

Infectious Diseases in South Dakota, 2017

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 2017. It highlights important statistics and shows key trends on selected reportable diseases in the state.

Table 83 Reportable Diseases in South Dakota, 2008-2017 (Calendar years)

Reportable diseases	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
Babesiosis	0	0	0	0	0	1	1	0	0	0	2
Botulism	0	0	0	0	0	0	0	0	0	0	0
Brucellosis	0	0	0	0	0	1	0	0	0	1	2
Campylobacteriosis	262	300	297	301	276	296	307	346	450	395	3230
Carbapenem-resistant <i>Enterobacteriaceae</i> (CRE)	NR	NR	NR	NR	NR	12	3	37	58	64	110
Chicken Pox (Varicella)	55	53	62	67	32	43	23	27	32	24	418
Chlamydia	2919	3015	3187	3412	3925	3947	4129	3967	4336	4439	37276
Coccidioidomycosis	NR	NR	NR	NR	NR	NR	NR	NR	5	6	11
Cryptosporidiosis	88	137	108	143	113	175	151	248	158	163	1484
Cyclosporiasis	1	0	0	0	0	1	0	0	3	4	9
Ehrlichiosis and Anaplasmosis	1	0	0	4	1	1	0	0	1	1	9
Giardiasis	137	113	102	110	144	111	131	129	116	104	1197
Gonorrhea	382	345	467	602	707	789	880	1055	1271	1291	7789
Hantavirus pulmonary syndrome	0	0	0	1	1	0	0	0	0	1	3
Hepatitis A	3	3	1	2	0	4	3	2	1	1	20
Hepatitis B, chronic	48	33	51	51	51	80	58	52	60	52	536
Hepatitis B, acute	0	4	2	2	2	5	3	2	2	2	24
Hepatitis C, chronic	364	384	350	356	392	406	516	570	714	563	4615
Hepatitis C, acute	0	1	0	0	4	1	0	0	22	20	48
<i>Haemophilus influenzae</i> type b	0	0	0	1	0	3	0	1	1	1	7
Hemolytic uremic syndrome	3	3	2	0	0	0	1	1	1	0	11
HIV and AIDS	34	21	35	21	29	36	31	25	47	41	279
Legionellosis	3	2	9	2	9	8	9	10	9	15	76
Leprosy	1	0	0	0	0	0	0	0	0	0	1
Listeriosis	1	1	3	1	0	0	0	0	0	2	8
Lyme disease	3	1	1	4	4	4	2	5	11	12	47

Reportable diseases	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
Malaria	0	1	3	2	5	7	5	4	4	8	39
Measles	0	0	0	0	0	0	8	2	0	0	10
Meningococcal disease	3	5	0	3	0	4	2	1	1	0	19
Mumps	1	2	2	0	0	0	0	0	2	0	7
Pertussis	67	56	32	37	71	67	109	16	15	9	479
Q fever	1	9	4	1	2	4	5	5	4	5	40
Rabies, animal	24	53	32	40	60	28	21	29	27	22	336
Salmonellosis	154	197	186	162	170	183	164	230	305	226	1977
Shiga toxin-producing <i>E. coli</i>	53	71	35	41	48	42	41	62	84	91	568
Shigellosis	76	4	7	6	11	190	616	285	28	29	1252
Spotted fever rickettsiosis	3	0	0	1	1	7	3	2	6	13	36
Methicillin-resistant <i>Staph aureus</i> (MRSA), invasive	77	94	98	91	89	94	124	159	144	115	1085
<i>Strep. pneumoniae</i> , invasive	NR	NR	NR	42	97	99	88	110	129	135	700
Syphilis (primary, secondary and early latent)	4	2	4	0	21	49	76	48	41	52	297
Syphilis, congenital	0	0	0	0	0	0	3	0	2	3	8
Toxic shock syndrome	1	0	0	0	0	0	0	3	1	0	5
Tularemia	10	5	11	8	5	7	5	25	14	13	103
Tuberculosis	16	18	15	15	19	9	8	17	12	14	129
Typhoid fever	2	2	1	0	0	3	0	1	2	0	11
West Nile fever	28	15	16	2	141	92	45	29	117	46	531
West Nile neuroinvasive	11	6	4	0	62	57	12	11	35	27	225
Vibriosis	NR	NR	NR	NR	NR	NR	NR	NR	5	12	17

*NR = not reportable

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

Table 84 Reportable Diseases by County of Residence, South Dakota, 2017 (Calendar years)

County of residence	Campylobacteriosis	Chlamydia	Cryptosporidiosis	Giardiasis	Gonorrhea	Hepatitis B, chronic	Hepatitis C, chronic	Legionellosis	MRSA, invasive	Pertussis	Salmonella	Shigellosis	<i>Strep. pneumoniae</i> , invasive	Shiga Toxin-Prod <i>E. coli</i>	Tularemia	Varicella (Chicken pox)	West Nile disease
TOTAL	395	4439	163	104	1291	52	563	15	115	9	226	29	135	91	13	24	73
Incidence*	45.4	510.4	18.7	12.0	148.4	6.0	64.7	1.7	13.2	1.0	26.0	3.3	15.5	10.5	1.5	2.8	8.4
Aurora	5	>5	<5	0	0	0	>5	0	0	0	<5	0	0	0	0	0	>5
Beadle	5	57	5	0	7	>5	8	0	0	0	5	0	0	<5	0	>5	<5
Bennett	>5	30	0	0	11	0	>5	0	>5	0	0	0	<5	0	0	0	0
Bon Homme	<5	9	5	>5	<5	0	7	0	0	0	<5	0	>5	0	0	<5	>5
Brookings	10	121	10	>5	9	>5	8	>5	>5	0	12	0	>5	<5	0	>5	5
Brown	18	175	<5	>5	16	>5	12	0	>5	0	5	0	5	<5	0	0	>5
Brule	6	27	0	<5	<5	0	<5	0	<5	0	0	0	<5	0	0	0	<5
Buffalo	0	32	0	0	11	0	7	0	0	0	<5	0	>5	0	0	0	0
Butte	5	41	<5	>5	<5	0	7	>5	0	0	5	>5	0	<5	0	0	0
Campbell	5	<5	0	0	<5	0	0	0	<5	0	0	0	>5	0	0	0	>5
Charles Mix	14	70	<5	>5	19	0	21	0	6	0	5	0	>5	>5	<5	0	>5
Clark	<5	<5	0	>5	0	0	0	0	0	0	<5	0	>5	0	0	0	>5
Clay	11	60	>5	>5	11	0	5	0	>5	0	<5	>5	>5	10	0	0	>5
Codington	8	108	<5	5	<5	0	7	0	0	0	8	0	>5	5	0	0	>5
Corson	6	61	0	0	15	0	19	0	<5	0	<5	0	>5	0	0	0	0
Custer	<5	26	>5	0	5	0	5	0	0	0	0	0	<5	0	<5	0	0
Davison	16	99	5	<5	27	<5	8	0	>5	0	8	0	7	<5	0	<5	>5
Day	<5	12	<5	<5	<5	0	>5	0	0	0	0	0	<5	6	0	0	>5
Deuel	5	>5	<5	0	<5	0	>5	0	0	0	<5	<5	0	<5	0	0	>5

