SOUTH DAKOTA DEPARTMENT OF HEALTH

PUBLIC HEALTH BULLETIN

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A decade of West Nile virus in South Dakota: human epidemiology 2002 – 2011

By Lon Kightlinger, MSPH, PhD, State Epidemiologist

West Nile virus (WNV), a mosquito-borne flavivirus, was first detected in North America during the summer of 1999 in New York City. Over the next several years WNV swarmed across North America, reaching South Dakota in 2002 and all contiguous 48 United States by 2006. During the 10 years since WNV was first detected in South Dakota 1,759 people have been reported and confirmed ill and 26 individuals have died. Although we are unable to predict WNV's activity during the next decade, it is prudent to expect it to persist as a public health threat to South Dakota into the foreseeable future.

West Nile cases and deaths in South Dakota and the United States, 1999-2011

	South Dakota				United States*			
Year	Neuro-invasive	Fever	Total cases	Deaths	Neuro-invasive	Fever	Total cases	Deaths
1999	0	0	0	0	59	3	62	7
2000	0	0	0	0	19	2	21	2
2001	0	0	0	0	64	2	66	10
2002	14	23	37	0	2,946	1,160	4,156	284
2003	170	869	1,039	14	2,866	6,830	9,862	264
2004	6	45	51	1	1,142	1,269	2,539	100
2005	35	194	229	2	1,294	1,607	3,000	119
2006	38	75	113	3	1,459	2,616	4,269	177
2007	48	160	208	6	1,217	2,350	3,630	124
2008	11	28	39	0	687	624	1,356	44
2009	6	15	21	0	373	322	720	32
2010	4	16	20	0	629	392	1,021	57
2011*	0	2	2	0	474	216	690	43
TOTAL	332	1,427	1,759	26	13,229	17,393	31,392	1,263

*2011 United States data is provisional, South Dakota is complete

Culex tarsalis mosquitoes are the insect vector of WNV in South Dakota and birds are the primary reservoir of the virus. Humans are among the accidental mammalian hosts. Human infection is generally asymptomatic, but approximately 20% of human infections cause acute febrile illness (West Nile fever) and about 1% develops more severe neuroinvasive syndromes including meningitis, encephalitis and acute flaccid

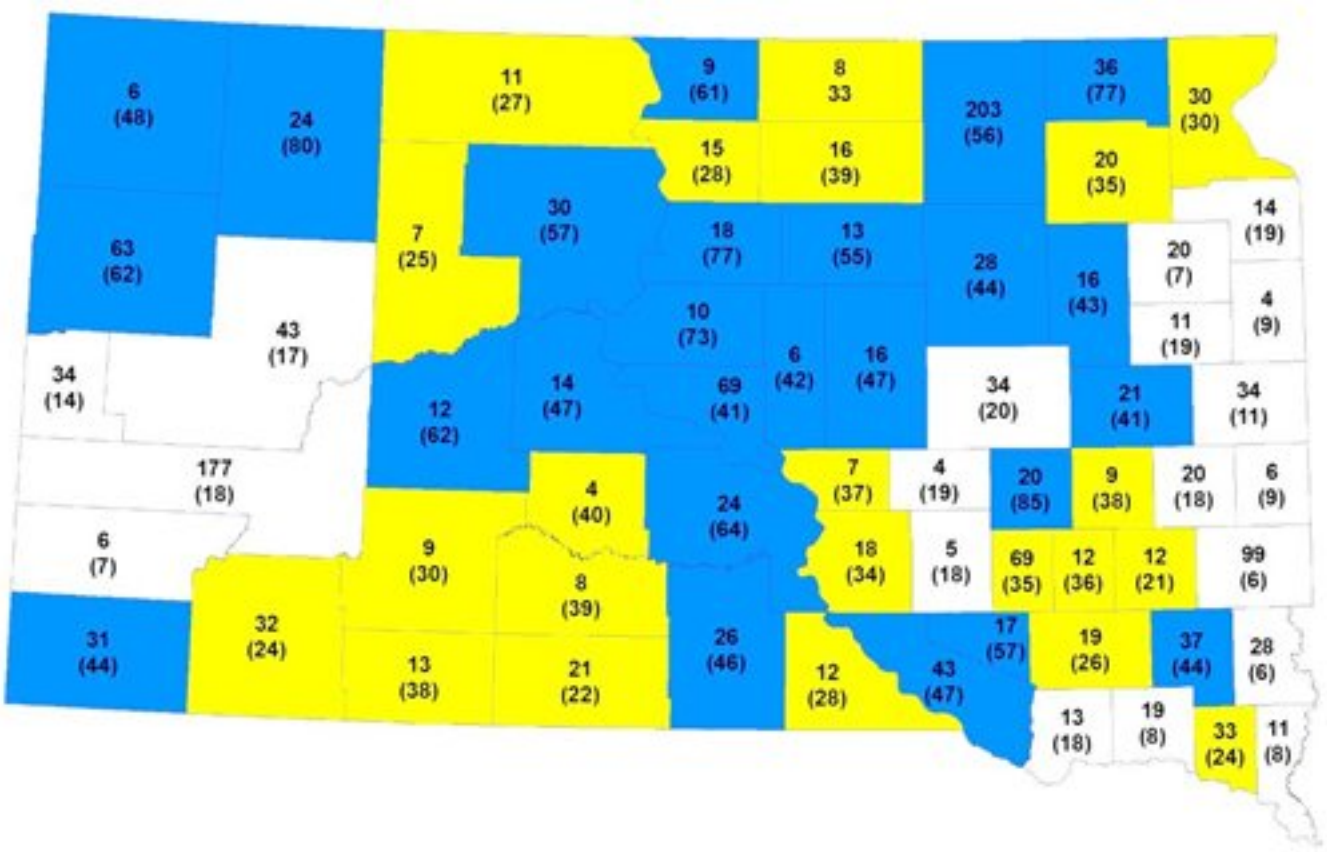
paralysis or poliomyelitis. Approximately 10% of WNV neuroinvasive cases are fatal. Since WNV disease is a relatively recent occurrence in the United States the long-term health problems of those infected are not yet well understood.

