South Dakota

An Annual Report on Cancer Incidence and Mortality Among South Dakotans, 2019

Photo credit: South Dakota Department of Tourism

**South Dakota Cancer Registry
2023**

Cancer in
South Dakota
2019

South Dakota Cancer Registry, South Dakota Department of Health

Preface
Cancer in South Dakota, 2019 is the 27th annual report from the South Dakota Cancer Registry (SDCR) in the Office of Disease Prevention and Health Promotion in the Division of Family and Community Health within the South Dakota Department of Health (SD DOH). This report contains 2019 cancer incidence and mortality data of South Dakota residents.

Acknowledgements
The South Dakota Cancer Registry acknowledges all the Certified Tumor Registrars in the health system cancer registries who work diligently to maintain quality data. The SDCR also acknowledges the hospitals, clinics, physicians, pathology laboratories, and other providers and health entities that submit data.

Changes in Report
Age-adjusted rates were calculated using the 2000 US standard million and the US Census Bureau 2002 – 2019 population estimates for South Dakota. Reports published before 2012 used the 2000 South Dakota census population for age-adjusted calculations and are not comparable to this report.

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Suggested Citation

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Web Access: This report is available on the internet at the following URL: https://getscreened.sd.gov/registry/data/

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I. EXECUTIVE SUMMARY

This report provides data to organizations working on cancer prevention and control to identify public health concerns, target goals for cancer care, and to inform citizens and health care professionals about risks, early detections, and treatment.

Incidence 2019

- South Dakota had 4,937 reportable invasive cases of cancer diagnosed, which excludes the less life-threatening cancers such as *in situ* cancers (except *in situ* bladder cases) and the common skin cancers.

- Each day 10-11 cases of cancer were diagnosed in residents of South Dakota; this includes only cases of invasive cancer and *in situ* bladder.

- The five most diagnosed cancer sites (prostate, female breast, lung, colorectal, melanoma) accounted for 58% of all cancer cases.

- Prostate cancer was the most common reportable malignancy with 756 cases, 15.3% of all cases and 29.4% of cases for men.

- Female breast cancer was the second most common reportable cancer with 701 cases, 14.2% of all cases and 29.7% of cases for women.

- Lung cancer was the third most common reportable malignancy with 675 cases, accounting for 13.7% of all cases.

- Colon and rectal cancers were the fourth most common malignancy with 440 cases, 8.9% of all cases.

- Melanoma cancers were the fifth most common malignancy with 249 cases, 6% of all reported cases.

- 52% of all new cancers were diagnosed in males and 48% were in females.

- Males had an age-adjusted incidence rate of 478.2 per 100,000, which was higher than females who had an age-adjusted rate of 432.3 per 100,000.

- Whites accounted for 92.7% of cancer cases with 4,576 cases whereas American Indians accounted for 5.4% with 269 cases.

- The American Indian age-adjusted incidence rate was 558.4, which is higher than the age-adjusted rate among whites of 459.6.

- The South Dakota age-adjusted incidence rate for 2019 was 451.3 compared to the CDC's United States Cancer Statistics age-adjusted incidence rate of 438.6 per 100,000 persons.

Mortality 2019

- Overall, cancer was the second leading cause of death in South Dakota.

- Each day over four South Dakotans died from cancer.

- Five cancer sites (lung, colorectal, pancreas, female breast, prostate) caused over half of all cancer deaths.

- In 2019, cancer accounted for 21% of South Dakotan resident deaths, a 2.4% increase from 2018.

- Lung and bronchus cancers were the leading cause of cancer deaths at 430 deaths or 24.8% of all cancer deaths. Lung and bronchus cancers caused one in four deaths due to cancer.

- Colorectal cancer was the second leading cause of cancer deaths with 153 deaths, 8.8% of all cancer deaths.

- Pancreatic cancer was the third leading cause of death with 142 deaths, 8.2% of all cancer deaths.

- Female breast cancer was the fourth leading cause of cancer deaths with 106 deaths, 6.1% of all cancer deaths and 13% of all female cancer deaths.

- Prostate cancer was the fifth leading cause of death with 86 deaths, 5% of all cancer deaths and 9.3% of all male cancer deaths.

- Over half, 53% of all cancer deaths were males and 47% were females.

- Males had an age-adjusted death rate of 176.8 per 100,000, whereas females had an age-adjusted rate of 133.8 deaths per 100,000.

- Whites accounted for 93% of deaths with 1,615 deaths, whereas American Indians were 5.2% with 91 deaths.

- The American Indian age-adjusted death rate was 203.3 which is 79.0% higher than the rate among whites at the age-adjusted death rate of 153.0

- South Dakota's age-adjusted death rate for 2019 was 153.3 compared to the CDC's United States Cancer Statistics 2019 rate of 146.0.

Trends

- Melanoma incidence cases have increased significantly from 150 cases in 2009 to 249 cases in 2019.

- For the last decade, female breast cancer mortality rates have remained steady.

- For the last 5 years, prostate cancer cases have slowly increased. Mortality rates, however, have remained steady.

- Lung cancer cases and mortality rates have remained relatively stable over the last 10 years.

II. INTRODUCTION

A limited cancer data collection system was established in 1992 under South Dakota Codified Laws, SDCL 1-43-1 to 1-43-18, and Administrative Rules ARSD 44:22:01 to 44:22:05, inclusive. The South Dakota Cancer Registry (SDCR) was established in 2001 to develop a statewide, population-based cancer surveillance system. However, the state legislature amended the law to expand reporting to reflect statewide surveillance. SDCL 1-43-14 has been in effect since July 1, 2005:

> *Any hospital licensed pursuant to chapter 34-12, physician licensed pursuant to chapter 36-4, physician assistant licensed pursuant to chapter 36-4A, nurse practitioner or nurse midwife licensed pursuant to chapter 36-9A, pathology laboratory, or free-standing radiology center that detects, diagnoses, or treats a cancer case in South Dakota shall submit a report to the Department of Health as required by § 1-43-11 to 1-43-17, inclusive.*

Reportable cancers for 2019 include benign central nervous system and all malignant neoplasms except basal and squamous cell carcinomas of the skin and *in situ* cervical cancers. In addition to receiving cases from hospital cancer registries, the SDCR actively follows back pathology reports and abstracts cases from facilities without tumor registries.

The SDCR performs many quality assurance procedures to assure that the data is valid. The data runs through numerous edits and is consolidated if it is received from more than one reporting source. In addition, the SDCR links incidence data with mortality files to identify persons whose death records show cancer as a cause of death. The SDCR also links the incidence file with the Indian Health Service database to identify any American Indian South Dakotan who was misclassified as another race.

The SDCR uses the cancer incidence data reported as well as the mortality data and health behavior surveys collected by the department's Health Statistics Office and Vital Records to provide useful information for cancer control and prevention programs, researchers, clinicians, and policy makers. The SDCR can answer several epidemiological questions such as:

- ➢ How many South Dakotans are diagnosed or die from cancer each year?
- ➢ What are the most common cancers?
- ➢ When are cancers being diagnosed, i.e. at what stage?
- ➢ Which cancers are the deadliest?
- ➢ Who is most affected by cancer?
- ➢ What are the trends in cancer incidence and mortality?
- ➢ Where are cancers occurring?
- ➢ Where and what are the disparities?
- ➢ Are screening efforts working?

Every life is touched by cancer in some way whether one is diagnosed with the disease or has a family member or friend with the disease. Although cancer is primarily a disease of people over 50 years old, the younger a person dies from cancer, the greater the impact on societal and economic costs. Cancer concerns voiced by South Dakotans are a priority for the SDCR.

As the SDCR continues to collect population-based data and as more health care entities and providers report cases, more questions can be answered with the data. For example, SDCR can look at modifiable risk factors such as obesity and exercise.

Cancer prevention is action taken to lower the chance of getting cancer. By preventing cancer, the number of new cases of cancer is lowered. Hopefully, this will reduce the burden of cancer and lower the number of deaths caused by cancer.

Scientists study risk factor and protective factors to find ways to prevent new cancers from starting. Below are a few key point risk factors:

- Factors That are Known to Increase the Risk of Cancer
    - Cigarette Smoking and Tobacco Use
    - Infections
    - Radiation (e.g., Sun exposure, Radon, Medical Imagining)
    - Immunosuppressive Medicines After Organ Transplant
- Factors That May Affect the Risk of Cancer
    - Diet
    - Alcohol
    - Physical Activity
    - Obesity
    - Diabetes
    - Environmental Risk Factors

The most successful way to prevent cancer is to limit the number of modifiable risk factors by following these guidelines:

- Do not smoke
- Maintain a healthy weight
- Get at least 30 minutes of physical activity every day
- Eat a healthy diet
- Get the HPV vaccination
- Limit alcohol intake to less than one drink a day
- Protect yourself from the sun

> Some risk factors for cancer can be avoided, but many cannot. For example, both smoking and inheriting certain genes are risk factors for some types of cancer, but only smoking can be avoided. Risk factors that a person can control are called modifiable risk factors.
>
> Source: https://www.cancer.gov/about-cancer/causes-prevention

The SDCR continuously expands data collection. This will help prevention and control programs to target at risk populations as well as support epidemiologic studies. The end goal is to reduce the cancer burden by producing valid and accurate data reflecting the complete assessment of cancer in South Dakota, and to disseminate the information in a timely manner.