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
Dewey	<5	136	0	0	<5	0	0	0	<5	0	<5	0	0	<5	0	0	0
Douglas	<5	<5	<5	<5	<5	0	0	0	0	0	<5	0	0	<5	0	0	<5
Edmunds	9	<5	<5	0	<5	0	0	0	0	0	<5	0	<5	0	0	0	0
Fall River	<5	14	<5	<5	0	<5	0	0	0	0	7	0	0	0	0	0	0
Faulk	<5	<5	0	0	0	0	0	0	0	0	<5	0	0	0	<5	0	<5
Grant	<5	14	<5	<5	<5	0	0	<5	<5	0	8	0	0	0	0	0	<5
Gregory	7	12	<5	<5	<5	0	0	0	<5	<5	<5	0	0	<5	0	0	0
Haakon	0	0	0	0	0	0	0	0	<5	<5	<5	0	0	<5	0	0	0
Hamlin	9	15	<5	<5	<5	<5	0	0	0	0	<5	<5	0	<5	0	0	<5
Hand	<5	<5	0	0	<5	0	0	0	0	0	0	0	0	0	0	0	0
Hanson	<5	<5	<5	0	0	<5	<5	0	<5	0	0	0	0	<5	0	0	0
Harding	8	5	0	0	0	0	0	0	0	0	0	0	0	<5	0	0	0
Hughes	<5	93	<5	0	21	<5	17	0	<5	0	<5	<5	7	0	<5	<5	<5
Hutchinson	5	7	5	<5	<5	0	<5	0	<5	0	<5	0	<5	0	0	0	<5
Hyde	0	<5	0	0	<5	0	0	0	0	0	0	0	0	0	0	0	0
Jackson	<5	39	0	0	11	0	<5	0	0	0	<5	0	<5	<5	<5	0	<5
Jerauld	<5	<5	<5	0	<5	0	0	0	0	0	0	0	<5	0	0	0	0
Jones	<5	<5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kingsbury	8	11	<5	<5	<5	0	<5	0	0	0	5	0	0	<5	0	0	<5
Lake	5	26	0	<5	<5	<5	<5	0	<5	<5	0	0	<5	0	0	0	<5
Lawrence	14	121	<5	<5	17	0	5	<5	0	0	<5	0	5	<5	0	0	0
Lincoln	9	125	7	9	22	<5	13	0	<5	<5	12	<5	5	<5	0	<5	<5
Lyman	<5	34	0	<5	5	0	14	0	<5	0	<5	0	<5	0	0	0	<5
Marshall	6	9	0	0	<5	0	0	0	0	0	8	0	0	0	0	0	0
McCook	<5	7	<5	0	<5	0	0	0	<5	0	<5	0	<5	<5	0	0	<5
McPherson	<5	<5	0	0	0	0	0	0	<5	0	0	0	<5	0	0	0	<5
Meade	15	95	<5	<5	15	0	7	0	<5	0	<5	0	<5	<5	0	0	<5
Mellette	0	16	0	0	8	0	<5	0	0	0	<5	0	0	0	0	0	0
Miner	<5	<5	<5	0	0	0	<5	0	0	0	<5	0	0	<5	0	0	0
Minnehaha	38	1104	26	28	372	35	162	<5	26	<5	51	5	26	10	<5	6	<5
Moody	<5	21	<5	<5	<5	0	<5	0	<5	0	<5	0	<5	0	0	0	<5
Oglala Lakota	5	292	0	<5	121	<5	32	<5	8	0	<5	5	7	0	<5	<5	<5
Pennington	41	727	15	11	316	<5	88	6	12	<5	17	<5	16	11	<5	<5	7
Perkins	6	7	0	0	0	0	0	0	0	0	<5	0	0	<5	0	0	0
Potter	0	5	0	<5	0	0	0	0	0	0	<5	0	0	0	0	0	0
Roberts	9	86	<5	0	10	0	9	0	5	0	<5	0	<5	0	0	<5	0
Sanborn	<5	9	0	0	0	0	<5	0	0	0	<5	0	<5	<5	<5	0	0
Spink	<5	12	<5	0	0	0	0	0	<5	0	0	0	0	<5	0	0	0
Stanley	<5	6	0	0	<5	0	<5	0	<5	0	<5	0	0	0	0	0	0
Sully	0	<5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Todd	<5	247	0	<5	106	0	19	0	8	0	<5	10	<5	0	<5	0	0
Tripp	6	11	0	0	<5	0	<5	<5	0	0	<5	<5	<5	5	0	0	<5
Turner	<5	11	<5	0	<5	0	<5	0	0	0	<5	0	<5	<5	0	0	0
Union	<5	37	11	0	10	<5	<5	0	0	0	<5	0	<5	<5	0	0	0
Walworth	<5	31	0	0	6	0	<5	0	0	0	<5	0	<5	0	0	0	<5
Yankton	13	63	22	6	12	0	12	0	5	<5	<5	0	<5	5	0	0	6
Ziebach	0	24	0	0	5	0	<5	0	0	0	<5	0	0	0	0	<5	0

*Incidence: cases per 100,000 population
Individual county events of 1, 2, 3 or 4 are published as <5

Table 85 Reportable Diseases by Gender, Race and Age, South Dakota, 2017 (Calendar years)

	Campylobacteriosis	Chlamydia	CRE	Cryptosporidiosis	Giardiasis	Gonorrhea	Hepatitis B, chronic	Hepatitis C, chronic	HIV and AIDS	MRSA, invasive	Pertussis	Salmonellosis	Shiga Toxin Producing <i>E. coli</i>	Shigellosis	<i>Strep. pneumo.</i> , invasive	Syphilis (P, S, EL)	Tuberculosis	Tularemia	Varicella (Chicken pox)	West Nile Disease	
Total	395	4439	64	163	104	1291	52	563	41	115	9	226	91	29	135	52	14	13	24	73	
Incidence*	45.4	510.4	7.4	18.7	12.0	148.4	6.0	64.7	4.7	13.2	1.0	26.0	10.5	3.3	15.5	6.0	1.6	1.5	2.8	8.4	
Gender																					
Female	140	3105	43	83	34	726	18	244	8	55	5	117	52	22	65	6	6	8	11	34	
Male	255	1334	21	80	70	565	34	319	33	60	4	109	39	7	70	46	8	5	13	39	
Race																					
White	348	1892	51	154	92	355	8	248	18	69	9	189	79	8	83	37	1	4	18	65	
Am.Indian	31	1792	12	4	6	753	1	246	11	42	0	23	8	17	42	8	7	8	5	6	
Black	5	234	1	1	4	137	25	20	7	2	0	4	1	2	4	5	3	0	0	0	
Asian	1	26	0	0	0	6	13	0	2	0	0	1	0	0	0	0	3	1	1	0	
Other	6	174	0	4	1	28	2	19	3	1	0	7	2	2	4	2	0	0	0	2	
Unknown	4	321	0	0	1	12	3	30	0	1	0	2	1	0	2	0	0	0	0	0	
Age group																					
<1 yr	6	1	1	2	2	2	0	0	0	1	1	13	1	1	3	0	0	0	4	0	
1-4 yrs	44	0	1	29	28	0	1	1	0	0	0	21	24	5	6	0	0	3	10	1	
5-14 yrs	32	40	1	26	13	10	2	0	0	0	1	25	13	3	4	0	0	3	6	1	
15-24 yrs	69	2763	0	24	8	610	5	70	7	6	1	21	14	1	4	17	1	0	3	3	
25-39 yrs	84	1481	6	39	18	563	27	191	23	8	1	46	15	5	17	24	2	2	1	13	
40-64 yrs	109	150	19	29	23	102	15	267	11	44	4	73	13	10	52	10	5	3	0	40	
≥65 yrs	49	4	36	14	12	4	2	34	0	56	1	26	11	4	49	1	6	2	0	15	

*Incidence: cases per 100,000 population

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 percent 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 2017, there were 395 cases of *Campylobacter* infection, slightly lower than the record high of 450 cases reported in 2016. Counties with the highest incidence (cases per 100,000 population) included Harding (644), Campbell (363), Faulk (258), and Perkins (202). Children less than five years old had the highest rate of disease. South Dakota's rate of campylobacteriosis ranks high nationally, usually double the rate of states receiving enhanced funding for conducting active surveillance for foodborne disease (FoodNet).

Figure 48
Incidence of Campylobacteriosis by County of Residence: South Dakota, 2017
(cases per 100,000)

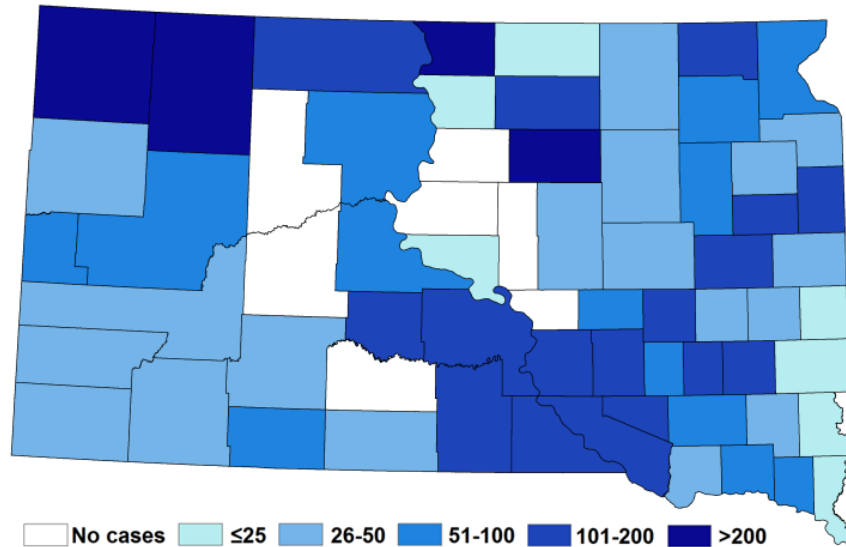
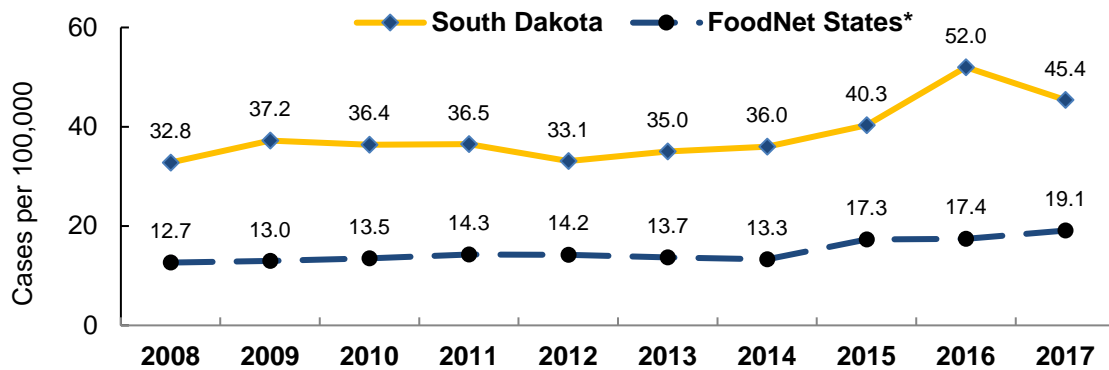