Since 1999 there have been 31,392 reported cases of human WNV disease and 1,263 WNV-associated deaths in the United States. In South Dakota 1,759 human WNV disease cases, including 332 cases of WNV neuroinvasive cases and 26 WNV-associated deaths, have been reported since 2002. The peak outbreak year in South Dakota was 2003 when 1,039 human WNV cases and 14 deaths were reported, while 2011 had the fewest with only 2 confirmed cases. During the 2003 WNV outbreak South Dakota had 10.5% of reported WNV cases in the nation and 5.3% of deaths. During the past 10 years there have also been 119 viremic blood donors, 2 cases of WNV transmission through blood transfusion, and 16 cases of pregnancy-associated WNV illness reported in South Dakota.

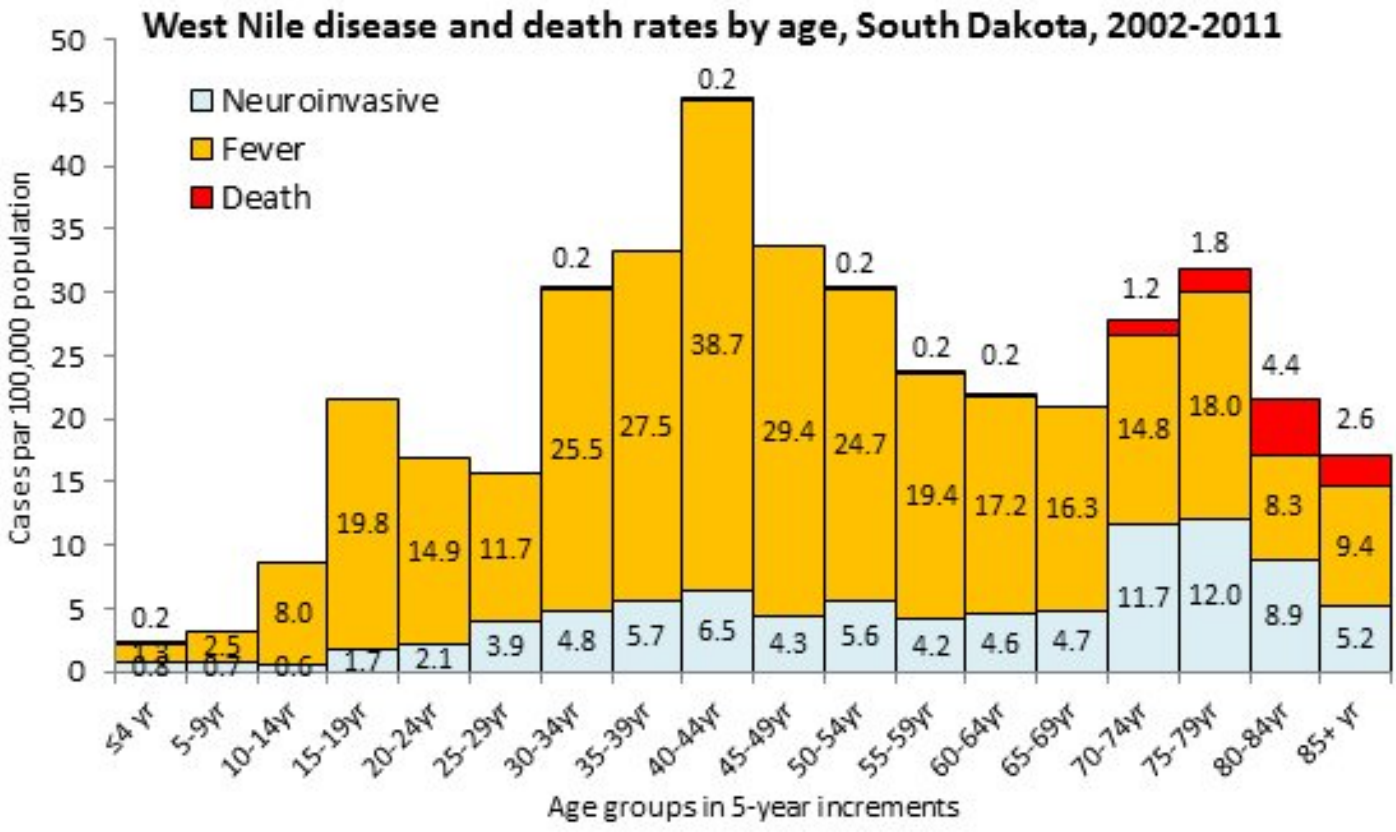
Human WNV cases have been reported in residents of all 66 South Dakota counties over the past decade. The annual average rate of disease in South Dakota has been 21.6 cases per 100,000 population over the past 10 years. Brown County reported the most cumulative WNV cases, 203, and Deuel and Jerauld counties have had the fewest case, 4. Sanborn County had the highest average annual incidence of WNV disease was (84.9 cases per year per 100,000 population), whereas Minnehaha County had the lowest incidence (5.8 cases per year per 100,000 population). Nearly every city, town and village in the state had human WNV cases reported over the past decade. Ten communities reported 20 or more cases during the 10-year period: Rapid City 160, Aberdeen 154, Sioux Falls 81, Mitchell 62, Pierre 62, Belle Fourche 37, Spearfish 27, Huron 22, Sturgis 20 and Vermillion 20.