Age-adjusted incidence rate: Age-adjusted incidence rates are calculated using the direct method and standardized to the age distribution of the 2000 US standard population (Appendix A). Age adjustment allows rates for one geographic area to be compared with rates from other geographic areas that may have differences in age distributions. Any observed differences in age-adjusted incidence rates between populations are not due to different age structures. Reports prior to 1999 used the 1970 US standard population. In conformity with the National Cancer Institute's (NCI) Surveillance, Epidemiology, and End Results (SEER) Program guidelines, the incidence rates for cancer sites exclude the following:

- *In situ* cases, except bladder
- Basal and squamous cell skin cancers
- Cases with unknown age
- Cases with unknown gender

Age-adjusted mortality rates: Mortality rates are calculated for total cases and separately for males and females. The mortality rates are age-adjusted to the 2000 US standard population using five-year groups and are per 100,000 persons. Rates are presented for 2019 and for the five-year period, 2015-2019.

Age-specific incidence rates: Age specific rates are calculated by dividing the number of cases for a given age group by the total population of that age group and are expressed as an average annual rate per 100,000 persons by age group. Age specific rates exclude the same types of cases that are excluded from age-adjusted incidence rates. These rates, however, are crude rates, i.e. not age-adjusted.

Annual percent change (APC): The annual percent change is the average rate of change in a cancer rate per year in a given time frame indicating how fast or how slowly a cancer rate has increased or decreased each year over a period of years. A negative APC describes a decreasing trend, and a positive APC describes an increasing trend.

Cancer case definitions: A "cancer case" is defined as the primary cancer site, i.e., the site where the cancer started. Since an individual can have more than one primary cancer site, the number of incident cancer cases could be greater than the number of persons who are diagnosed with cancer. A *metastasis* is not a primary site.

Changes in diagnostic criteria: Early detection resulting from either screening or early response to symptoms may result in increasing diagnosis of small tumors that are not yet life-threatening. This may raise incidence and survival rates but without changes in mortality rates. Cancers likely to be affected are breast, colon, cervix uteri, prostate, and melanoma. Prostate cancer is particularly prone to changing diagnostic criteria.

Confidence intervals (CI): A confidence interval tells how confident we are of the accuracy of the calculated rates. The SDCR uses a computed interval with a given probability of 95%, i.e., the true value of the calculated rate is contained within the interval. Thus, given a calculated rate of 191.4 and a confidence interval of 182.1 to 200.8, it is better to say that the true rate will fall between 182.1 and 200.8. The larger the sample size, the shorter the interval size, giving us more certainty that the rate is correct. When CI for percentages contains zero, the rate is considered to be stable. Above zero, the statistical significance is higher and below zero it is lower.

Data source: All data, tables, and figures come from the South Dakota Department of Health, *American Cancer Society Facts and Figures 2019* or *SEER Cancer Statistics Review 1975-2019* and should be cited as such if taken out of this report in part. SEER data represents approximately 10% of the U.S population.

Disparity: Health disparities are differences in the incidence, prevalence, mortality, and burden of diseases and other adverse health conditions that exist among specific population groups in the United States.[1] Health disparities can be defined as a specific group bearing a disproportionate share of negative health outcomes compared to the general population, i.e., disease, disability, and

death.[2] Disparity can occur as a result of factors such as poverty, living in geographically underserved areas and belonging to specific minority groups.

Early detection/screening: Improved early detection/screening may produce increases in both incidence and survival rates. Increases may occur as a result of the introduction of new procedures. The interval between the time a cancer is diagnosed by a screening procedure and the time when it would have been diagnosed in the absence of screening procedures is called the lead-time. Changes in lead-time, for example, in breast cancer diagnosis, have led to increased survival rates and reduction of mortality.

Limitations to data interpretation and comparison: Several factors need to be considered when reviewing cancer statistics and interpreting them. A cancer registry database is a fluid and dynamic database, therefore, the reported number of new cases in a particular race, gender, and age cancer category may change for the calendar year for which the data have already been reported in a previous publication. Additional cancer cases which have been previously overlooked for a given diagnosis year may be found and reported to the central registry. There may also be elimination of duplicate records for the same patient, often due to name changes or spelling corrections.

Metastasis: When cancer spreads from the primary site to other organs or tissues of the body, it is said to metastasize. Cancer usually spreads through the blood or the lymphatic system.

Mortality/incidence ratio (M/I): This ratio is calculated by dividing the number of deaths in a given year by the number of new cancers diagnosed in the same year. The death to case ratio provides a crude indication of the prognosis for patients. A ratio approaching 1.0, when the number of deaths equals the number of cases for a particular type of cancer, indicates a poor prognosis. A lower ratio indicates fewer deaths relative to the number of cases and suggests a better prognosis.

Racial misclassifications: When race is not specified in a source document and the default is to record these cases as white or unknown, the results are considered biased. Numerator error can occur because of misclassification.

Rate comparisons: When comparing age-adjusted rates and age-specific rates based on fewer than 10 cases, rate comparisons are difficult to interpret. In comparing rates among geographic areas such as counties, states and health districts, the absolute numbers and differences in demographics should be considered, as well as clinical significance of the disease. Data quality indicators for each registry should also be reviewed. Interpretations made without considering these factors may be misleading. There will also be differences between mortality statistics published by various agencies and the mortality rates in this report.

Risks and associated risk factors: These were developed using the "American Cancer Society Textbook of Oncology," and the Harvard Cancer Center, *Causes of Human Cancer*.

Stage at time of diagnosis: Staging is the process of describing the extent or spread of disease from the origin, which is the primary site. Summary staging is the standard used for comparison nationally. SEER Summary Stages 2000 are defined as follows:

- ***In Situ:*** Malignant cells are within the cell group from which they arose, without penetration of the basement membrane of the tissue and no stromal invasion. *In situ* is "in place".

- ***Localized:*** The malignant cells are limited to the organ of origin and have spread no farther than the organ in which they started.

- ***Regional:*** The tumor is beyond the limits of the organ of origin by direct extension to adjacent areas with or without lymph node involvement.

- ***Distant:*** The primary tumor has broken away and has traveled, growing secondary tumors

in other parts of the body. It has metastasized.

In situ and localized stages are the **early stages** of diagnosis. Regional and distant stages are **late stage** diagnoses.

Staging: Stage is based on an assessment of the size of the primary tumor, whether it has spread, and, if so, how far. Because an accurate diagnosis is so important to effective treatment, physicians might use physical exams, imaging, lab tests, a biopsy, an analysis of the patient's body fluids, and surgery in various combinations in the staging process. Advancement in diagnostic procedures may change in due time. These advancements might increase the chance that a given cancer will be diagnosed at a more advanced stage, for example with new scanning methods metastases can be detected. Therefore, if someone was previously diagnosed with a localized tumor, they may now be staged as distant. This is called stage migration and can affect the analysis of all solid tumors.

Statistical significance: This determines whether an event happens by chance alone. The null hypothesis states that in a given place and a period of time, all events occur randomly by chance. If not, then there is statistical significance. Confidence intervals are used to test statistical significance in this report. If the confidence intervals of two different rates intersect each other, then there is no statistical difference between the two rates.[3] However, if the confidence intervals do not intersect one another, there is statistical significance. This report looks at the South Dakota rates as compared to the US national rates using SEER data.

In South Dakota, case counts can be very low; therefore, magnitude bias is inherent with confidence intervals and z- tests. For example, in the year 2001, cervical cancer rates were 10 per 100,000 American Indian women, a cervical cancer age-adjusted rate six times higher than white women in South Dakota. However, the case counts were two for American Indians and 10 whites. Small numbers result in wider confidence intervals, thus less confidence in the data.

[1]*http://epi.grants.cancer.gov/ResPort/HDoverview.html*
[2]*http://www.omni.org/docs/CMHFProceedings.pdf*
[3]BIOSTATISTICS *The Bare Essentials, 2nd edition Norman and Shreiner Page 512*

IV. CANCER INCIDENCE

South Dakota collected 4,937 new reportable cancer cases in 2019. Data at the county level ranged from a low incidence rate of 192.7 in Corson County to a high of 744.9 in Potter County. There were four counties with rates significantly lower than the state incidence rate of 451.3. Four counties had a significantly higher rate.

The United States incidence rate in 2019 was 438.6 and the South Dakota incidence rate was 451.3 per 100,000 persons.

A map displaying the 2019 incidence rates by county can be located on page 14 of this report. On page 15 is a map displaying the mortality rates by county.