Figure 49
Campylobacteriosis Incidence, South Dakota & U.S. (FoodNet States*) 2008-2017



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

Carbapenem-resistant *Enterobacteriaceae* (CRE)

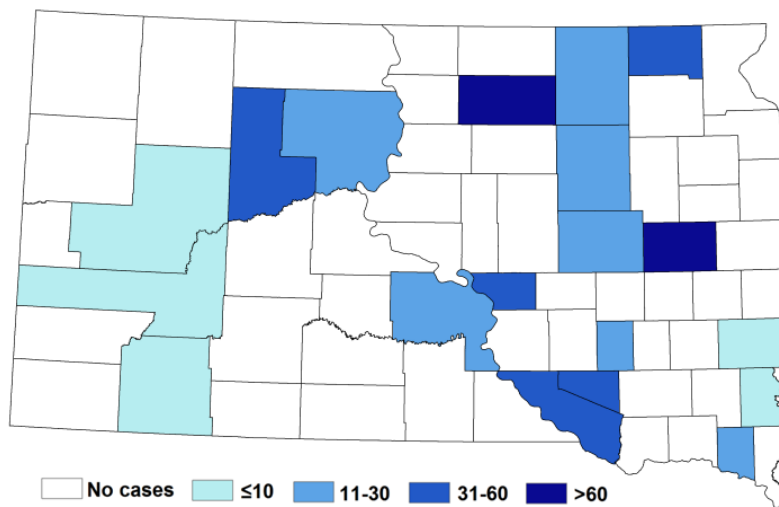
Carbapenem-resistant *Enterobacteriaceae* (CRE) are a family of bacteria that are difficult to treat because they are highly resistant to antibiotics. CRE are an important emerging threat to public health. Common *Enterobacteriaceae* include *Klebsiella* species, *Enterobacter* species, and *Escherichia 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, 64 cases of CRE were reported in 2017. The statewide incidence was 7.4 cases per 100,000 population.

Figure 50
Incidence of CRE by County of Residence: South Dakota, 2017
 (cases per 100,000)



Chlamydia

Chlamydia is a common sexually transmitted disease (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 2017, there were 4,439 cases reported. Youth in 15-24 year age group had the highest rate.

Figure 51
Chlamydia Incidence, South Dakota & United States 2008-2017

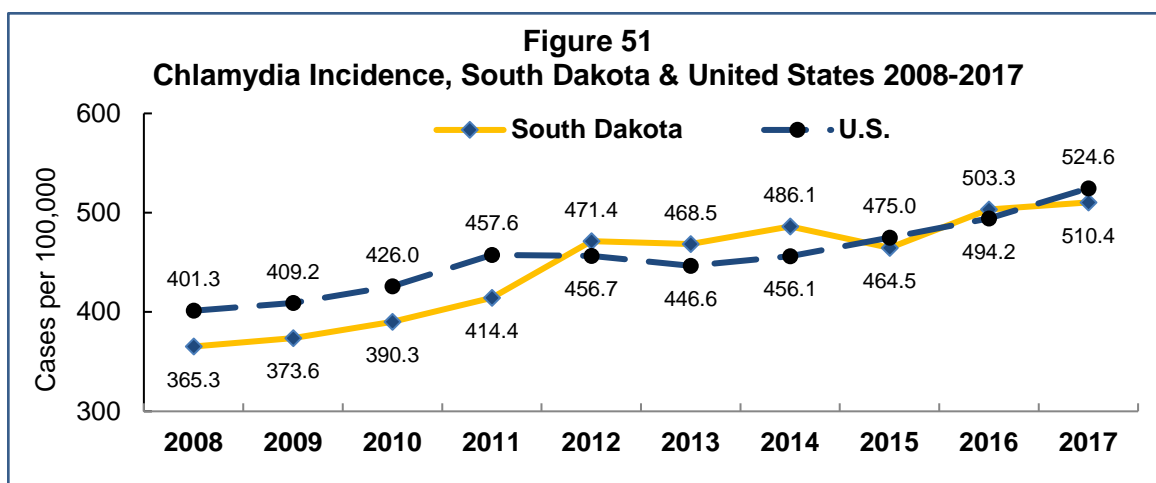
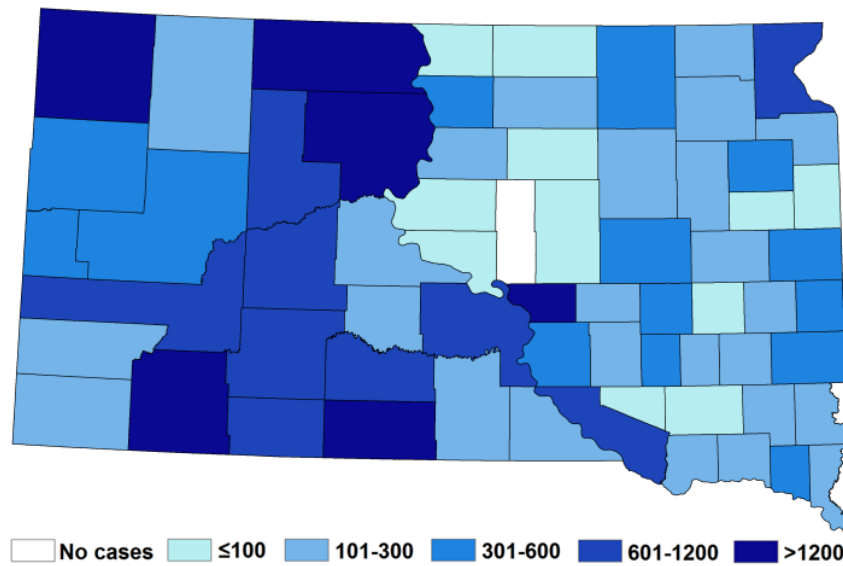


Figure 52
Incidence of Chlamydia by County of Residence: South Dakota, 2017
(cases per 100,000)



Cryptosporidiosis

Cryptosporidiosis is a diarrheal disease caused by a chlorine-tolerant protozoan parasite that is transmitted by cattle or human feces through contaminated food or water or by direct person-to-person or animal-to-person contact. In 2017, there were 163 cases (18.7 cases per 100,000 population) reported in South Dakota. Children less than 5 years old had the highest rate of disease. South Dakota’s cryptosporidiosis rate has been consistently higher than the national rate over the past decade.

Figure 53
Cryptosporidiosis Incidence, South Dakota & United States 2008-2017

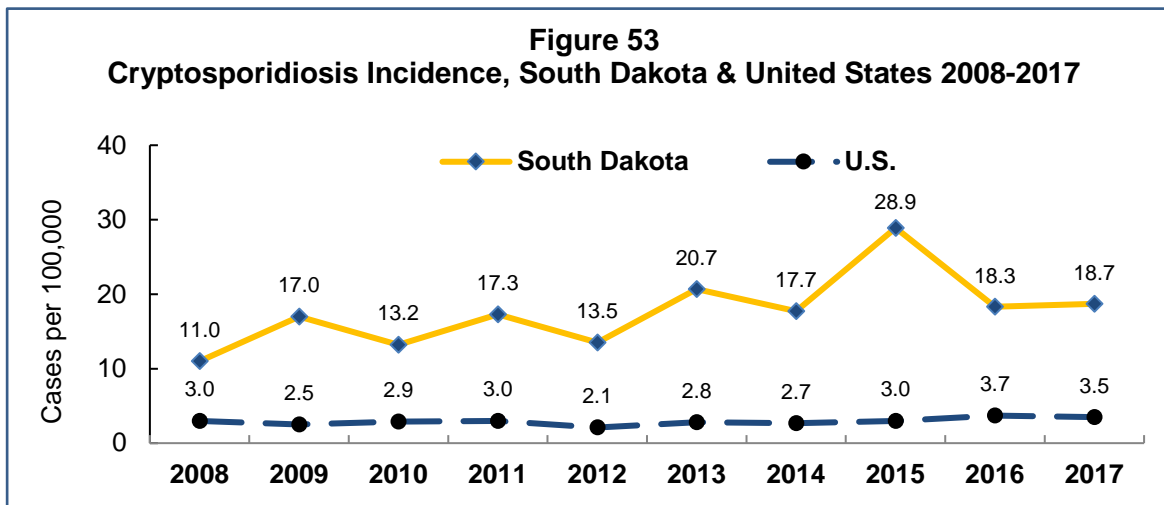
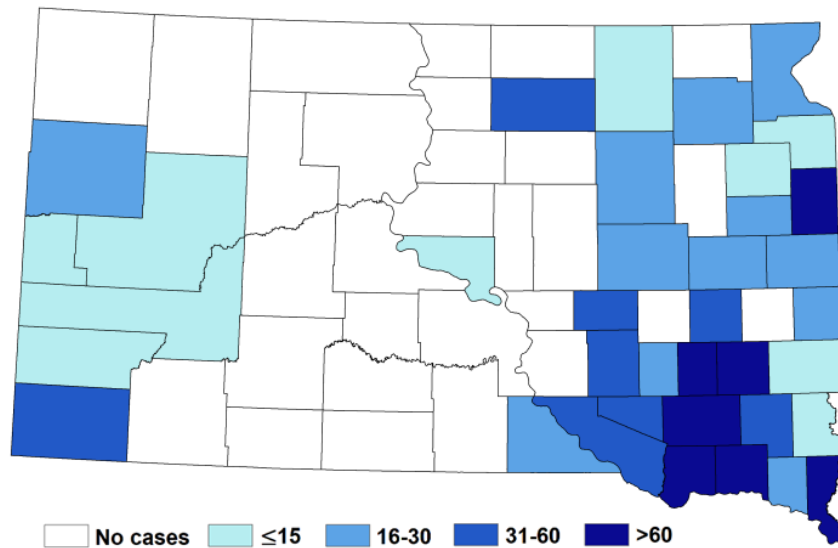


