About 20% of WNV infected people develop fever with other symptoms such as headache, body aches, joint pains, vomiting, diarrhea, or rash. Most people with this type of West Nile virus disease recover completely, but fatigue and weakness can last for weeks or months.

In South Dakota, 152 human cases of WNV disease (35 neuroinvasive and 117 non-neuroinvasive) were reported in 2016. The overall incidence of was 17.6 cases per 100,000 population, the highest rate since 2012. Fifty (33%) WNV cases were hospitalized, and there were six deaths. Additionally, 16 persons were identified to have WNV infection through blood donation screening.

Incidence of WNV by County of Residence: South Dakota, 2016
(cases per 100,000)



Incidence of Neuroinvasive WNV disease: United States, 2016
(cases per 100,000)



Other Infectious Diseases

Other infectious diseases reported in South Dakota during 2016 include 9 cases of legionellosis, 6 cases of Rocky Mt. spotted fever, 5 cases each of coccidioidomycosis and vibriosis, 4 cases each of malaria, and Q fever, 3 cases of cyclosporiasis, 2 cases each of mumps and Typhoid fever, and 1 case each of anaplasmosis, invasive *Haemophilus influenzae* Type B, hemolytic uremic syndrome, invasive meningococcal disease, and toxic shock syndrome.