West Nile cases reported 2002-2011 (upper number) **and average annual disease rate per 100,000 population** (lower number in parenthesis)**, South Dakota.** State rate 21.6.

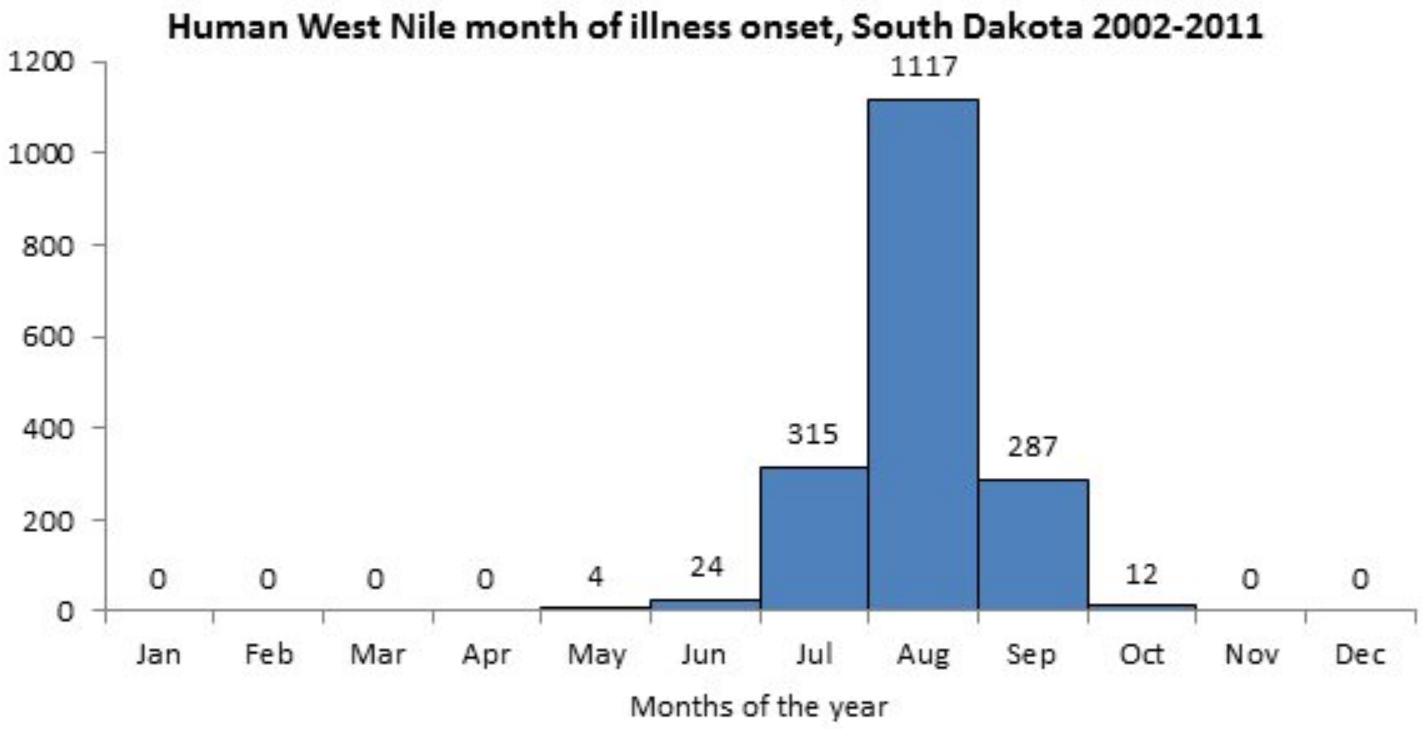
White counties: low incidence <20 cases per 100,000 population per year.
Yellow (light gray) counties: medium incidence 20-39 cases per 100,000 population per year.
Blue counties (dark gray): high incidence ≥40 cases per 100,000 population per year.



People in all age groups have been infected, sickened and killed by WNV in South Dakota. The youngest death was a baby less than 6 months of age, while the oldest case was 96 and the oldest death was 92 years of age. People in their 70's had the highest risk of developing neuroinvasive disease, while middle-age people in their 40's had the highest rate of WNV fever diagnosis. The elderly had the highest death rate with 77% of all WNV-associated deaths being among people 70 years and older. The WNV disease rates appeared to be normally distributed among the race groups in South Dakota with White people accounting for 91% of reported cases and 81% of deaths, while American Indians accounted for 9% of cases and 15% of deaths. Other race groups comprised <1% of cases. People who are immunocompromised, pregnant or have had organ transplants are at higher risk of severe WNV disease.



West Nile disease is a seasonal illness in South Dakota associated with the ecology, distribution and infectiousness of the *Culex tarsalis* mosquito vector and the bird reservoirs. Following the bite of a WNV infectious mosquito there is a 2 to 15 day incubation period before a person becomes ill. Although cases have occurred from May to October in South Dakota, 98% of cases became ill during July, August and September, with 64% of cases occurring during August. The earliest case onset was 8 May 2004 and the latest case in the season was 17 October 2005.