Figure 54
Incidence of Cryptosporidiosis by County of Residence: South Dakota, 2017
(cases per 100,000)



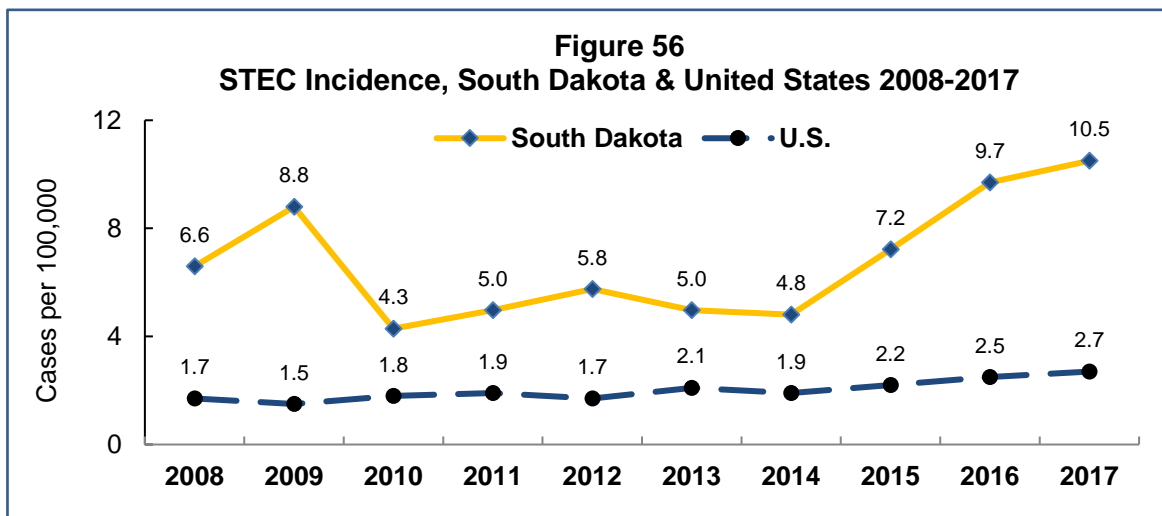
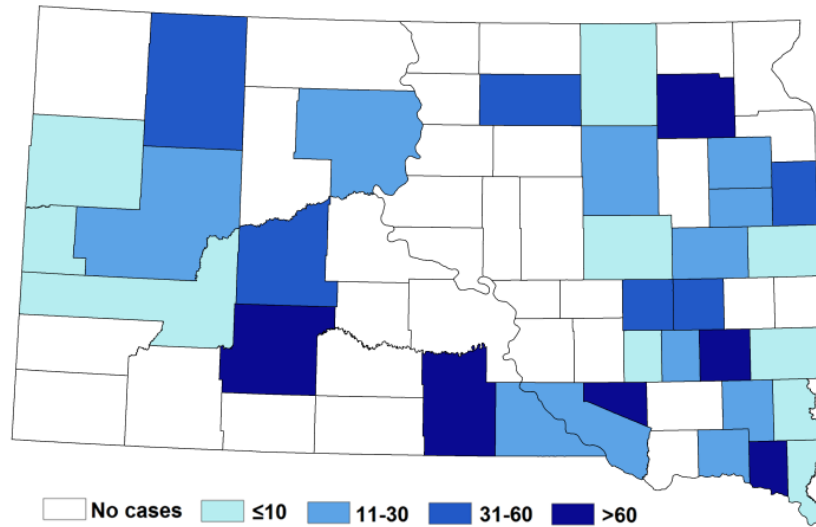
***Escherichia coli*, shiga toxin-producing (STEC)**

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 feces 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 their feces. 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 2017, 91 cases of STEC were reported, representing an 89 percent increase above the five-year median (median: 48). The incidence rate was 10.5 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 38 cases (42%) that occurred in children less than 15 years of age. Three 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 2017: 34 cases of O157:H7, 14 cases of O103, nine cases of O111, eight cases of O26, five cases of O121, three cases of O145, two cases of O5:NM, and one case each of O91, O172, and O159:H19.

Figure 55
Incidence of STEC by County of Residence: South Dakota, 2017
(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*). Giardiasis is transmitted person-to-person or by contaminated water, or in some cases animal-to-human. In 2017, 104 cases of *Giardia* infection were reported in South Dakota residents (12.0 cases per 100,000 population). This represented a 20 percent decrease from the five-year median (median: 129). South Dakota’s giardiasis rate has been more than double the national rate over the past decade.

Figure 57
Incidence of Giardiasis by County of Residence: South Dakota, 2017
(cases per 100,000)

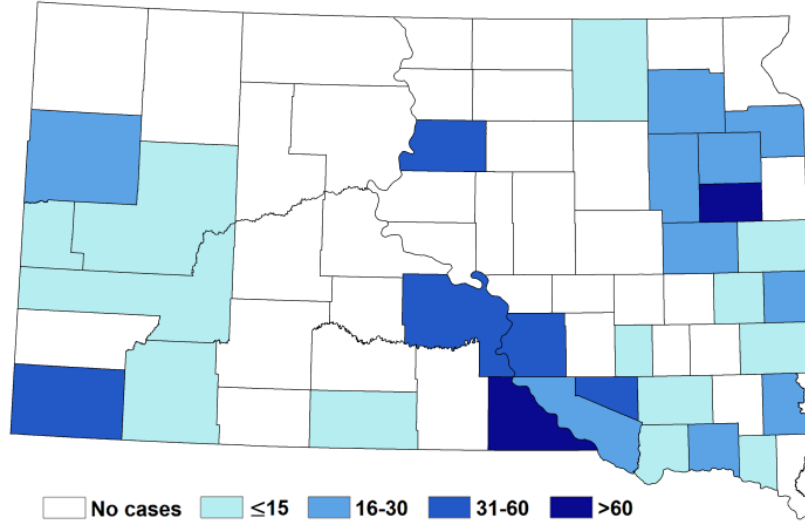
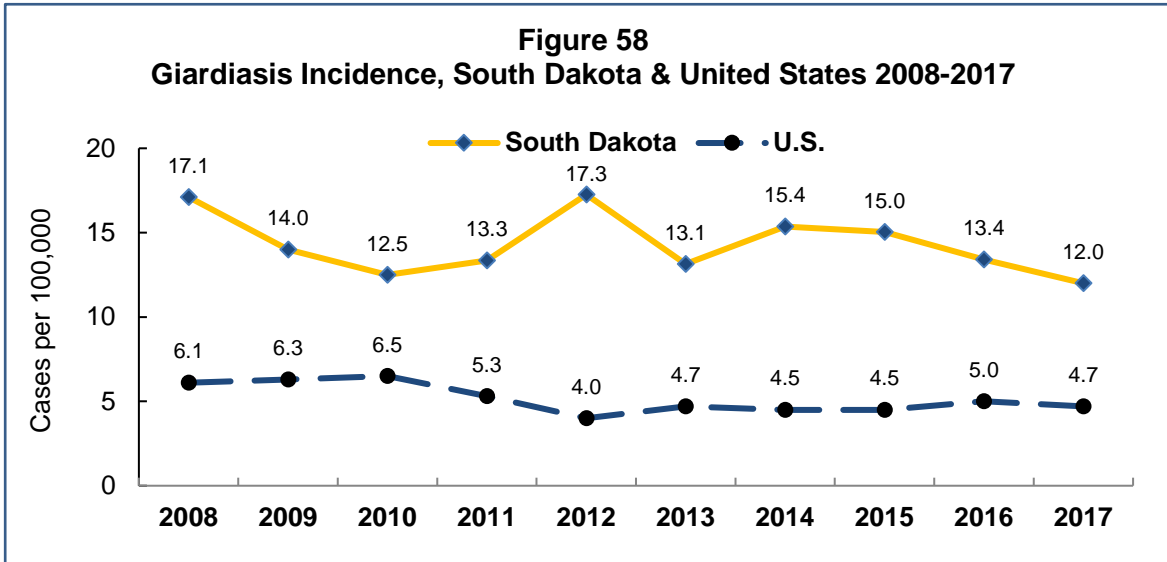


Figure 58
Giardiasis Incidence, South Dakota & United States 2008-2017



Gonorrhea

Gonorrhea is a sexually transmitted disease (STD) that can cause infections in the genitals, rectum, and throat, and less commonly as an 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 2017, there were 1,291 cases, which is a rate of 148.4 cases per 100,000 population. The median age for gonorrhea cases was 25 years old (range: 0 to 80). Females accounted for 56 percent of cases.