Table 1 : Cancer Cases and Incidence Rates by County
South Dakota, 2019 and 2015-2019

County	2019 Cases	2019 Rate		2015-2019^ Cases	2015-2019^ Rate	
South Dakota	4937	451.3		23,743	452.3	
Aurora	20	467.0		107	540.4	▲
Beadle	103	353.9		533	461.9	
Bennett	13	367.7		63	377.3	
Bon Homme	33	314.8		199	398.7	
Brookings	128	397.6		706	448.6	
Brown	240	510.5		1,142	480.8	
Brule	31	394.4		178	517.6	▲
Buffalo	9	570.5		38	495.2	
Butte	68	451.4		306	430.1	
Campbell	6	322.8		33	264.6	▼
Charles Mix	57	483.4		271	448.6	
Clark	28	497.1		135	494.3	
Clay	68	537.7		321	531.2	▲
Codington	170	442.4		879	480.0	
Corson	8	192.7	▼	44	234.3	▼
Custer	78	408.7		299	358.3	
Davison	117	419.8		624	486.1	
Day	34	349.1		203	445.9	
Deuel	18	314.0		136	427.7	
Dewey	29	580.3		115	463.2	
Douglas	19	380.3		104	497.0	
Edmunds	24	407.7		149	524.9	▲
Fall River	53	407.0		274	422.2	
Faulk	17	459.6		89	497.3	
Grant	45	422.9		240	438.3	
Gregory	31	467.6		129	394.6	
Haakon	21	720.5	▲	79	504.1	
Hamlin	34	478.8		177	496.5	
Hand	28	645.5	▲	115	460.0	
Hanson	11	284.9	▼	83	509.7	
Harding	6	443.0		21	281.4	▼
Hughes	114	514.6		479	437.7	
Hutchinson	44	426.7		265	487.7	
Hyde	10	398.9		50	442.6	
Jackson	15	424.2		66	397.6	
Jerauld	15	529.1		69	415.3	
Jones	10	715.1	▲	36	526.3	▲
Kingsbury	40	473.8		227	562.5	▲
Lake	62	315.7		364	402.7	
Lawrence	133	337.7		694	381.2	
Lincoln	292	450.7		1,253	435.0	
Lyman	23	451.7		93	387.8	
McCook	41	570.6		203	558.6	▲
McPherson	19	468.2		96	496.3	
Marshall	23	296.7	▼	123	350.1	
Meade	129	364.5		601	382.5	
Mellette	12	513.2		57	535.0	
Miner	16	402.8		84	506.9	
Minnehaha	1,115	550.2		5,118	528.0	▲
Moody	34	407.3		171	393.5	
Oglala Lakota	48	455.9		202	422.2	
Pennington	643	426.5		2,993	428.7	
Perkins	13	251.3	▼	72	311.2	
Potter	25	744.9	▲	90	490.4	
Roberts	45	318.8		258	393.5	
Sanborn	17	512.8		76	464.4	
Spink	42	456.0		226	499.3	
Stanley	23	506.8		83	400.3	
Sully	9	536.5		29	293.4	▼
Todd	27	366.7		143	442.1	
Tripp	33	403.4		181	417.3	
Turner	50	428.4		278	466.8	
Union	94	450.9		494	505.5	▲
Walworth	28	318.0		159	385.0	
Yankton	138	436.6		582	379.0	
Ziebach	9	351.8		30	232.8	▼

* Counts less than three are suppressed. Incidence rates with counts less than 20 are generally considered unstable. ▲Rate significantly higher than the state rate. ▼ Rate significantly lower than the state rate. Number of the cases and rates are averaged over the five-year period. Rates per 100,000 age-adjusted to 2000 US standard population and SD 2019 estimated population. Source: South Dakota Department of Health

Table 2: Age-adjusted Incidence Rates byCounty for Selected Sites, 2019

	Colorectal		Lung and Bronchus		Female Breast		Prostate		Bladder		NHL	
	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate
South Dakota	**440**	**41.0**	**675**	**58.0**	**701**	**130.9**	**756**	**131.7**	**233**	**20.3**	**280**	**25.3**
Aurora	3	55.9	*	36.9	3	125.4	0	0.0	*	18.7	*	40.7
Beadle	7	32.0	12	41.6	7	60.4	15	124.1	4	16.2	4	22.0
Bennett	*	22.6	*	23.1	*	37.7	3	176.9	0	0.0	0	0.0
Bon Homme	*	8.3	*	10.1	5	66.2	9	171.2	7	63.1	*	25.1
Brookings	17	57.0	14	40.8	18	111.6	23	139.7	8	23.1	9	23.5
Brown	19	41.8	30	60.7	37	151.9	40	158.1	10	18.4	13	26.8
Brule	4	51.8	*	26.2	3	87.7	5	153.1	*	28.9	3	27.8
Buffalo	*	142.6	0	0.0	0	0.0	0	0.0	0	0.0	*	38.0
Butte	3	14.9	8	43.4	12	146.5	7	82.7	3	16.2	4	22.9
Campbell	0	0.0	0	0.0	*	36.9	3	278.2	0	0.0	0	0.0
Charles Mix	8	68.9	9	69.0	4	58.2	7	112.9	0	0.0	*	8.2
Clark	3	50.2	*	27.4	4	113.4	5	178.4	0	0.0	3	44.2
Clay	5	41.0	8	55.7	14	242.8	5	69.4	3	22.3	*	10.8
Codington	13	31.1	37	91.5	19	94.3	17	93.1	7	18.6	9	22.5
Corson	*	60.5	*	20.3	0	0.0	*	90.9	0	0.0	0	0.0
Custer	8	38.3	10	49.2	16	177.8	12	95.3	4	20.4	5	23.1
Davison	16	50.1	15	55.3	13	91.9	15	105.0	4	17.9	10	35.7
Day	*	22.1	7	64.3	4	125.0	5	96.1	3	19.2	*	7.9
Deuel	3	35.8	3	48.5	*	157.1	3	79.2	*	36.3	0	0.0
Dewey	3	63.9	8	154.2	3	111.8	6	240.0	0	0.0	*	32.3
Douglas	*	36.8	3	56.8	*	36.9	5	218.7	4	71.7	*	21.9
Edmunds	*	13.0	3	45.2	*	28.1	3	95.1	*	18.2	0	0.0
Fall River	6	59.2	7	44.0	7	83.3	5	68.1	3	19.9	*	15.1
Faulk	*	64.4	*	22.7	0	0.0	*	89.3	0	0.0	*	45.2
Grant	5	52.1	*	10.0	9	166.9	11	181.9	*	6.9	0	0.0
Gregory	3	35.6	5	61.6	*	80.0	6	167.9	*	15.8	4	54.9
Haakon	*	38.3	*	49.1	4	330.4	3	171.3	4	145.5	0	0.0
Hamlin	*	10.1	3	40.0	8	242.2	8	189.0	0	0.0	*	17.6
Hand	3	56.9	*	46.4	3	171.8	6	281.5	*	31.3	*	23.2
Hanson	*	34.6	0	0.0	*	63.3	3	79.7	0	0.0	0	0.0
Harding	*	92.5	*	61.1	*	322.2	0	0.0	0	0.0	0	0.0
Hughes	9	42.8	19	84.4	12	115.1	17	153.2	10	41.0	7	34.4
Hutchinson	7	67.8	*	4.2	7	105.2	11	212.9	*	13.9	*	4.2
Hyde	0	0.0	*	55.4	3	166.5	*	192.1	0	0.0	*	24.6
Jackson	4	111.7	*	53.8	0	0.0	3	180.3	0	0.0	0	0.0
Jerauld	3	124.5	0	0.0	3	158.4	*	88.1	0	0.0	0	0.0
Jones	0	0.0	3	178.5	*	112.7	0	0.0	*	53.5	0	0.0
Kingsbury	6	86.3	4	47.2	6	130.6	10	196.9	*	8.1	4	44.7
Lake	3	11.9	7	36.4	7	62.4	14	149.5	3	13.0	5	30.1
Lawrence	17	46.8	23	58.5	26	132.0	18	76.9	3	7.1	5	10.8
Lincoln	22	37.0	44	66.2	39	117.2	32	94.2	12	18.5	25	42.0
Lyman	*	18.6	6	138.0	3	108.9	3	121.6	0	0.0	*	16.7
McCook	10	125.4	3	33.9	6	176.1	3	86.3	0	0.0	3	36.5
McPherson	*	32.4	*	22.7	*	46.0	4	190.2	*	46.8	3	66.2
Marshall	7	94.0	*	24.6	4	93.7	3	68.1	3	36.8	0	0.0
Meade	9	28.9	20	53.8	21	121.5	17	93.9	7	21.1	7	19.4
Mellette	*	78.3	3	143.9	0	0.0	0	0.0	*	84.7	*	36.5
Miner	*	42.5	*	33.3	*	42.6	4	180.6	0	0.0	0	0.0
Minnehaha	76	37.8	167	84.3	157	155.8	178	176.9	42	22.2	68	32.0
Moody	3	28.8	5	49.7	5	128.0	7	163.0	5	60.9	3	28.8
Oglala Lakota	4	40.6	5	42.6	9	142.1	8	186.7	*	19.0	*	22.7
Pennington	47	35.6	93	56.0	117	157.2	89	107.3	36	23.9	36	24.3
Perkins	*	15.0	0	0.0	*	32.0	4	144.9	*	20.8	*	19.1
Potter	*	38.3	4	67.4	3	181.9	3	128.9	0	0.0	3	69.9
Roberts	4	27.4	3	19.7	3	35.7	11	132.2	0	0.0	4	30.1
Sanborn	3	96.0	*	66.1	3	196.5	3	124.5	*	50.0	*	42.1
Spink	*	19.4	5	59.1	6	120.9	9	173.1	*	7.5	*	12.4
Stanley	*	38.4	4	87.8	3	159.2	4	140.4	0	0.0	0	0.0
Sully	3	189.9	*	88.5	*	378.5	*	41.8	*	41.8	0	0.0
Todd	5	62.1	3	37.5	5	110.8	*	31.7	0	0.00	*	20.3
Tripp	4	32.5	6	69.9	3	97.0	3	51.7	0	0.0	*	19.7
Turner	8	62.4	6	48.5	4	99.9	5	80.4	*	6.2	*	25.0
Union	9	44.5	10	42.4	11	105.8	23	207.1	3	12.1	5	23.9
Walworth	3	34.4	3	29.2	5	102.8	*	40.0	*	12.7	0	0.0
Yankton	13	41.1	17	49.1	17	124.1	27	168.8	8	22.4	7	24.6
Ziebach	*	34.0	0	0.0	*	81.5	*	85.7	0	0.0	0	0.0

Note: * Counts less than 3 are suppressed. Incidence rates with counts less than 20 are generally considered unstable.