As we enter the eleventh season of WNV transmission in South Dakota, and the fourteenth year in the United States, a human vaccine is still not licensed, and specific treatment regimens are still experimental. The lack of vaccine prevention and solid medical treatment leaves mosquito avoidance and mosquito control as the primary means of WNV prevention. The screening of donated blood has made blood transfusions safer.

The most important WNV prevention measures are mosquito avoidance and mosquito control. Mosquito avoidance includes limiting time outdoors, wearing protective clothing, screening windows and doors, sleeping under bed nets, avoiding infested areas and discouraging mosquito bites by using repellents containing DEET, Picaridin, Oil of Lemon Eucalyptus or IR3535. Mosquito control measures include elimination of standing water on personal and public property, and community-wide mosquito larval control and adulticide spraying. South Dakota communities have made considerable progress fighting the mosquitoes. In 2001, prior to the emergence of WNV, 8 South Dakota communities claimed to have mosquito control programs. Six years later, of the 233 South Dakota municipalities and tribes surveyed, 65% said they were using larvicidal control, 84% were doing adulticide spraying mosquito control, and 63% of communities were doing both.

Over the past 10 years human WNV infection has caused extensive disease and death in South Dakota. Although the infection rate has decreased since 2003 this mosquito-borne disease is unpredictable and may persist as a public health threat into the foreseeable future.

Public health surveillance case definition for West Nile disease and other arboviral diseases

[California Serogroup Viruses, (i.e., California encephalitis, Jamestown Canyon, Keystone, La Crosse, Snowshoe hare, and Trivittatus viruses), Eastern Equine Encephalitis Virus, Powassan Virus, St. Louis Encephalitis Virus, West Nile Virus, Western Equine Encephalitis Virus] www.cdc.gov/osels/ph_surveillance/nndss/casedef/arboviral_current.htm

Background: Arthropod-borne viruses (arboviruses) are transmitted to humans primarily through the bites of infected mosquitoes, ticks, sand flies, or midges. Other modes of transmission for some arboviruses include blood transfusion, organ transplantation, perinatal transmission, consumption of unpasteurized dairy products, breast feeding, and laboratory exposures.

Clinical description: Most arboviral infections are asymptomatic. Most arboviral infections are asymptomatic. Clinical disease ranges from mild febrile illness to sever encephalitis. For the purposes of surveillance and reporting, based on their clinical presentation, arboviral

disease cases are often categorized into two primary groups: neuroinvasive disease and non-neuroinvasive disease.

Neuroinvasive disease: Many arboviruses cause neuroinvasive disease such as aseptic meningitis, encephalitis, or acute flaccid paralysis (AFP). These illnesses are usually characterized by the acute onset of fever with stiff neck, altered mental status, seizures, limb weakness, cerebrospinal fluid (CSF) pleocytosis, or abnormal neuroimaging. AFP may result from anterior ("polio") myelitis, peripheral neuritis, or post-infectious peripheral demyelinating neuropathy (i.e., Guillain-Barré syndrome). Less common neurological manifestations, such as cranial nerve palsies, also occur.
Non-neuroinvasive disease: Most arboviruses are capable of causing an acute systemic febrile illness (e.g., West Nile fever) that may include headache, myalgias, arthralgias, rash, or gastrointestinal symptoms. Rarely, myocarditis, pancreatitis, hepatitis, or ocular manifestations such as chorioretinitis and iridocyclitis can occur.

Clinical criteria for diagnosis: A clinically compatible case of arboviral disease is defined as follows:
Neuroinvasive disease

- Fever (≥100.4°F or 38°C) as reported by the patient or a health-care provider, **AND**
- Meningitis, encephalitis, acute flaccid paralysis, or other acute signs of central or peripheral neurologic dysfunction, as documented by a physician, **AND**
- Absence of a more likely clinical explanation.

Non-neuroinvasive disease

- Fever (≥100.4°F or 38°C) as reported by the patient or a health-care provider, **AND**
- Absence of neuroinvasive disease, **AND**
- Absence of a more likely clinical explanation.

Laboratory criteria for diagnosis

- Isolation of virus from, or demonstration of specific viral antigen or nucleic acid in, tissue, blood, CSF, or other body fluid, **OR**
- 4-fold or greater change in virus-specific quantitative antibody titers in paired sera, **OR**
- Virus-specific IgM antibodies in serum with confirmatory virus-specific neutralizing antibodies in the same or a later specimen, **OR**
- Virus-specific IgM antibodies in CSF and a negative result for other IgM antibodies in CSF for arboviruses endemic to the region where exposure occurred, **OR**
- Virus-specific IgM antibodies in CSF or serum.

Case classification —Confirmed cases:
Neuroinvasive disease: A case that meets the above clinical criteria for neuroinvasive disease and one or more the following laboratory criteria for a confirmed case:

- Isolation of virus from, or demonstration of specific viral antigen or nucleic acid in, tissue, blood, CSF, or other body fluid, **OR**
- 4-fold or greater change in virus-specific quantitative antibody titers in paired sera, **OR**
- Virus-specific IgM antibodies in serum with confirmatory virus-specific neutralizing antibodies in the same or a later specimen, **OR**
- Virus-specific IgM antibodies in CSF and a negative result for other IgM antibodies in CSF for arboviruses endemic to the region where exposure occurred.