Figure 59
Incidence of Gonorrhea by County of Residence: South Dakota, 2017
 (cases per 100,000)

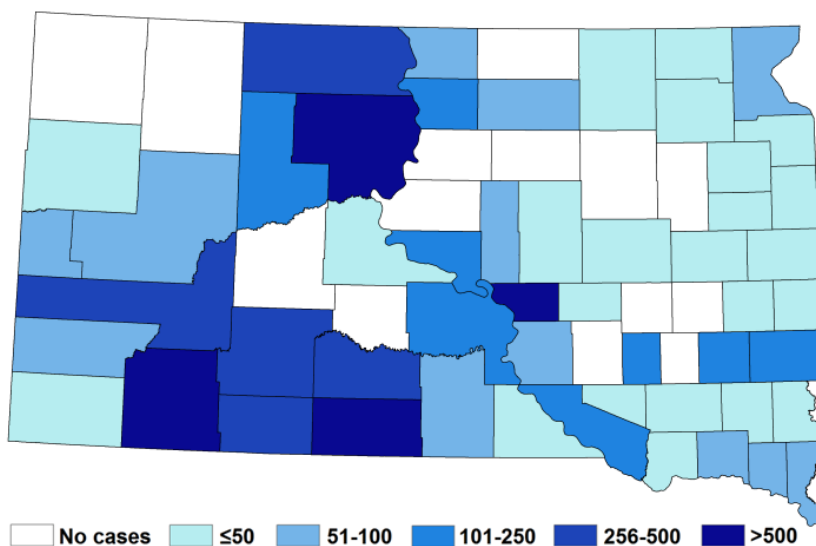
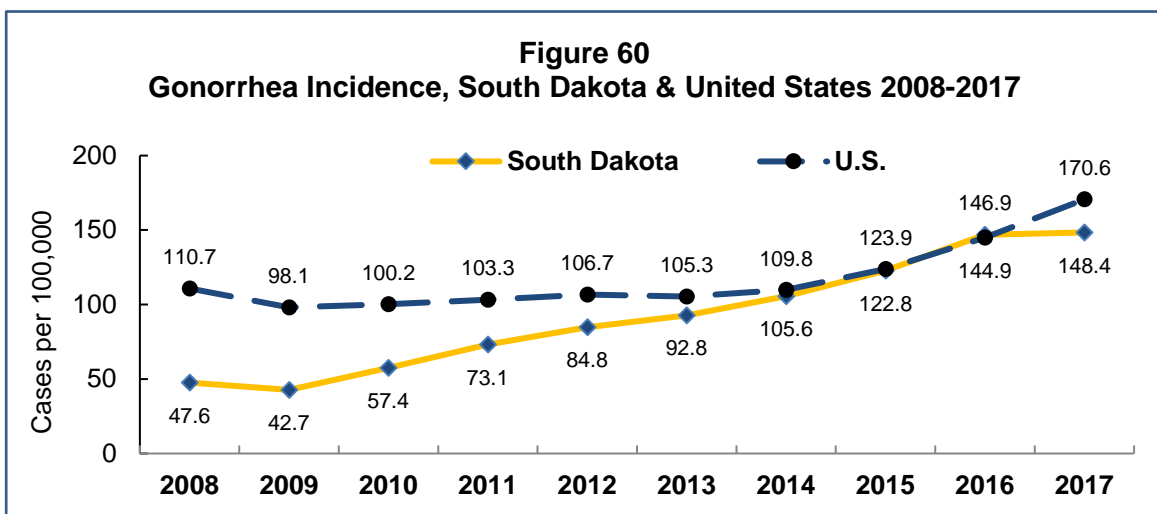
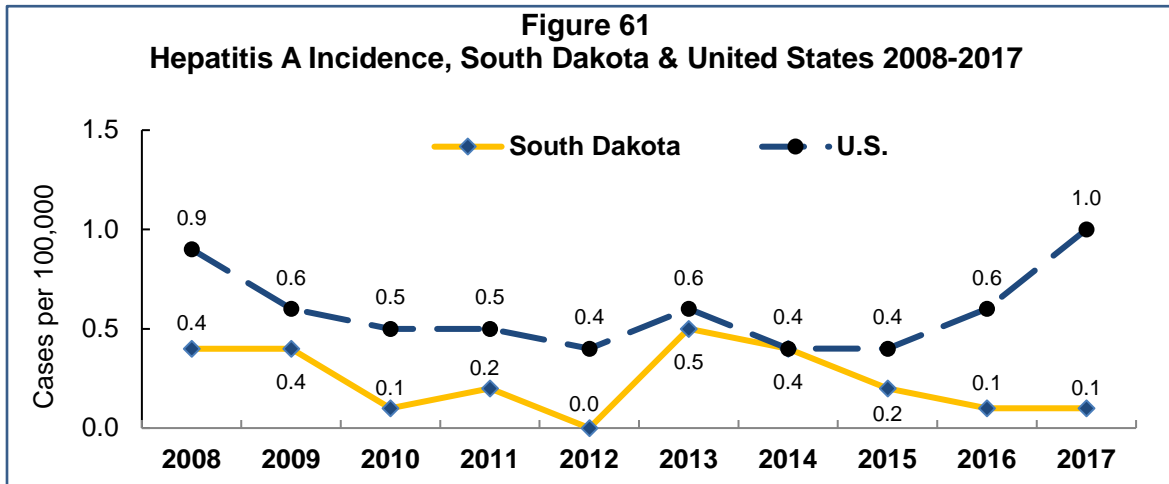


Figure 60
Gonorrhea Incidence, South Dakota & United States 2008-2017



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 2017.



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 percent 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 two cases of acute hepatitis B and 52 cases of chronic hepatitis B reported in 2017. The median age of cases was 34 years old (range: 4 to 71) and 65 percent were male.

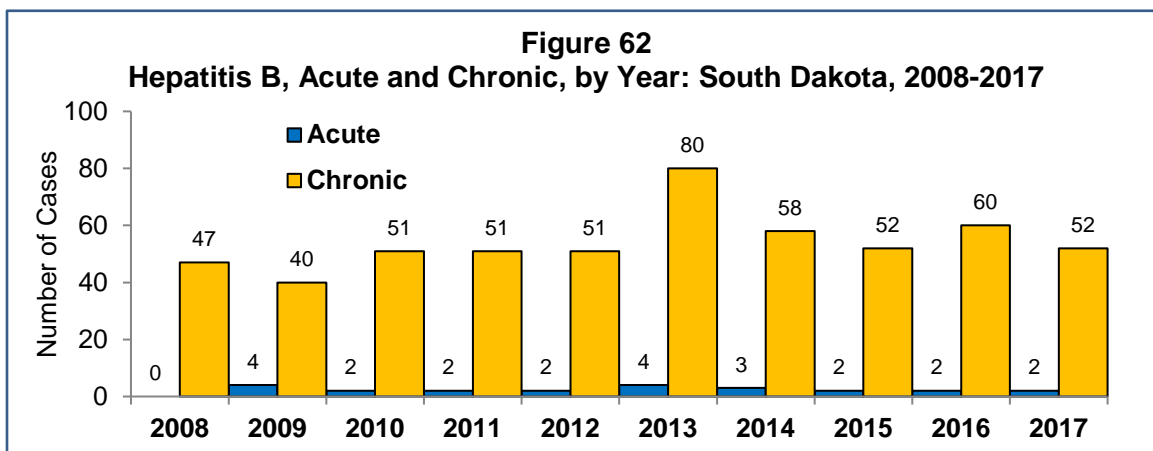
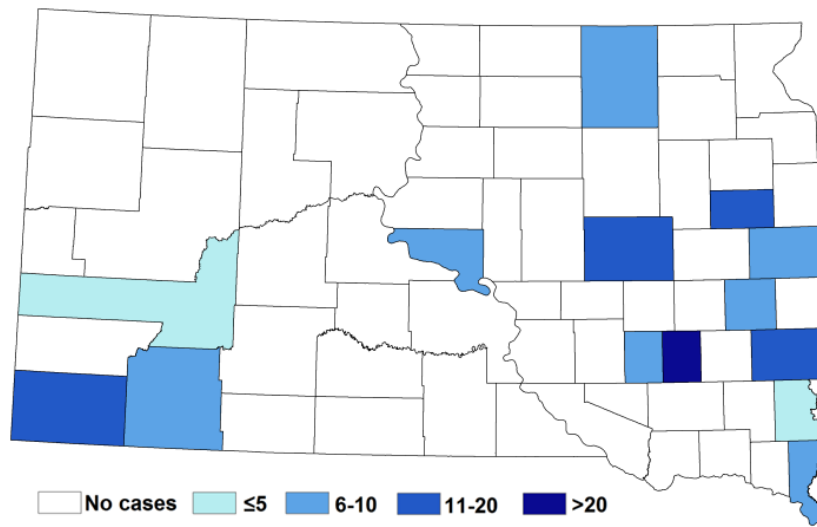