Table 3: Age-adjusted Incidence Rates by Site, Gender and Race, South Dakota, 2019

	TOTAL		MALE		FEMALE		WHITE		AMERICAN INDIAN	
	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate
Total	**4,937**	**451.3**	**2,575**	**478.2**	**2362**	**432.3**	**4,576**	**459.6**	**269**	**558.4**
Oral Cavity	**116**	**10.5**	**82**	**15.3**	**34**	**6.0**	**106**	**10.2**	**7**	**14.0**
Lip	10	1.1	10	2.3	0	0.0	10	1.2	0	0.0
Tongue	38	3.5	26	5.0	12	2.1	34	3.5	2	3.1
Salivary Gland	13	1.2	6	1.0	7	1.4	12	1.2	1	1.9
Floor of Mouth	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Gum and Other Mouth	11	0.8	8	1.2	3	0.4	11	0.9	0	0.0
Nasopharynx	10	0.9	5	0.9	5	0.9	8	0.7	2	3.3
Tonsil	26	2.4	21	3.9	5	0.9	25	2.5	1	2.1
Oropharynx	10	0.8	6	1.0	4	0.7	10	0.9	0	0.0
Hypopharynx	4	0.4	3	0.5	1	0.2	3	0.3	1	2.3
Other Oral Cavity & Pharynx	1	0.1	0	0.0	1	0.2	0	0.0	1	1.1
Digestive System										
Esophagus	61	5.4	51	9.5	11	1.7	56	5.3	4	11.8
Stomach	48	4.6	32	6.4	16	3.0	39	4.1	6	10.7
Small Intestine	25	2.3	19	3.5	6	1.4	22	2.2	2	3.6
Colorectal	440	41.0	234	44.9	206	33.8	394	39.3	25	47.9
Anus, Anal Canal and Anorectum	23	2.1	7	1.4	16	2.8	22	2.3	1	1.7
Liver & Intrahepatic Bile Duct	80	7.3	54	10.1	26	4.7	71	7.0	8	17.5
Gallbladder	13	1.2	4	0.8	9	1.5	12	1.2	1	3.9
Other Biliary	19	1.7	13	2.6	6	1.0	17	1.7	2	5.4
Pancreas	132	11.7	83	15.1	49	8.6	120	11.6	10	22.5
Retroperitoneum	4	0.4	1	0.2	3	0.5	4	0.4	0	0.0
Peritoneum, Omentum and Mesentery	6	0.6	0	0.0	6	1.1	5	0.4	0	0.0
Respiratory										
Nose, Nasal Cavity and Middle Ear	5	0.5	1	0.3	4	0.6	5	0.5	0	0.0
Larynx	37	3.2	26	4.3	11	2.3	33	3.1	3	4.6
Lung and Bronchus	675	58.0	327	52.8	348	50.5	571	52.0	22	46.6
Pleura	6	0.5	3	0.6	3	0.5	6	0.5	0	0.0
Mediastinum and Other Resp Organs	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Bones and Joints	**11**	**1.2**	**7**	**1.4**	**4**	**1.1**	**9**	**1.2**	**1**	**1.5**
Soft Tissue (Including Heart)	**38**	**3.5**	**18**	**3.5**	**20**	**3.5**	**35**	**3.6**	**3**	**4.7**
Skin										
Melanomas of the Skin	249	23.2	137	25.5	112	21.6	246	25.0	2	3.8
Other Skin	20	1.7	16	3.0	4	0.7	20	1.8	0	0.0
Breast										
Breast, Female	701	130.9			701	130.9	630	127.5	40	140.9
Breast, Male	5	1.0	5	1.0			5	1.1	0	0.0
Female										
Vulva	15	2.3			15	2.3	15	2.5	0	0.0
Vagina	4	0.7			4	0.7	3	0.6	1	2.9
Cervix Uteri	26	5.6			26	5.6	16	3.9	9	32.8
Corpus and Uterus, NOS	156	28.1			157	28.5	140	27.9	12	39.3
Ovary	51	9.8			51	9.8	47	9.7	3	11.9
Other Female Genital Organs	10	1.9			10	1.9	9	2.0	1	2.7

	TOTAL		MALE		FEMALE		WHITE		AMERICAN INDIAN	
	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate
Male										
Penis	5	0.8	5	0.8			5	0.4	0	0.0
Prostate	756	131.7	756	131.7			653	120.7	32	143.6
Testis	22	6.5	22	6.5			22	6.5	0	0.0
Other Male Genital Organs	0	0.0	0	0.0			0	0.0	0	0.0
Urinary										
Bladder	233	20.3	183	34.8	50	8.3	227	21.1	4	11.4
Kidney and Renal Pelvis	175	16.3	101	18.5	74	14.1	155	15.5	16	29.0
Ureter	8	0.6	3	0.5	5	0.6	8	0.6	0	0.0
Other Urinary Organs	4	0.3	1	0.2	3	0.4	4	0.3	0	0.0
Eye and Orbit	**6**	**0.6**	**1**	**0.1**	**5**	**1.2**	**6**	**0.8**	**0**	**0.0**
Brain and CNS										
Brain	56	6.0	33	7.4	23	4.6	52	6.7	1	1.5
Meninges and CNS	2	0.2	0	0.0	2	0.4	2	0.3	0	0.0
Endocrine										
Thyroid	152	17.6	48	10.3	104	25.4	170	18.2	47	19.8
Other Endocrine	5	0.6	5	1.2	0	0.0	4	0.5	0	0.0
Lymphomas										
Hodgkin's Lymphoma	18	2.0	12	2.5	6	1.6	18	2.4	0	0.0
Non-Hodgkin's Lymphoma	188	165.5	123	22.3	65	11.2	174	16.2	13	26.0
Multiple Myeloma	**75**	**6.6**	**52**	**9.9**	**23**	**3.6**	**69**	**6.3**	**4**	**8.6**
Leukemia	**157**	**14.9**	**90**	**17.2**	**67**	**12.9**	**144**	**14.5**	**11**	**24.9**
Acute Lymphocytic	9	1.0	4	0.9	5	1.1	7	1.0	2	2.2
Chronic Lymphocytic	68	6.2	45	8.3	23	4.3	66	6.5	1	2.1
Other Lymphocytic	7	0.8	7	1.5	0	0.0	7	0.9	0	0.0
Acute Myeloid	59	5.4	29	5.2	30	5.7	54	5.4	4	10.9
Acute Monocytic	1	0.1	0	0.0	1	0.2	0	0.0	0	0.0
Chronic Myeloid	23	2.3	11	2.3	12	2.3	18	1.7	3	6.1
Other Myeloid/Monocytic	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Other Acute Leukemia	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Other Leukemia	1	0.1	1	0.2	0	0.0	1	0.2	0	0.0
Mesothelioma	**7**	**0.6**	**3**	**0.6**	**4**	**0.6**	**7**	**0.6**	**0**	**0.0**

Rates per 100,000 age-adjusted to the 2000 US standard population and 2019 SD estimated population.
Source: South Dakota Department of Health

Table 3 above shows incidence and age-adjusted incidence rates for South Dakota in 2019 by primary sites, gender, and race according to SEER site category recodes (Appendix C).

Table 4: Percentage of Selected Cancers by Age Groups in South Dakota, 2019

	0-19	20-34	35-49	50-64	65-74	75-84	85+
All Sites	1%	2%	7%	29%	33%	20%	8%
Bladder	0%	0%	3%	21%	33%	27%	16%
Breast, Female	0%	2%	12%	31%	32%	17%	6%
Colorectal	1%	2%	8%	30%	24%	21%	14%
Corpus and Uterus, NOS	0%	3%	12%	37%	30%	15%	3%
Hodgkin's Lymphoma	5%	39%	17%	17%	5%	17%	0%
Kidney and Renal Pelvis	2%	2%	10%	34%	35%	14%	3%
Leukemia	5%	2%	7%	25%	32%	21%	8%
Lung and Bronchus	0%	0%	1%	24%	36%	30%	9%
Melanomas of the Skin	0%	4%	12%	29%	35%	14%	6%
Non-Hodgkin's Lymphoma	3%	2%	5%	22%	38%	24%	7%
Pancreas	0%	1%	4%	21%	42%	22%	10%
Prostate	0%	0%	2%	30%	46%	19%	3%
Thyroid	1%	14%	32%	30%	17%	3%	2%

Note: Detail may not sum to totals because of rounding. Source: South Dakota Department of Health

In 2019, 62% of all cancers were diagnosed between ages 50 to 74 (Table 4). Notable were the 32% of thyroid and 17% of Hodgkin's lymphoma cancers diagnosed between the ages of 35 to 49. In 2019, 44% of the Hodgkin's lymphoma cases were diagnosed in persons under 35 years old, compared to 39% in 2018.