Non-neuroinvasive disease: A case that meets the above clinical criteria for non-neuroinvasive disease and one or more of the following laboratory criteria for a confirmed case:

- Isolation of virus from, or demonstration of specific viral antigen or nucleic acid in, tissue, blood, CSF, or other body fluid, **OR**
- 4-fold or greater change in virus-specific quantitative antibody titers in paired sera, **OR**
- Virus-specific IgM antibodies in serum with confirmatory virus-specific neutralizing antibodies in the same or a later specimen, **OR**
- Virus-specific IgM antibodies in CSF and a negative result for other IgM antibodies in CSF for arboviruses endemic to the region where exposure occurred.

Case Classification — Probable cases:
Neuroinvasive disease: A case that meets the above clinical criteria for neuroinvasive disease and the following laboratory criteria:
Virus-specific IgM antibodies in CSF or serum but with no other testing.

Non-neuroinvasive disease
A case that meets the above clinical criteria for non-neuroinvasive disease and the laboratory criteria for a probable case:
Virus-specific IgM antibodies in CSF or serum but with no other testing.

Comments on Interpreting arboviral laboratory results

- **Serologic cross-reactivity.** In some instances, arboviruses from the same genus produce cross-reactive antibodies. In geographic areas where two or more closely-related arboviruses occur, serologic testing for more than one virus may be needed and results compared to determine the specific causative virus. For example, such testing might be needed to distinguish antibodies resulting from infections within genera, e.g., flaviviruses such as West Nile, St. Louis encephalitis, Powassan, Dengue, or Japanese encephalitis viruses.
- **Rise and fall of IgM antibodies.** For most arboviral infections, IgM antibodies are generally first detectable at 3 to 8 days after onset of illness and persist for 30 to 90 days, but longer persistence has been documented (e.g, up to 500 days for West Nile virus). Serum collected within 8 days of illness onset may not have detectable IgM and testing should be repeated on a convalescent-phase sample to rule out arboviral infection in those with a compatible clinical syndrome.
- **Persistence of IgM antibodies.** Arboviral IgM antibodies may be detected in some patients months or years after their acute infection. Therefore, the presence of these virus-specific IgM antibodies may signify a past infection and be unrelated to the current acute illness. Finding virus-specific IgM antibodies in CSF or a 4-fold or greater change in virus-specific antibody titers between acute- and convalescent-phase serum specimens provides additional laboratory evidence that the arbovirus was the likely cause of the patient's recent illness. Clinical and epidemiologic history also should be carefully considered.
- **Persistence of IgG and neutralizing antibodies.** Arboviral IgG and neutralizing antibodies can persist for many years following a symptomatic or asymptomatic infection. Therefore, the presence of these antibodies alone is only evidence of previous infection and clinically compatible cases with the presence of IgG, but not IgM, should be evaluated for other etiologic agents.
- **Arboviral serologic assays.** Assays for the detection of IgM and IgG antibodies commonly include enzyme-linked immunosorbent assay (ELISA), microsphere immunoassay (MIA), or immunofluorescence assay (IFA). These assays provide a presumptive diagnosis and should have confirmatory testing performed. Confirmatory testing involves the detection of arboviral-specific neutralizing antibodies utilizing assays such as plaque reduction neutralization test (PRNT).
- **Other information to consider**. Vaccination history, detailed travel history, date of onset of symptoms, and knowledge of potentially cross-reactive arboviruses known to circulate in the geographic area should be considered when interpreting results.

Colorectal Cancer in South Dakota

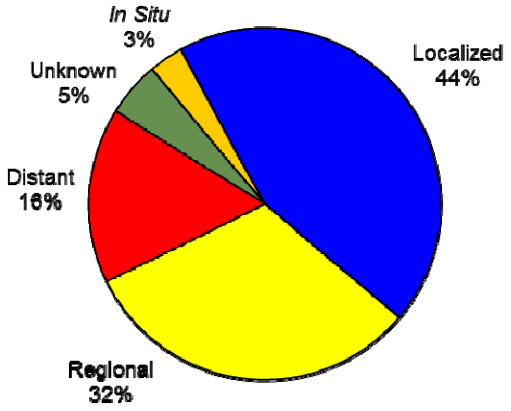
By the South Dakota Cancer Registry, South Dakota Department of Health

The South Dakota Cancer Registry has released the 2009 colorectal cancer data. For 2005-2009, the average number of new colorectal cancer cases per year is 433 and the average number of annual deaths due to colorectal cancer is 161.

Incidence 2009		**Mortality 2009**	
Number of cases		Number of deaths	
Total	426	Total	157
Males	222	Males	75
Females	204	Females	82
White	402	White	149
American Indian	18	American Indian	8
Median age at diagnosis	72 yrs	Median age at death	77 yrs
Mode	78 yrs	Mode	93 yrs
Age range at diagnosis	29-96 yrs	Age range at death	35-98 yrs
SD age-adjusted incidence rate	45.2	SD age-adjusted death rate	15.9
US SEER age-adjusted incidence rate (2008)	*45.1	US SEER age-adjusted death rate (2008)	*16.4

Rates per 100,000 US 2000 Standard Population and SD 2009 Estimated Population
*2009 US SEER age-adjusted rates not available.
Source: South Dakota Department of Health

The graph at the right displays the Surveillance Epidemiology and End Results (SEER) Summary Stage at diagnosis for 2009 colorectal cancer cases in South Dakota. As shown, almost half of the cases were diagnosed at the more advanced stages of regional and distant. Patient survival rates decline when diagnosed at a more advanced stage as illustrated in the table below for cases diagnosed nationally in years 2001-2007.