Figure 63
Incidence of Hepatitis B, Chronic, by County of Residence: South Dakota, 2017
(cases per 100,000)

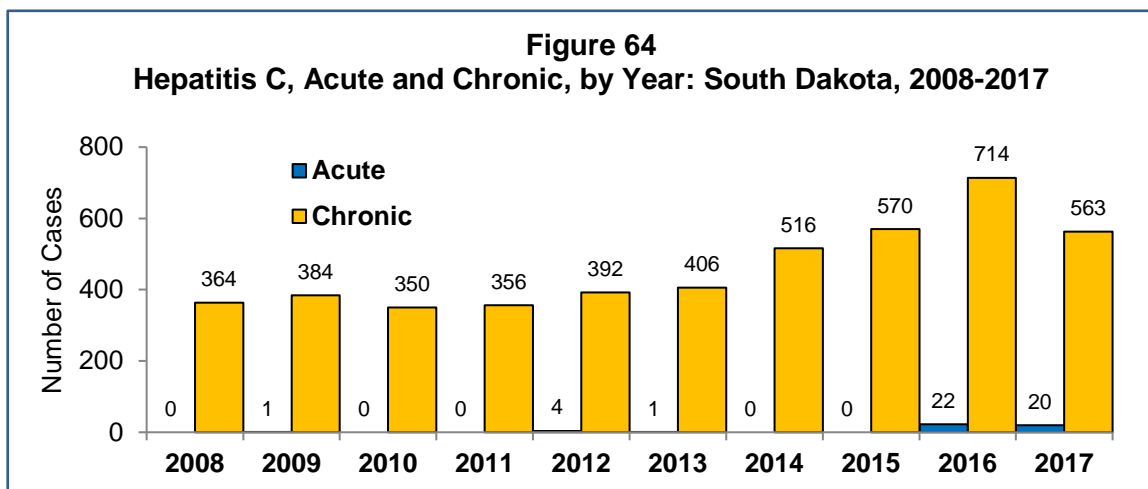


Hepatitis C, Acute and Chronic

Hepatitis C causes liver disease. For most people hepatitis C is a long-term, chronic infection and may cause long-term health problems resulting in death. The majority (70-80%) of persons might not be aware of their infection because they do not become clinically ill. There is no vaccine available for hepatitis C. Hepatitis C is a blood-borne virus and the greatest risk for infection is among persons who inject drugs.

There were 583 cases of hepatitis C (20 acute, 563 chronic) reported during 2017 in South Dakota. The counties with the highest incidence (cases per 100,00 population) were Corson (452), Lyman (359), Buffalo (350), Dewey (326), and Oglala Lakota (223).

Figure 64
Hepatitis C, Acute and Chronic, by Year: South Dakota, 2008-2017



Influenza

During the 2017-2018 influenza season, the predominant virus was influenza A(H3N2). In South Dakota, there were 5,978 confirmed influenza cases reported to SDDOH, including 607 (10%) A(H3N2), 75 (1%) A(H1N1), 3,717 (62%) A-not subtyped, and 1,448 (24%) influenza B. Additionally, 51,761 rapid antigen influenza tests were performed with 10,282 positive (20%) results; 7,141 (69%) positive for influenza A and 3,141 (31%) positive for influenza B.

The first confirmed case of influenza was reported the first week of October 2017 and the last case reported early September 2018.

The peak of the season was the third week in February 2018 with A(H1N1), A(H3N2) and influenza B viruses all circulating at the same time.

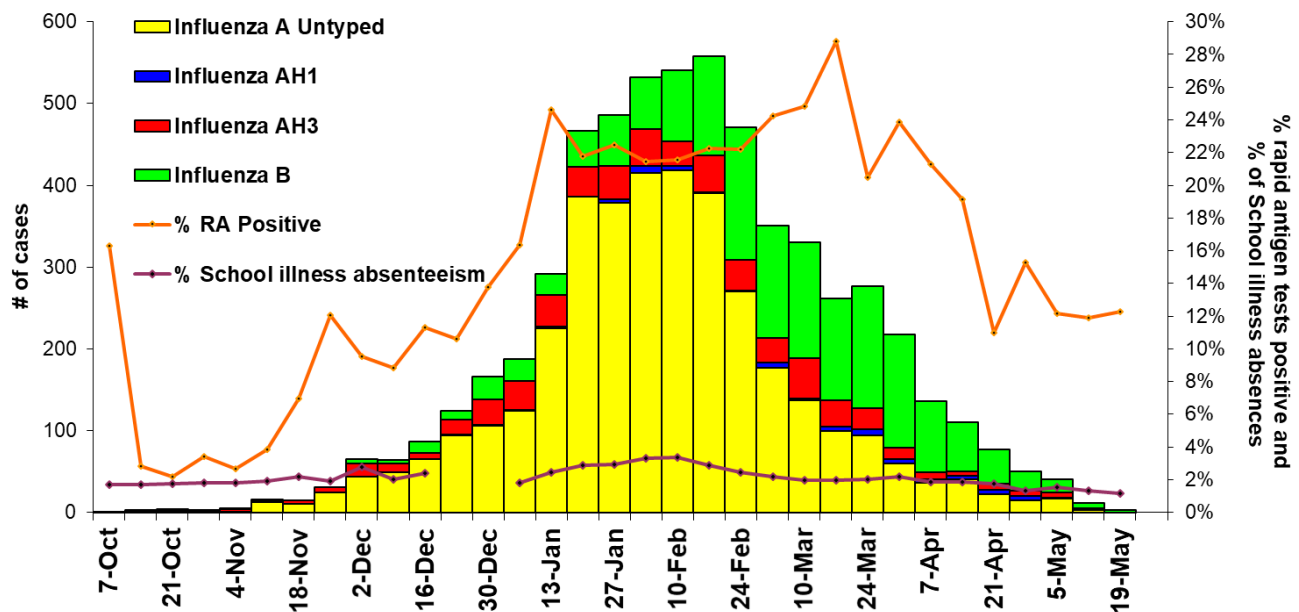
There were 878 individuals reported hospitalized during the 2017-2018 influenza season and 100 influenza-associated deaths reported.

Table 86
South Dakota Influenza Cases by Age group, 2017-2018

Lab Confirmed Influenza Cases (by DFA, PCR, or culture)		Influenza Associated Hospitalizations	Influenza Associated Deaths
Age Group	# Cases (%)	# Hosp (%)	Deaths (%)
0-4	1244 (21%)	62 (7%)	0 -
5-18	1635 (27%)	33 (4%)	1 (1%)
19-49	1222 (20%)	97 (11%)	1 (1%)
50-64	732 (12%)	139 (16%)	5 (5%)
> 64	1145 (19%)	547 (62%)	93 (93%)
Total	5978	878	100

Figure 67
2017-2018 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 exposure to Lyme disease in South Dakota is low.

In 2017, 12 cases of Lyme disease were reported in South Dakota residents. Ten (83%) cases reported recent travel to other states in the Midwest and Northeast where they were likely exposed to blacklegged ticks.

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

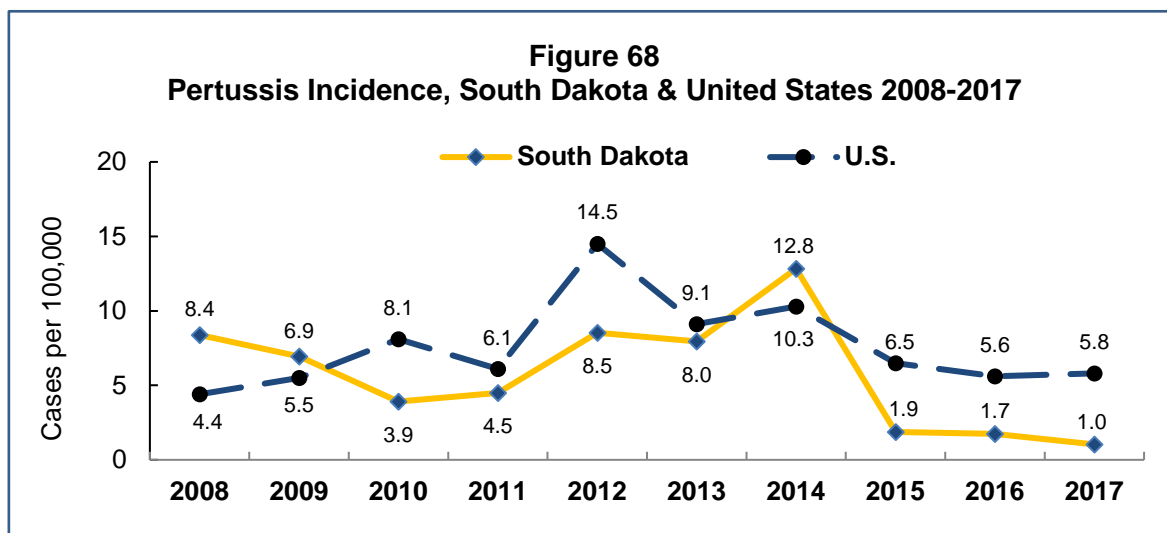
Methicillin-resistant *Staphylococcus aureus* (MRSA) is a bacterium resistant to most commonly used antibiotics. Most MRSA infections are skin infections, but may cause life-threatening bloodstream infections, pneumonia and surgical site infections.