Figure 1 below shows that incidence rates for American Indians in South Dakota were higher than those for whites in 2019. Of the 4,937 newly diagnosed cases in 2019, 269 or 5.5% were American Indians, 121 males, and 148 females.

Figure 1: All Sites Cancer Incidence Rates by Race and Gender, South Dakota, 2019
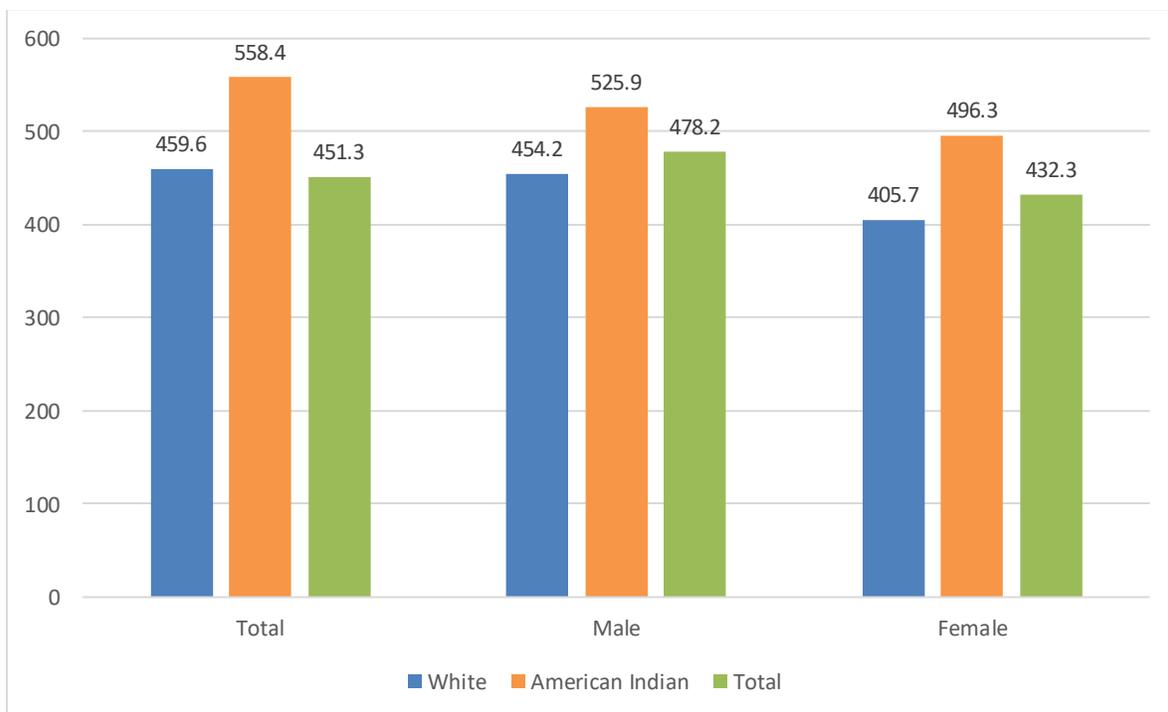
Note: Rates per 100,000 age-adjusted to the 2000 US standard population and 2019 SD estimated population.
Source: South Dakota Department of Health

Prostate cancer was the most common cancer diagnosed during 2019. The other four most diagnosed cancers were female breast, lung and bronchus, colorectal, and melanoma, which accounted for 57.5% of the new cases diagnosed and 46.1% of cancer deaths. Figure 2 shows the percent of new cancer cases and deaths by rank and gender.

Figure 2: Percent Distribution of Cancer Cases and Deaths by Rank and Gender, South Dakota, 2019

Males

■ Cases ■ Deaths

Cancer	Cases	Deaths
Prostate	29%	9%
Lung	12%	21%
Colorectal	9%	7%
Melanoma	6%	2%
Non-Hodgkin's	6%	5%
Bladder	7%	3%
Kidney	4%	4%
Leukemia	4%	4%
Thyroid	2%	0
Pancreas	3%	9%
Oral Cavity	3%	2%
Myeloma	3%	2%
Liver	3%	4%
Esophagus	3%	4%
Brain	2%	4%
Stomach	2%	2%
Larynx	2%	1%
Hodgkin's		0%

Females

■ Cases ■ Deaths

Cancer	Cases	Deaths
Breast	30%	14%
Lung	15%	29%
Colorectal	9%	10%
Uterus	8%	8%
Melanoma	5%	1%
Ovary	5%	5%
Non-Hodgkin's	4%	3%
Thyroid	4%	0
Kidney	4%	3%
Leukemia	3%	5%
Pancreas	2%	7%
Bladder	2%	1%
Oral Cavity	1%	1%
Myeloma	1%	1%
Liver	1%	3%
Brain	1%	3%
Stomach	1%	1%
Esophagus	0	2%
Larynx		0

Figure 3: Cancer Incidence Rates by County, South Dakota, 2019

Legend:
- ☐ <= 305.9
- ☐ 306.0 – 406.9
- ☐ 407.0 – 589.9
- ☐ >= 590.0

Source: South Dakota Department of Health

Note: Rates per 100,000 age-adjusted to 2000 US standard population and 2019 SD estimated population. Source: South Dakota Department of Health
South Dakota has an area of 77,121 square miles with a 2019 estimated population of 882,235 persons resulting in a population density of 11 persons per square mile. Population densities range from a
low of 0.5 in Harding County to a high of 210.0 persons per square mile in Minnehaha County.

Figure 4: Cancer Mortality Rates by County, South Dakota, 2019

Source: South Dakota Department of Health

Legend:
- ≤ 90.0
- 90.1 – 165.9
- 166.0 – 252.0
- ≥ 252.1

Note: Rates per 100,000 age-adjusted to 2000 US standard population and 2019 SD estimated population. Source: South Dakota Department of HealthSouth Dakota has an area of 77,121 square miles with a 2019 estimated population of 882,235 persons resulting in a population density of 11 persons per square mile. Population densities range from a low of 0.5 in Harding County to a high of 210.0 persons per square mile in Minnehaha County.

SEER Summary Staging:

- *In Situ* - Malignant cells are within the cell groups from which they arose, without penetration of the basement membrane of the tissue and stromal invasion.

- **Localized** - The malignant cells are limited to the organ of origin and have spread no farther than the organ where they began.

- **Regional** - The tumor is beyond the limits of the organ of origin by direct extension to adjacent areas such as the regional lymph nodes, adjacent organs, or tissue.

- **Distant** - The tumor cells have broken away from the primary tumor and traveled to other parts of the body.

- **Unknown** - If extension or metastatic, there is not sufficient evidence available to assign a stage.

Figure 5: Stage at Diagnosis, All Sites, South Dakota, 2019
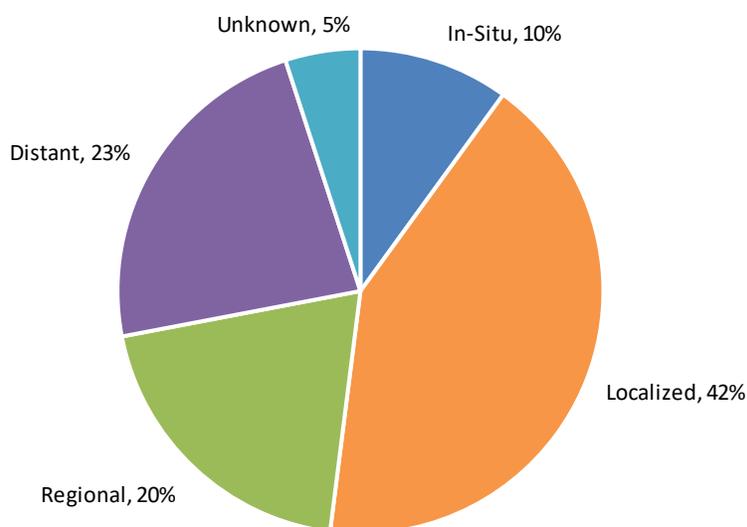
Source: South Dakota Department of Health

The figure above demonstrates the percentage of cases diagnosed at each stage of disease. For 2019, there were a total of 5,330 cases reported to the South Dakota State Cancer Registry, which includes *in situ* cases. The number of cases is in Table 5.