Source: South Dakota Department of Health

Stage at Diagnosis	5-Year Relative Survival, 2001-2007
Localized	90.1%
Regional	69.2%
Distant	11.7%
Unknown	33.3%

South Dakota's Colorectal Cancer Screening Program 2010-2011

GETSCREENEDSD Stop Colorectal Cancer.

To increase colorectal cancer screening, the South Dakota Department of Health implemented a colorectal screening program June 1, 2010. While the program focus is to raise awareness for all South Dakotans, the program provides direct colorectal screening services through participating medical providers for patients that qualify.

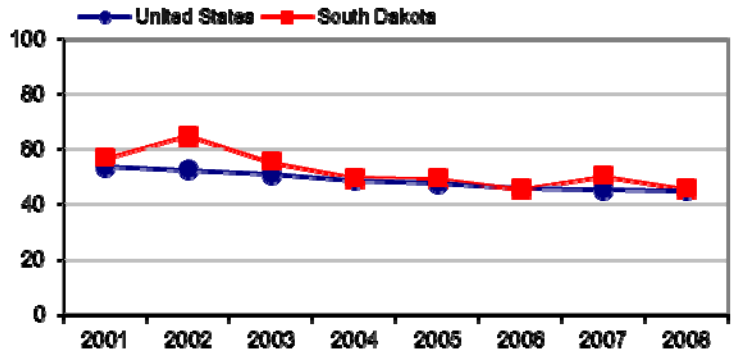
Colorectal Cancer Screening Program eligibility criteria are based on the following:

- Age: 50 and older
- Income: 200% of the Federal Poverty Guideline
- Insurance: Underinsured or uninsured for colorectal cancer screening

During the first two years of the program, 1,149 patients were screened and **118 cancers prevented!**

Diet and physical activity are the most important environmental influences on colorectal cancer. Without behavior modification to reduce the risk of developing colorectal cancer, the incidence rates will not decline without recommended colorectal cancer screenings. See below for the age-adjusted colorectal cancer incidence rates for the United States and South Dakota for 2001-2008. Except for 2002, South Dakota rates have been close to the national rates.

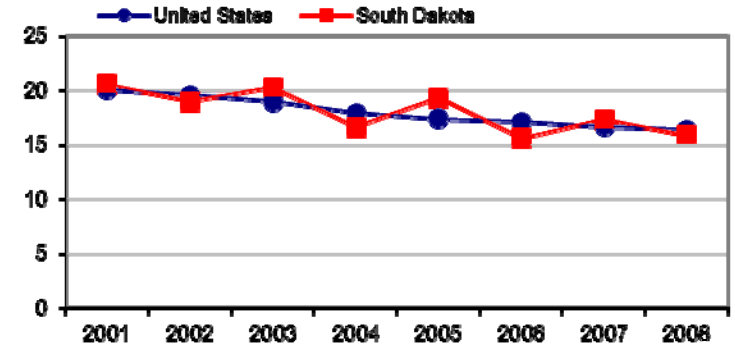
Colorectal Incidence Rates, US and SD



Rates per 100,000 US 2000 Standard Population and SD Estimated Population
US rates are provided by SEER www.seer.cancer.gov
Source: South Dakota Department of Health

Colorectal cancer screening rates in 2001 were 50% and increased to over 66% in 2010. As more South Dakotans participate in recommended colorectal cancer screenings, the mortality rates will continue to decrease. During screenings, precancerous polyps are removed to prevent cancer. The age-adjusted colorectal cancer mortality rates are shown below for the United States and South Dakota for 2001-2008.

Colorectal Mortality Rates, US and SD



Rates per 100,000 US 2000 Standard Population and SD Estimated Population
US rates are provided by SEER www.seer.cancer.gov
Source: South Dakota Department of Health

For additional information, please contact Kay Dosch, SD Cancer Registry Coordinator, at 605-773-6345 or 800-592-1861 or see the website at http://getscreened.sd.gov/registry/ under the Data & Publications tab for the entire colorectal cancer monograph.