In 2017, there were 115 cases of invasive MRSA reported in South Dakota, a 7 percent decrease from the five-year median (median: 124). 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. Youth and adults infected with pertussis may expose unprotected infants who are at risk of severe disease and complications.

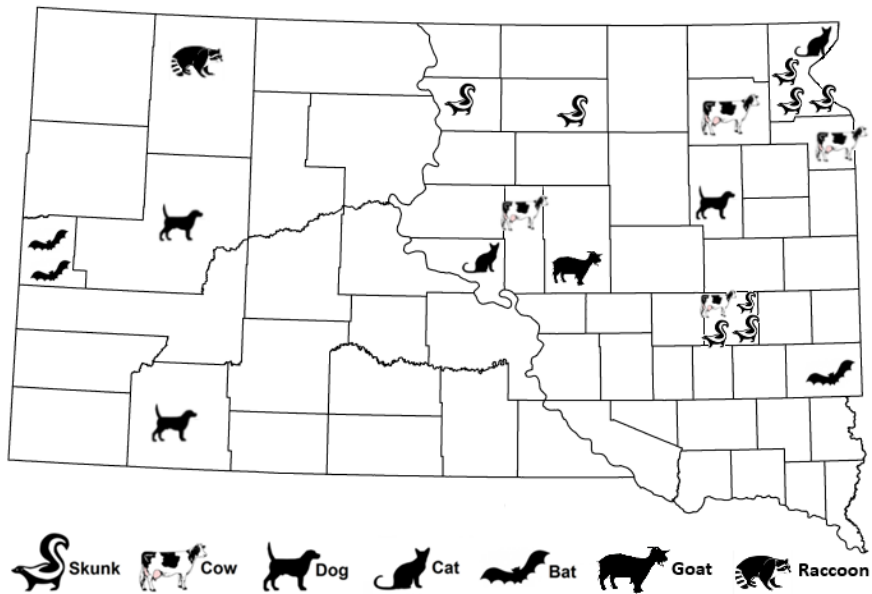
In 2017, nine cases of pertussis were reported in South Dakota. Two (22%) cases were less than 15 years old.



Rabies, animal

Rabies is a viral disease affecting the central nervous system. All mammals, including humans, are susceptible to the rabies virus. In humans, rabies causes a rapidly progressive and fatal encephalomyelitis (infection of the brain and spinal cord). Bites from infected animals constitute the primary route of transmission. Skunks (*Memphitis mephitis*) are the primary rabies reservoir in South Dakota. Over the past decade 48 percent of skunks tested have been rabid. Bat rabies is also enzootic in South Dakota with three percent of bats tested being positive.

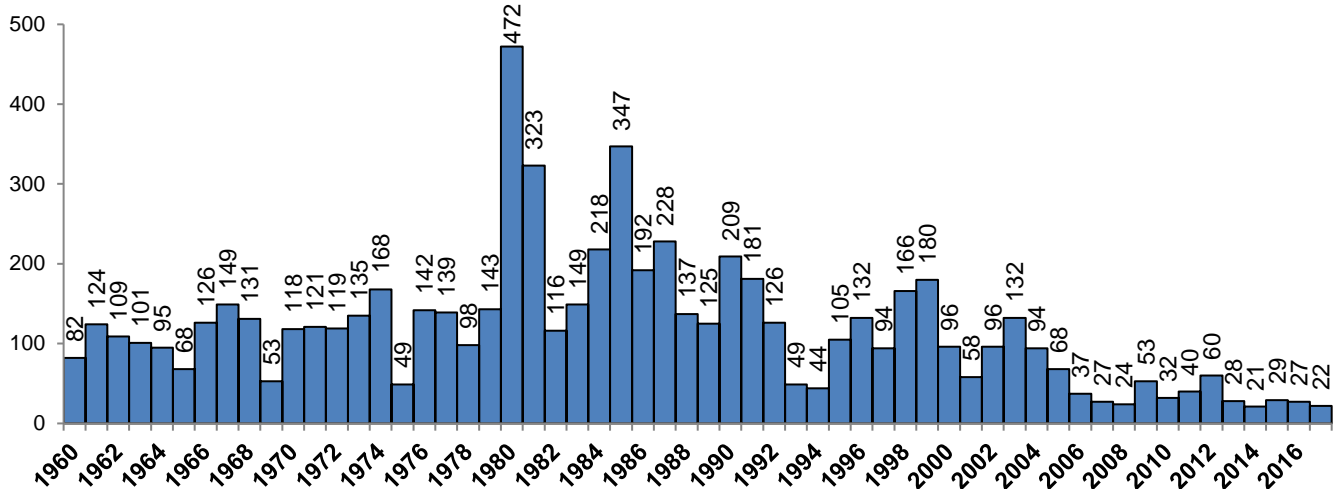
Figure 69
Animal Rabies in South Dakota, 2017



A total of 22 animals tested positive for rabies in 2017, a 19 percent decrease from the previous year. The 22 rabid animals included nine domestic animals (4 cattle, 3 dogs, 2 cats) and 13 wild animals (8 striped skunks, 3 bats, 1 raccoon). No human rabies was reported. South Dakota's last human rabies case was in 1970.

Rabid animals during 2017 were from the following counties: Clark 1, Day 1, Edmunds 1, Grant 1, Hand 1, Hughes 1, Hyde 1, Lawrence 2, Mead 1, Miner 4, Minnehaha 1, Oglala Lakota 1, Perkins 1, Roberts 4, and Walworth 1.

Figure 70
Animal Rabies, by Year: South Dakota, 1960 - 2017



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 2017, 226 cases of salmonellosis were reported in South Dakota (incidence of 26.0 cases per 100,000 population). This represented a 23 percent increase over the five-year median (median: 183). The *Salmonella* serotypes most commonly identified were *S. Typhimurium* (59 cases) and *S. Enteritidis* (38 cases), accounting for 51 percent of cases with available serotype information.

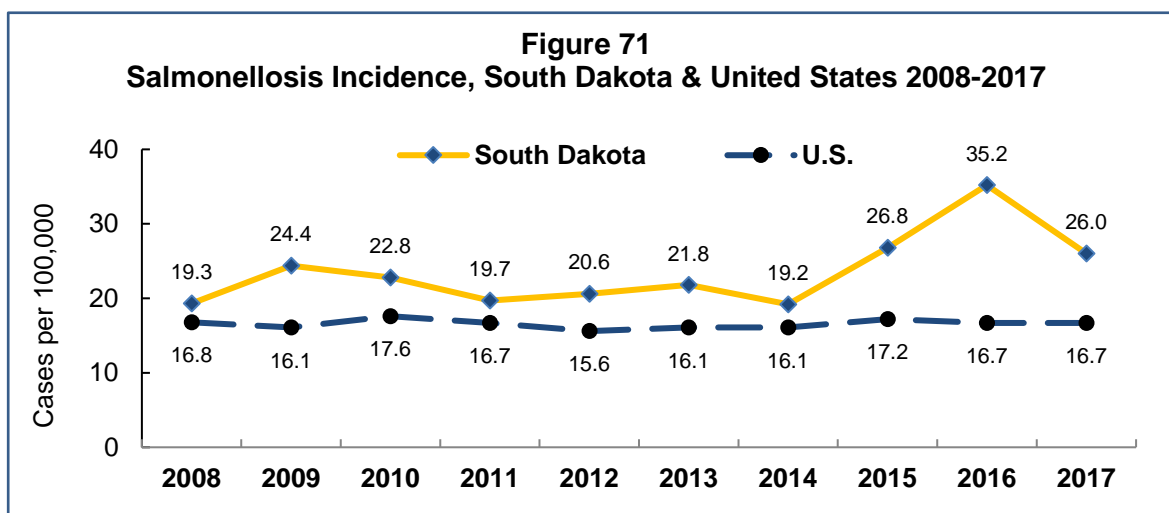
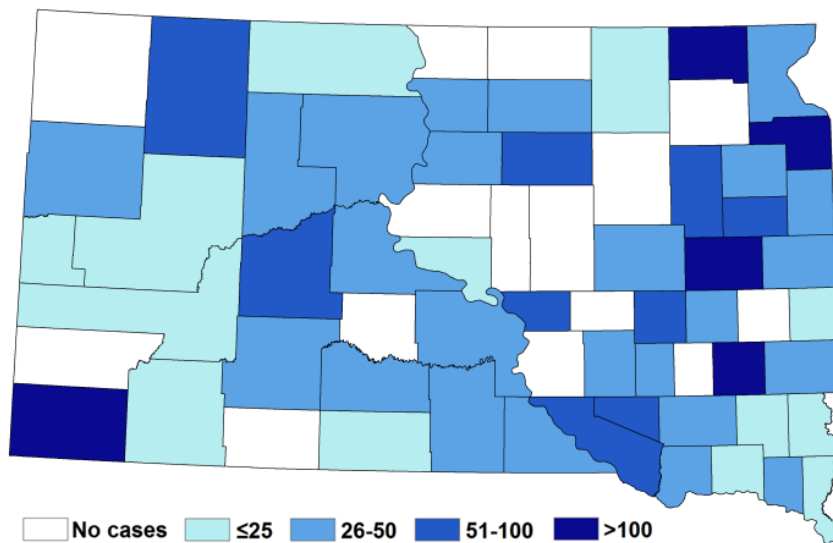