Table 5: South Dakota Stage at Diagnosis, All Cases, 2019

Stage	Number of Cases	Percent of Total
In Situ	523	10%
Localized	2259	42%
Regional	1036	20%
Distant	1248	23%
Unknown	264	5%

When analyzed by race, 44% of cancer cases diagnosed for Whites were diagnosed at localized stage and 36% for American Indians. American Indians had another 53% diagnosed at the regional and distant stages combined, while the same stages for Whites were a combined 41%. Stage at diagnosis by race was as follows:

Figure 6: Stage at Diagnosis in South Dakota, White, 2019

Number of cases = 5,093
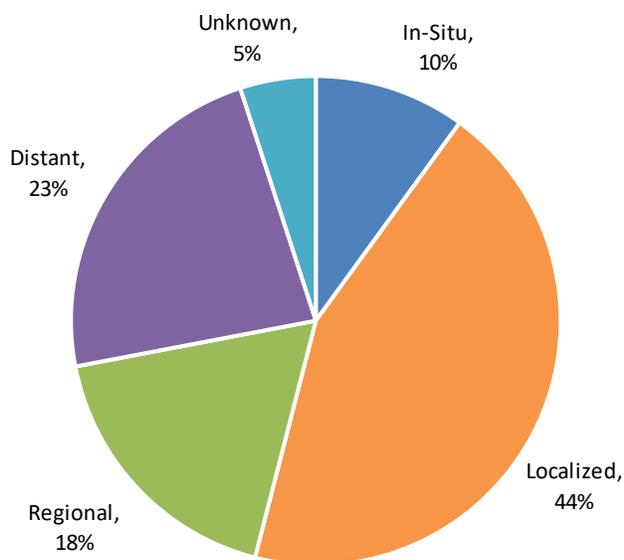
Figure 7: Stage at Diagnosis in South Dakota, American Indians, 2019

Number of cases = 275
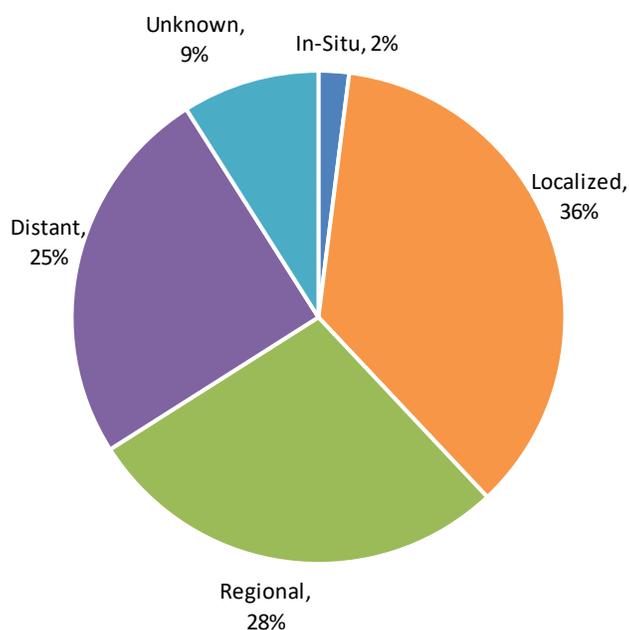
Source: South Dakota Department of Health

Source: South Dakota Department of Health

Cases of non-Hodgkin's lymphoma, myeloma, and leukemias are usually at distant stages, and therefore can skew the proportion of all sites diagnosed at distant stages. Some differences in case counts by stage for selected sites are shown in Table 6.

Source: South Dakota Department of Health

VII. CANCER MORTALITY

Cancer age-adjusted mortality rates for 2019 ranged from a low of 20.7 in Campbell County to a high of 258.9 in Perkins County. South Dakota's age-adjusted mortality rate was 153.3 in 2019 compared to a five-year (2015-2019) mortality rate of 154.6.

In 2019, seven counties had a significantly lower rate (▼) than that of the entire state and three had a significantly higher rate (▲). The five-year rates show three counties having significantly lower rates and four counties with significantly higher rates.

The United States age-adjusted mortality rate in 2018 was 146.0 and the South Dakota rate was 153.3 per 100,000 persons.

The South Dakota 2019 mortality rates are displayed in a state map on page 15 of this report.

Table 6 : Cancer Deaths and Mortality Rates by County
South Dakota, 2019 and 2015-2019 Average

County	2019 Deaths	2019 Rate		2015-2019^ Deaths	2015-2019^ Rate	
South Dakota	1,737	153.3		1,684	154.6	
Aurora	5	99.7		7	150.0	
Beadle	33	125.6		39	160.0	
Bennett	7	209.9		7	198.3	
Bon Homme	10	84.5		15	130.0	
Brookings	47	134.9		40	129.1	
Brown	58	104.5		72	138.6	
Brule	15	183.0		11	141.2	
Buffalo	*	35.9	▼	4	283.0	▲
Butte	34	231.2		30	203.7	
Campbell	*	20.7	▼	3	109.8	▼
Charles Mix	14	119.5		23	177.2	
Clark	9	158.3		9	140.2	
Clay	18	125.9		21	162.1	
Codington	59	142.5		61	157.9	
Corson	7	182.1		7	192.2	
Custer	27	162.3		23	133.6	
Davison	43	154.9		43	148.3	
Day	14	123.0		16	153.5	
Deuel	12	168.2		13	186.2	
Dewey	8	158.4		9	189.4	
Douglas	5	154.8		7	130.6	
Edmunds	5	77.2		7	105.8	▼
Fall River	27	228.0		25	195.1	
Faulk	5	112.8		5	136.2	
Grant	21	175.7		18	156.2	
Gregory	9	110.0		13	162.7	
Haakon	9	219.6		6	165.4	
Hamlin	18	225.0		13	170.2	
Hand	4	52.5	▼	7	115.4	
Hanson	7	185.9		9	281.8	▲
Harding	*	70.5		*	76.1	▼
Hughes	50	223.4		35	154.9	
Hutchinson	21	142.0		19	139.7	
Hyde	8	257.2	▲	5	160.6	
Jackson	7	211.7		7	182.3	
Jerauld	10	244.0	▲	6	161.1	
Jones	3	196.7		3	188.8	
Kingsbury	12	134.2		16	185.4	
Lake	13	69.0	▼	24	129.2	
Lawrence	50	122.9		50	133.2	
Lincoln	69	112.6		62	112.9	
Lyman	10	211.7		9	196.3	
McCook	18	229.6		18	218.1	
McPherson	7	115.8		6	126.7	
Marshall	8	116.3		8	120.8	
Meade	62	181.6		55	177.1	
Mellette	5	214.7		5	232.1	▲
Miner	4	126.5		8	227.4	
Minnehaha	361	179.7		331	173.8	
Moody	14	145.4		11	123.4	
Oglala Lakota	21	194.3		19	217.2	
Pennington	244	167.7		218	155.2	
Perkins	14	258.9	▲	9	182.2	
Potter	4	62.1	▼	7	123.1	
Roberts	21	140.2		22	152.4	
Sanborn	3	80.0		4	119.2	
Spink	12	94.4		15	145.2	
Stanley	7	142.5		7	159.7	
Sully	*	59.0	▼	3	126.4	
Todd	10	210.3		14	237.8	▲
Tripp	12	115.8		14	139.1	
Turner	20	149.1		20	156.5	
Union	38	179.2		32	157.2	
Walworth	13	127.3		14	137.5	
Yankton	48	129.9		43	125.5	
Ziebach	*	23.8	▼	*	119.7	

* Counts less than three are suppressed. Mortality rates with counts less than 20 are generally considered unstable. ▲ Rate significantly higher; ▼ Rate significantly lower
^ Number of the cases and rates are averaged over the five-year period.
Rates per 100,000 age-adjusted to 2000 US standard population and SD 2019 estimated population. Source: South Dakota Department of Health