10 Leading causes of death by year, South Dakota, 1989 – 2010*

Rank	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
1	Heart 2,383	Heart 2,322	Heart 2,324	Heart 2,277	Heart 2,253	Heart 2,275	Heart 2,273	Heart 2,187	Heart 2,124	Heart 2,102	Heart 2,016	Heart 2,105	Heart 1,984	Heart 1,933	Heart 1,942	Heart 1,775	Heart 1,764	Heart 1,743	Heart 1,623	Heart 1,677	Heart 1,778	Cancer 1,651
2	Cancer 1,461	Cancer 1,377	Cancer 1,524	Cancer 1,576	Cancer 1,529	Cancer 1,470	Cancer 1,564	Cancer 1,540	Cancer 1,548	Cancer 1,569	Cancer 1,635	Cancer 1,604	Cancer 1,598	Cancer 1,561	Cancer 1,645	Cancer 1,559	Cancer 1,610	Cancer 1,561	Cancer 1,606	Cancer 1,561	Cancer 1,506	Heart 1,611
3	Stroke 509	Stroke 520	Stroke 466	Stroke 496	Stroke 490	Stroke 496	Stroke 533	Stroke 481	Stroke 568	Stroke 537	Stroke 544	Stroke 561	Stroke 491	Stroke 518	Stroke 475	Stroke 463	Stroke 511	Accident 443	CLRD 458	CLRD 486	CLRD 440	CLRD 451
4	Accident 331	Accident 332	CLRD 324	CLRD 306	CLRD 354	Accident 303	CLRD 325	Accident 339	CLRD 337	Accident 347	Accident 340	CLRD 387	Accident 382	CLRD 382	Accident 390	Accident 407	CLRD 440	Stroke 437	Stroke 408	Alzheimer 401	Stroke 417	Stroke 411
5	CLRD 264	CLRD 271	I & P 310	Accident 300	Accident 308	CLRD 298	Accident 313	CLRD 294	Accident 300	CLRD 315	CLRD 338	Accident 318	CLRD 360	Accident 344	CLRD 379	CLRD 393	Accident 396	CLRD 375	Accident 357	Stroke 391	Alzheimer 402	Alzheimer 401
6	I & P 229	I & P 252	Accident 305	I & P 261	I & P 283	I & P 284	I & P 313	I & P 287	I & P 268	I & P 283	I & P 262	I & P 208	Diabetes 210	I & P 239	I & P 223	Alzheimer 255	Alzheimer 289	Alzheimer 330	Alzheimer 345	Accident 372	Accident 348	Accident 391
7	Diabetes 148	Diabetes 119	Diabetes 137	Diabetes 166	Diabetes 168	Diabetes 178	Diabetes 169	Diabetes 180	Diabetes 195	Diabetes 210	Diabetes 195	Alzheimer 180	I & P 186	Diabetes 193	Diabetes 201	Diabetes 227	I & P 242	Diabetes 261	Diabetes 246	Diabetes 216	Diabetes 200	Diabetes 241
8	Suicide 91	Suicide 93	Suicide 99	Aneurysm 91	Suicide 117	Suicide 98	Suicide 86	Suicide 126	Suicide 126	Suicide 115	Alzheimer 156	Diabetes 179	Alzheimer 159	Alzheimer 169	Alzheimer 175	I & P 180	Diabetes 239	I & P 173	I & P 189	I & P 186	I & P 135	I & P 166
9	Liver 73	Atheros 56	Aneurysm 74	Suicide 79	Liver 76	Liver 86	Kidney 76	Alzheimer 78	Senility 88	Kidney 93	Suicide 103	Kidney 130	Mental 135	Mental 144	Mental 159	Suicide 114	Suicide 123	Suicide 125	Suicide 101	Suicide 123	Suicide 128	Suicide 139
10	Atheros 63	Aneurysm 54	Kidney 69	Kidney 77	Kidney 73	Kidney 83	Liver 76	Mental 74	Kidney 75	Senility 77	Kidney 99	Suicide 95	Suicide 108	Kidney 128	Kidney 131	Liver 97	Liver 83	Liver 83	Liver 94	Liver 100	Liver 99	Liver 93
Total	6,534	6,320	6,636	6,680	6,774	6,724	6,901	6,793	6,855	6,850	6,941	7,014	6,915	6,886	7,109	6,811	7,074	7,038	6,800	7,056	6,913	7,087
CDR												929	911	904	927	880	907	893	853	877	851	870
AADR												805	786	772	787	742	758	732	695	712	689	713

*ICD-9 codes 1988-1998; ICD-10 codes 1999-2010.
Heart: Heard disease
CLRD: Chronic lower respiratory disease, also as COPD chronic obstructive pulmonary disease
Aneurysm: Aortic Aneurism
Kidney: Nephritis, nephrotic syndrome and nephrosis

CDR: Crude death rate per 100,000 population
Cancer: Malignant neoplasms
I & P: Influenza and pneumonia
Liver: Chronic liver disease and cirrhosis
Senility: Senile and presenile organic psychotic conditions

AADR: Age-adjusted death rate per 100,000 population
Stroke: Cerebrovascular diseases
Mental: Organic, including symptomatic, mental disorders
Atherso: Atherosclerosis

Local physicians or coroners submit death certificates to the South Dakota Department of Health. Over the past 22 years, 1989-2010, the first and second most common causes of death were heart disease and cancer. During these two decades heart disease deaths have dramatically decreased, whereas cancer deaths increased slightly. Stroke deaths declined and were the third leading cause of death in all but the last two years. Death causes that have increased during the two decades include deaths due to accidents, chronic lower respiratory disease, Alzheimer's, diabetes, suicide, kidney disease and liver disease.

Age-grouped deaths during the 7-year period, 2000-2006, show accidental deaths as the leading cause of death in children and young adults in the 1-44 year age groups, cancer death is most common in the 45-74 year age groups, and heart disease death is most common in the elderly 75 years and older.

Lon Kightlinger, State Epidemiologist

Source: South Dakota Vital Statistics Reports, 1999-2008.