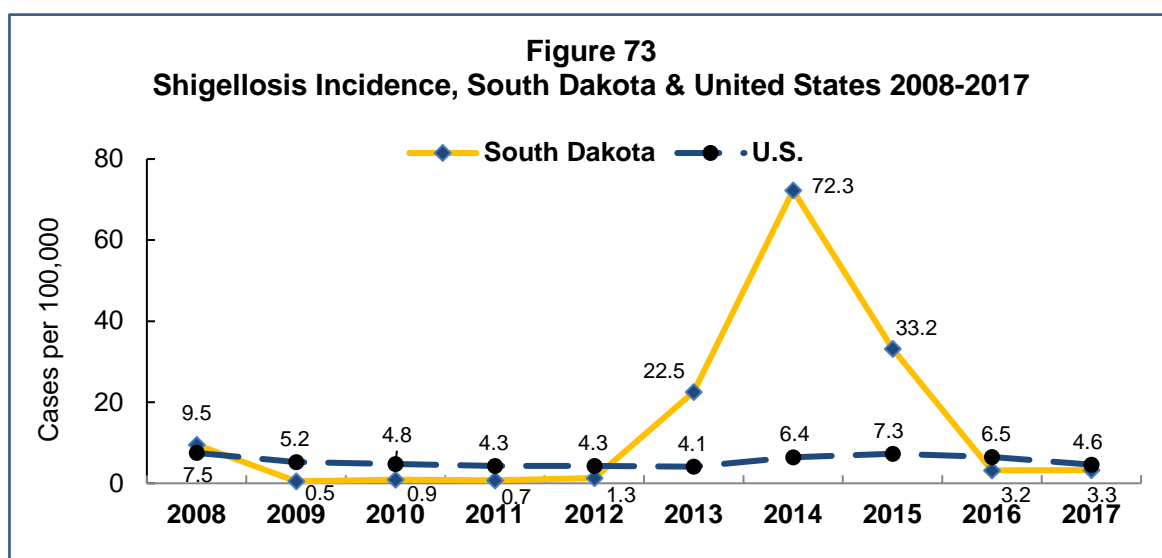
Figure 72
Incidence of Salmonellosis by County of Residence: South Dakota, 2017
(cases per 100,000)



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 occurs within one to four days. 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 2017, there were 29 cases of shigellosis reported in South Dakota – an 85 percent decrease from the five-year median (median: 190). The median age of cases was 36 years (range: 0 to 88). 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 the bacteria *Streptococcus pneumoniae*, 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 2017, 135 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 52 cases of early syphilis (primary and secondary, early latent) and three congenital syphilis cases reported in 2017. During the five-year period, 2013-2017, 30 of South

Dakota's 66 counties reported cases of primary, secondary or congenital syphilis. Three counties (Minnehaha, Corson and Dewey) accounted for 72 percent 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.

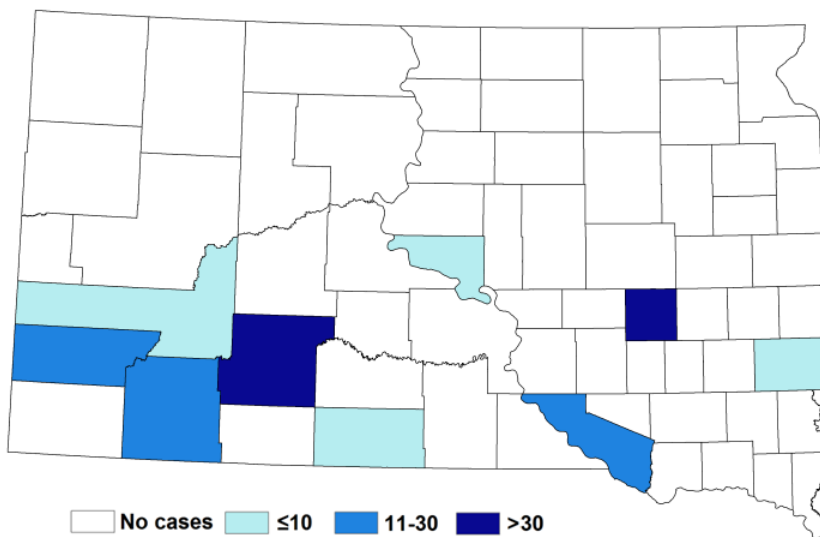
There were 14 cases of TB reported in South Dakota in 2017. The median age of cases was 54 years (range: 23 to 82). American Indians have historically reported the highest percentage of TB cases by race. This trend continued in 2017 as American Indians contributed 50 percent of the total TB cases. In addition, 43 percent of the TB cases were foreign-born.

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 13 cases of tularemia reported in South Dakota in 2017 (4 oropharyngeal, 3 ulceroglandular, 2 glandular, 2 typhoidal, and 2 pneumonic). Sanborn County had the highest incidence at 81.6 cases per 100,000 population.

Figure 74
Incidence of Tularemia by County of Residence: South Dakota, 2017
(cases per 100,000)



Varicella (chicken pox)

Varicella (chicken pox) is a highly contagious disease consisting of a blistery 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 the cough or sneeze of an infected person. 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.

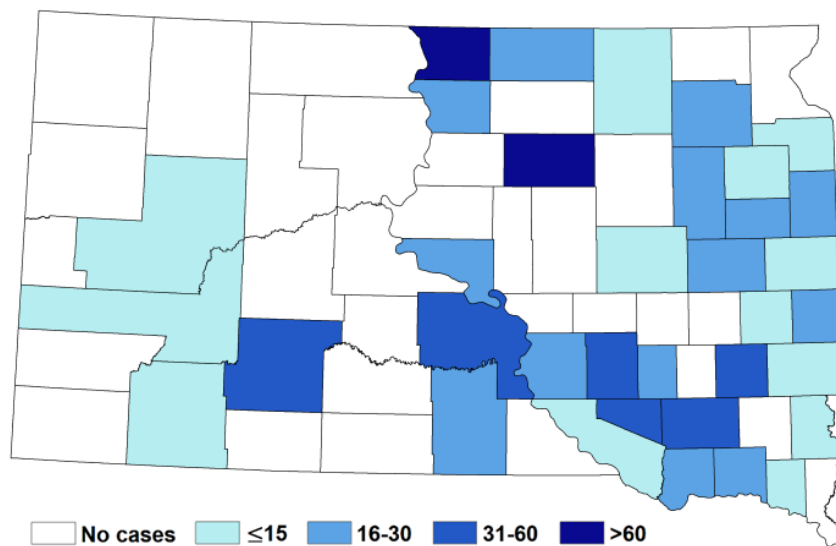
In 2017, 24 cases of chicken pox were reported in South Dakota with 46 percent of cases being unvaccinated. The median age was 3 years old (range: 0 to 34).

West Nile Virus (WNV)

West Nile disease is a viral mosquito-borne illness that emerged in South Dakota in 2002. Less than one percent of people who are infected with WNV develop a serious neurologic illness such as encephalitis (infection of the brain) or meningitis (infection of the spinal cord). 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 ten percent. About 20 percent 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, 73 human cases of WNV disease (27 neuroinvasive and 46 non-neuroinvasive) were reported in 2017. The overall incidence of WNV was 8.4 cases per 100,000 population. Thirty-three (45%) WNV cases were hospitalized, and there were four deaths. Additionally, two persons were identified to have WNV infection through blood donation screening.

Figure 75
Incidence of WNV by County of Residence: South Dakota, 2017
(cases per 100,000)



Other Infectious Diseases

Other infectious diseases reported in South Dakota during 2017 include: 15 cases of legionellosis, 13 cases of spotted fever rickettsiosis, 12 cases of vibriosis, eight cases of malaria, six cases of coccidioidomycosis, five cases of Q fever, four cases of cyclosporiasis, two cases of listeriosis, and one case each of anaplasmosis, brucellosis, hantavirus pulmonary infection, and invasive *Haemophilus influenzae* Type B. Additionally, there were two Zika virus infections reported in pregnant women who had recently spent time outside of the United States.