Cancer in South Dakota 2019 April 2023

Table 7: Age-adjusted Mortality Rates by County for Selected Sites, 2019

	Colorectal		Lung and Bronchus		Female Breast		Prostate		Bladder		NHL	
	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate
South Dakota	**153**	**13.7**	**430**	**37.2**	**106**	**18.1**	**86**	**17.6**	**43**	**3.9**	**69**	**6.2**
Aurora	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Beadle	0	0.0	8	26.1	5	30.4	0	0.0	*	5.0	*	6.1
Bennett	0	0.0	*	23.1	*	67.5	0	0.0	0	0.0	0	0.0
Bon Homme	0	0.0	5	38.5	*	7.7	0	0.0	0	0.0	0	0.0
Brookings	5	15.7	13	36.7	3	12.3	4	30.1	*	3.3	*	6.4
Brown	5	9.8	13	24.0	3	8.0	4	16.8	0	0.0	*	1.4
Brule	3	25.1	5	63.2	0	0.0	0	0.0	0	0.0	0	0.0
Buffalo	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Butte	4	31.5	10	66.3	*	20.5	*	9.7	*	12.2	*	11.3
Campbell	*	20.7	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Charles Mix	*	5.3	5	36.5	*	34.5	*	14.1	0	0.0	0	0.0
Clark	*	46.8	*	27.2	*	59.2	0	0.0	0	0.0	0	0.0
Clay	*	5.5	7	50.0	3	46.6	0	0.0	0	0.0	*	9.5
Codington	5	12.2	21	51.0	*	9.4	3	15.6	4	8.5	0	0.0
Corson	0	0.0	*	44.3	0	0.0	0	0.0	0	0.0	0	0.0
Custer	3	23.9	*	9.6	0	0.0	*	7.5	3	13.5	*	10.9
Davison	4	10.2	14	49.5	*	14.0	3	28.8	0	0.0	3	11.6
Day	*	6.4	*	22.1	*	24.8	*	23.9	*	12.8	*	9.3
Deuel	3	43.8	0	0.0	*	22.1	0	0.0	*	13.7	0	0.0
Dewey	0	0.0	3	52.9	*	50.0	0	0.0	0	0.0	*	13.3
Douglas	0	0.0	*	43.9	*	112.7	0	0.0	0	0.0	0	0.0
Edmunds	0	0.0	*	13.0	0	0.0	0	0.0	0	0.0	0	0.0
Fall River	3	31.6	5	36.9	*	18.5	*	14.6	*	12.6	*	6.1
Faulk	0	0.0	0	0.0	0	0.0	*	33.0	0	0.0	0	0.0
Grant	*	16.7	5	40.3	3	43.2	3	56.6	0	0.0	*	10.1
Gregory	0	0.0	*	24.2	*	11.9	0	0.0	*	7.6	*	13.0
Haakon	*	43.6	0	0.0	0	0.0	*	45.8	0	0.0	*	26.0
Hamlin	0	0.0	4	55.9	*	38.6	*	19.3	*	10.1	*	10.1
Hand	*	15.0	0	0.0	0	0.0	0	0.0	*	8.1	0	0.0
Hanson	*	46.9	*	12.6	*	71.0	*	155.1	0	0.0	0	0.0
Harding	*	35.3	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Hughes	3	12.3	14	65.8	*	20.3	3	31.6	5	19.9	*	5.5
Hutchinson	3	29.0	4	31.1	*	6.5	0	0.0	*	4.2	0	0.0
Hyde	*	57.0	*	24.6	*	148.8	0	0.0	0	0.0	0	0.0
Jackson	0	0.0	*	25.4	0	0.0	*	50.0	*	72.4	0	0.0
Jerauld	*	53.0	4	81.1	0	0.0	*	55.4	0	0.0	0	0.0
Jones	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Kingsbury	*	21.8	5	59.6	0	0.0	0	0.0	0	0.0	*	11.5
Lake	0	0.0	3	15.3	*	8.6	*	17.4	0	0.0	*	6.6
Lawrence	*	5.1	15	35.9	4	19.5	6	35.9	*	4.3	3	7.8
Lincoln	6	10.8	15	26.9	6	20.2	3	11.2	0	0.0	4	7.0
Lyman	*	22.1	3	65.1	0	0.0	0	0.0	0	0.0	0	0.0
McCook	0	0.0	5	57.6	0	0.0	*	23.0	0	0.0	*	11.6
McPherson	0	0.0	*	14.3	*	16.5	0	0.0	0	0.0	0	0.0
Marshall	0	0.0	3	42.3	0	0.0	0	0.0	*	10.6	*	17.1
Meade	10	32.3	20	59.7	*	4.9	0	0.0	*	3.3	4	14.3
Mellette	0	0.0	*	48.2	0	0.0	0	0.0	0	0.0	0	0.0
Miner	0	0.0	*	33.3	0	0.0	0	0.0	0	0.0	0	0.0
Minnehaha	24	13.2	102	50.4	19	16.6	21	28.6	3	2.1	15	7.4
Moody	0	0.0	5	53.9	*	35.5	*	22.8	0	0.0	*	11.4
Oglala Lakota	*	7.1	6	49.8	*	35.5	*	34.0	0	0.0	0	0.0
Pennington	16	10.9	47	31.1	17	24.0	12	20.4	6	4.9	8	5.8
Perkins	3	59.0	*	10.3	0	0.0	3	105.9	0	0.0	0	0.0
Potter	*	33.3	0	0.0	*	20.7	0	0.0	0	0.0	0	0.0
Roberts	5	29.9	5	32.1	*	8.2	0	0.0	0	0.0	*	7.0
Sanborn	0	0.0	*	33.0	0	0.0	0	0.0	0	0.0	0	0.0
Spink	*	8.1	0	0.0	*	24.4	0	0.0	0	0.0	0	0.0
Stanley	*	21.4	4	80.2	0	0.0	0	0.0	0	0.0	0	0.0
Sully	0	0.0	0	0.0	0	0.0	*	91.2	0	0.0	0	0.0
Todd	*	14.7	5	101.1	*	32.4	0	0.0	0	0.0	0	0.0
Tripp	*	16.2	*	13.1	0	0	0	0.0	0	0.0	*	10.0
Turner	3	21.6	7	46.7	*	23.4	*	6.2	*	9.1	0	0.0
Union	7	34.6	6	24.2	0	0.0	*	4.3	0	0.0	*	3.2
Walworth	*	18.8	*	17.6	0	0.0	0	0.0	0	0.0	0	0.0
Yankton	3	9.6	8	22.0	3	11.2	0	0.0	*	4.5	*	3.1
Ziebach	0	0.0	0	0.0	*	48.5	0	0.0	0	0.0	0	0.0

Note: * Counts less than 3 are suppressed. Mortality rates with counts less than 20 are generally considered unstable.
Rates per 100,000 age-adjusted to the 2000 US standard population and 2019 SD estimated population.
Source: South Dakota Department of Health

Table 8: Age-adjusted Mortality Rates by Site, Gender, and Race, South Dakota, 2019

	TOTAL		MALE		FEMALE		WHITE		AMERICAN INDIAN	
	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate
Total	**1,737**	**153.3**	**921**	**176.8**	**816**	**133.8**	**1,615**	**151.9**	**91**	**203.3**
Oral Cavity										
Lip	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Tongue	5	0.4	4	0.7	1	0.2	4	0.3	1	2.3
Salivary Gland	3	0.2	3	0.6	0	0.0	3	0.2	0	0.0
Floor of Mouth	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Gum and Other Mouth	6	0.6	2	0.4	4	0.8	6	0.7	0	0.0
Nasopharynx	2	0.2	1	0.2	0	0.1	2	0.2	0	0.0
Hypopharynx	2	0.1	2	0.3	0	0.0	3	0.2	0	0.0
Tonsil	3	0.2	3	0.5	0	0.0	3	0.2	0	0.0
Oropharynx	1	0.1	1	0.1	0	0.0	1	0.1	0	0.0
Other Oral Cavity and Pharynx	1	0.1	0	0.0	1	0.3	1	0.2	0	0.0
Digestive System										
Esophagus	54	4.7	38	6.9	16	2.7	48	4.5	6	12.5
Stomach	23	2.4	16	3.4	7	1.4	19	2.0	2	3.3
Small Intestine	6	0.5	3	0.6	3	0.4	6	0.5	0	0.0
Colorectal	153	13.7	74	14.9	79	12.6	144	14.0	6	10.2
Anus, Anal Canal and Anorectum	3	0.2	0	0.0	3	0.4	3	0.2	0	0.0
Liver and Intrahepatic Bile Duct	65	5.6	41	7.6	24	3.7	55	5.1	8	20.5
Gallbladder	6	0.5	0	0.0	6	1.0	6	0.6	0	0.0
Other Biliary	7	0.6	3	0.5	4	0.7	7	0.6	0	0.0
Pancreas	142	12.3	86	15.9	56	9.5	135	12.4	6	13.5
Retroperitoneum	1	0.1	0	0.0	1	0.1	1	0.1	0	0.0
Peritoneum, Omentum and Mesentery	6	0.6	0	0.0	6	1.0	5	0.5	1	3.7
Respiratory										
Nose, Nasal Cavity and Middle Ear	1	0.1	1	0.2	0	0.0	1	0.1	0	0.0
Larynx	7	0.6	6	1.1	1	0.2	6	0.6	1	1.5
Lung and Bronchus	430	37.2	212	40.0	218	35.0	403	36.6	23	49.0
Pleura	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Mediastinum and Other Resp Organs	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Bones and Joints	**4**	**0.4**	**2**	**0.5**	**2**	**0.2**	**4**	**0.4**	**0**	**0.0**
Soft Tissue	**12**	**1.1**	**6**	**1.1**	**6**	**1.0**	**12**	**1.2**	**0**	**0.0**
Skin										
Melanoma of the Skin	17	1.5	11	1.9	6	1.0	17	1.6	0	0.0
Other Nonepithelial Skin	12	1.2	11	2.4	1	0.2	11	1.1	1	3.2
Breast										
Breast, Female	106	18.1			106	18.1	96	17.5	8	37.7
Breast, Male	1	0.3	1	0.3			1	0.3	0	0.0
Female										
Vulva	5	0.7			5	0.7	5	0.8	0	0.0
Vagina	4	0.6			4	0.6	4	0.6	0	0.0
Cervix Uteri	10	2.0			10	2.0	9	1.9	1	4.4
Corpus and Uterus, NOS	30	4.4			30	4.4	28	4.5	2	5.7
Ovary	35	5.8			35	5.8	33	6.1	2	8.5
Other Female Genital Organs	1	0.1			1	0.1	1	0.1	0	0.0

	TOTAL		MALE		FEMALE		WHITE		AMERICAN INDIAN	
	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate
Male										
Penis	1	0.2	1	0.2			0	0.0	1	5.4
Prostate	86	17.6	86	17.6			82	17.6	4	23.7
Testis	4	0.9	4	0.9			3	0.8	1	3.7
Other Male Genital Organs	0	0.0	0	0.0			0	0.0	0	0.0
Urinary										
Bladder	43	3.9	34	7.2	9	1.4	43	4.1	0	0.0
Kidney and Renal Pelvis	64	5.3	43	7.7	21	3.2	58	5.0	5	8.4
Ureter	2	0.2	0	0.0	2	0.3	2	0.2	0	0.0
Other Urinary Organs	2	0.2	2	0.5	0	0.0	2	0.3	0	0.0
Eye and Orbit	**2**	**0.2**	**1**	**0.2**	**1**	**0.2**	**2**	**0.2**	**0**	**0.0**
Brain and CNS										
Brain	60	5.8	38	8.3	22	3.4	59	6.4	1	1.0
Meninges and CNS	1	0.1	0	0.0	1	0.1	1	0.1	0	0.0
Endocrine										
Thyroid	2	0.2	0	0.0	1	0.3	2	0.2	0	0.0
Other Endocrine	3	0.4	1	0.3	2	0.4	3	0.4	0	0.0
Lymphomas										
Hodgkin's Disease	4	0.4	4	0.8	0	0.0	4	0.4	0	0.0
Non-Hodgkin's Lymphomas	69	6.3	47	9.3	22	3.6	68	6.4	1	1.8
Multiple Myeloma	**35**	**3.0**	**24**	**4.7**	**11**	**1.6**	**34**	**3.0**	**1**	**3.9**
Leukemia	**73**	**6.7**	**38**	**7.7**	**35**	**6.1**	**69**	**6.8**	**4**	**8.6**
Mesothelioma	**3**	**0.2**	**1**	**0.1**	**2**	**0.3**	**3**	**0.3**	**0**	**0.0**
Ill-Defined and Unspecified Sites	**123**	**10.6**	**70**	**13.6**	**53**	**8.6**	**112**	**10.3**	**9**	**20.7**

Rates per 100,000 age-adjusted to the 2000 US standard population and 2019 SD estimated population.
Source: South Dakota Department of Health

Table 9 shows death and age-adjusted mortality rates by SEER recode primary sites (Appendix D), gender and race. Approximately 1,700 persons die from cancer in South Dakota each year with a small change in counts. Overall, more males than females die from cancer.