10 Leading causes of death by age group, South Dakota, 2005-2010

	Age Groups											
	<1	1-4	5-14	15-24	25-34	35-44	45-54	55-64	65-74	75-84	85+	Total
Rank	Total 506	Total 85	Total 130	Total 629	Total 633	Total 1,027	Total 2,411	Total 4,174	Total 5,951	Total 11,139	Total 15,283	Total 41,968
1	Congenital abnormalities 136	Accidents 28	Accidents 58	Accidents 307	Accidents 228	Accidents 237	Cancer 690	Cancer 1,537	Cancer 2,201	Cancer 2,890	Heart disease 4,687	Heart disease 10,196
2	SIDS 59	Assault 8	Suicide 20	Suicide 182	Suicide 116	Cancer 161	Heart disease 441	Heart disease 901	Heart disease 1,249	Heart disease 2,720	Cancer 1,927	Cancer 9,495
3	Short gestation, low birth weight 59	Congenital abnormalities 6	Cancer 12	Homicide 29	Cancer 51	Heart disease 133	Accidents 275	Accidents 221	Chronic lower respiratory diseases 562	Chronic lower respiratory diseases 985	Alzheimer's disease 1,496	Chronic lower respiratory diseases 2,650
4	Accidents 35	Cancer 6	Congenital abnormalities 7	Cancer 20	Heart disease 44	Suicide 110	Liver disease 154	Chronic lower respiratory diseases 216	Diabetes 267	Stroke 777	Stroke 1,318	Stroke 2,575
5	Placenta cord membranes 21	Unknown causes 4	Influenza & pneumonia 7	Heart disease 11	Homicide 26	Liver disease 67	Suicide 135	Diabetes 180	Stroke 233	Alzheimer's disease 573	Chronic lower respiratory diseases 821	Accidents 2,307
6	Unknown Causes 19	Heart disease 4	Cerebral palsy 3	Congenital abnormalities 8	Liver disease 19	Undetermined intent 25	Diabetes 83	Stroke 142	Accidents 168	Diabetes 395	Influenza & pneumonia 656	Alzheimer's disease 2,168
7	Cardiovascular disorders 19	Hemophagocytic lymphohistiocytosis 3	Heart disease 3	Diabetes 5	Undetermined intent 15	Homicide 23	Stroke 74	Liver disease 128	Liver disease 87	Accidents 307	Accidents 443	Diabetes 1,403
8	Abnormal lab findings 18	Meningococcal Infection 3	Septicemia 2	Cerebral palsy 4	Unknown causes 13	Diabetes 22	Chronic lower respiratory diseases 50	Suicide 82	Influenza & pneumonia 85	Influenza & pneumonia 236	Diabetes 440	Influenza & pneumonia 1,091
9	Atelectasis 18	Lung disorders 2	Stroke 1	Epilepsy 4	Diabetes 11	Influenza & pneumonia 20	Alcohol use 39	Septicemia 49	Alzheimer's 85	Parkinson's disease 179	Unspecified dementia 319	Suicide 738
10	Maternal complications 16	Cerebral palsy 2		Stroke 4	Congenital abnormalities 10	Stroke 17	Influenza & pneumonia 33	Influenza & pneumonia 42	Kidney disease 53	Kidney disease 127	Hypertension 260	Liver disease 522
	All other 106	All other 19	All other 17	All other 55	All other 98	All other 214	All other 440	All other 677	All other 966	All other 1950	All other 2916	All other 8823

Top 5 causes of death are highlighted.

South Dakota Department of Health – Infectious Disease Surveillance

Selected Morbidity Report, 1 January – 29 February 2012

	Disease	2012 year-to-date	5-year median	Percent change
Vaccine-Preventable Diseases	Diphtheria	0	0	n/a
	Tetanus	0	0	n/a
	Pertussis	3	6	-50%
	Poliomyelitis	0	0	n/a
	Measles	0	2	n/a
	Mumps	0	2	n/a
	Rubella	0	0	n/a
	Haemophilus influenza type b	0	0	n/a
Sexually Transmitted Infections and Blood-borne Diseases	HIV infection	0	4	n/a
	Hepatitis B, acute	0	4	n/a
	Chlamydia	549	492	12%
	Gonorrhea	74	61	21%
	Syphilis, early	0	0	n/a
Tuberculosis	Tuberculosis	2	2	0%
Invasive Bacterial Diseases	Meningococcal, invasive	0	1	n/a
	Invasive Group A *Streptococcus*	0	0	n/a
Enteric Diseases	*E. coli*, Shiga toxin-producing	5	0	n/a
	Campylobacteriosis	10	22	-55%
	Salmonellosis	10	18	-44%
	Shigellosis	0	1	n/a
	Giardiasis	9	13	-31%
	Cryptosporidiosis	11	8	38%
	Hepatitis A	0	0	n/a
Vector-borne Diseases	Animal Rabies	7	3	133%
	Tularemia	0	0	n/a
	Rocky Mountain Spotted Fever	0	0	n/a
	Malaria (imported)	0	0	n/a
	Hantavirus Pulmonary Syndrome	0	0	n/a
	Lyme disease	0	0	n/a
	West Nile Virus disease	0	0	n/a
Other Diseases	Legionellosis	0	1	n/a
	Streptococcus pneumoniae, invasive	17	0	n/a
	Additionally, the following were reported: Chicken Pox (4); Hepatitis B, chronic (3); MRSA, invasive (12)			

Communicable diseases are obligatorily reportable by physicians, hospitals, laboratories, and institutions. The **Reportable Diseases List** is found at http://doh.sd.gov/Disease/report.aspx or upon request. Diseases are reportable by telephone, fax, mail, website, or courier.
Secure website: www.state.sd.us/doh/diseasereport
Telephones: 24 hour answering device 1-800-592-1804; for a live person at any time call 1-800-592-1861; after hours emergency 605-280-4810.
Fax 605-773-5509.
Mail in a sealed envelope addressed to the DOH, Office of Disease Prevention, 615 E. 4th Street, Pierre, SD 57501, marked "Confidential Medical Report".

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