Table 9: Percentage of Cancer Deaths by Age Groups and Selected Primary Sites, South Dakota, 2019

Age Group	0-19	20-34	35-49	50-64	65-74	75-84	85+
All Sites	0%	1%	3%	21%	27%	28%	20%
Bladder	0%	0%	5%	9%	14%	37%	35%
Female Breast	0%	1%	6%	26%	15%	27%	25%
Colorectal	0%	0%	6%	20%	22%	23%	29%
Corpus and Uterus, NOS	0%	0%	5%	21%	46%	10%	18%
Meninges, Brain and CNS	3%	1%	10%	25%	33%	20%	8%
Kidney and Renal Pelvis	0%	2%	2%	23%	37%	19%	17%
Leukemia	0%	4%	7%	11%	27%	30%	21%
Lung and Bronchus	0%	0%	1%	22%	29%	32%	17%
Melanoma of the Skin	0%	0%	7%	24%	17%	31%	21%
Non-Hodgkin's Lymphoma	0%	1%	1%	9%	26%	42%	20%
Pancreas	0%	0%	1%	19%	33%	32%	14%
Prostate	0%	0%	0%	9%	21%	33%	37%

Source: South Dakota Department of Health

Overall, in 2019 more persons 75 to 84 years of age died from cancer in South Dakota than any other age group (Table 10).

Figure 8: All Sites Cancer Mortality Rates by Race, and Gender, South Dakota, 2019
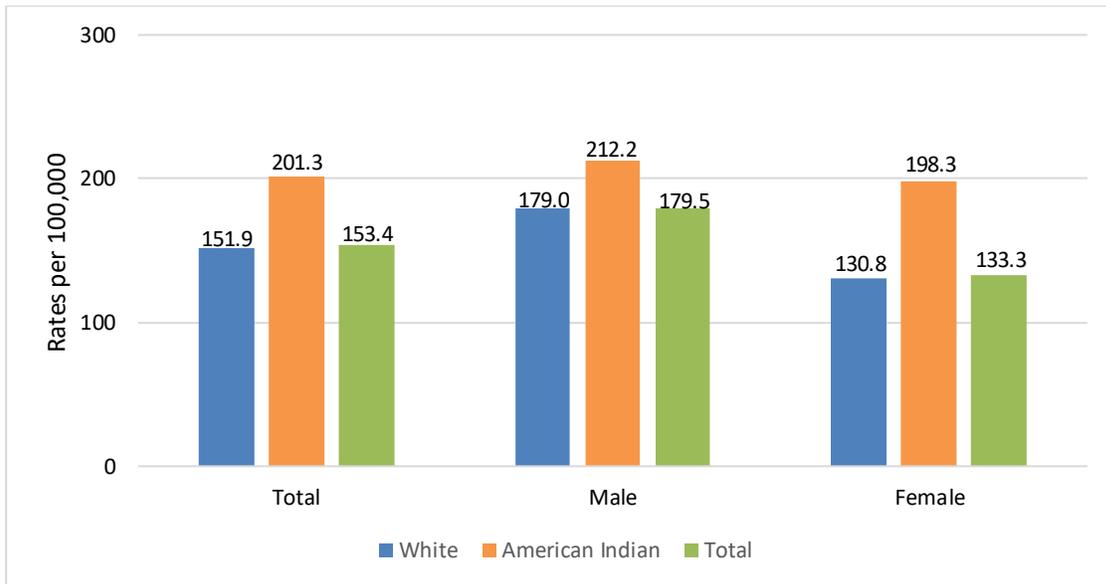
Note: Rates per 100,000 age-adjusted to 2000 US standard population and 2019 SD estimated population.
Source: South Dakota Department of Health

Figure 8 illustrates that American Indian males had a higher mortality rate than any other group. In 2012 American Indian females had a higher mortality rate than their male counterparts.

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X. SELECTED CANCER SITES INCIDENCE AND MORTALITY

This section covers the following cancers: bladder, female breast, cervix uteri, colorectal cancer, corpus uterus, kidney and renal pelvis, leukemia, lung and bronchus, melanoma (skin), myeloma, non-Hodgkin's lymphoma, ovary, pancreas, prostate, stomach, and thyroid.

These cancers were selected because of the ranking in the cancer sites reported as well as the importance and impact to society.

Topics for each cancer include incidence and mortality data along with age-adjusted rates, trends, comparison with national data (if available), risks, associated risk factors, and prevention.

BLADDER

Table 10: Bladder Incidence and Mortality Summary, 2019

Bladder Cancer			Incidence			Mortality		
			Total	Male	Female	**Total**	Male	Female
South Dakota	**Total**	# Cases / Deaths	**233**	183	50	**43**	34	9
		Age-Adjusted Rate	**20.3**	34.8	8.3	**3.9**	7.2	1.4
	White	# Cases / Deaths	**227**	178	49	**43**	34	9
		Age-Adjusted Rate	**21.1**	35.9	8.9	**4.1**	7.5	1.5
	American Indian	# Cases / Deaths	**4**	3	1	**0**	0	0
		Age-Adjusted Rate	**11.4**	21.1	3.9	**0.0**	0.0	0.0
.United States	**Total**	Age-Adjusted Rate	**18.3**	31.4	8.0	**4.1**	7.0	2.0
	White	Age-Adjusted Rate	**19.6**	33.4	8.4	**4.3**	7.4	2.1
	American Indian	Age-Adjusted Rate	**7.9**	13.4	3.4	**1.8**	3.0	0.8

[1]Includes *in situ* bladder; rates per 100,000 age-adjusted to 2000 US standard population and 2019 SD estimated population.
US rates www.seer.cancer.gov Source: South Dakota Department of Health

Figure 9: Bladder Cancer Stage at Diagnosis, South Dakota, 2019
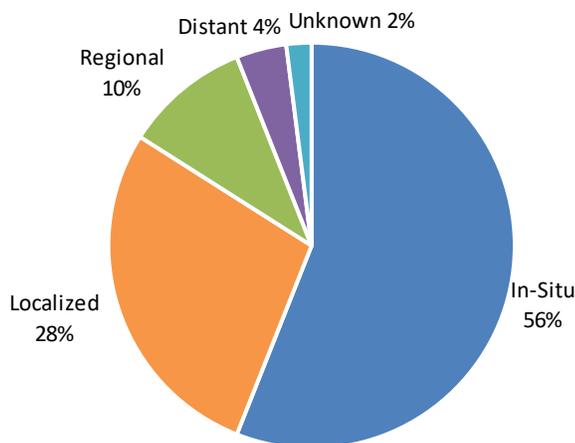
Source: South Dakota Department of Health

Descriptive Epidemiology

Stage at Diagnosis: Cancer is categorized as noninvasive and invasive. There were 130 noninvasive bladder cancers and 103 invasive cancers reported in 2019. More than half, 56%, of bladder cancer cases in South Dakota were diagnosed at noninvasive, *in situ* stage. Nationally, 48.9% of the cases of urinary bladder cancer are diagnosed at the *in-situ* stage. In South Dakota, 4.0% of the cases were not diagnosed until the disease had spread to distant sites. In the United States, distant stages accounted for 4.9% of bladder cancers reported.

Incidence: In 2019, 75,022 new cases of bladder cancer were diagnosed in the United States. There were

233 cases of bladder cancer reported in South Dakota. There were 183 men and 50 women diagnosed with bladder cancer in 2019. Statistically, men were diagnosed about four times as often as women. There were only 4 American Indian cases diagnosed in 2019. Both nationally and in South Dakota bladder cancer was the sixth most frequent cancer diagnosed.

Mortality: Advances in intravesical therapy and in the treatment of advanced disease with chemotherapy have reduced the percentage of mortality from bladder cancer. In South Dakota, ages from 75 and above have the highest mortality rate. In 2019, the South Dakota mortality rate was 3.9 and US mortality rate was 4.1.

Risk and Associated Factors: Bladder cancer was one of the first malignancies associated with industrialization. Cigarette smoking increases the risk of bladder cancer by two times that of a nonsmoker. Work exposure to certain chemicals also increases risk. Some of those with the highest risk are makers of rubber, leather, textiles, paint products, and printing compounds.

Prevention and Early Detection: Avoiding exposure to chemicals and cigarette smoking are two of the most common recommendations for prevention.

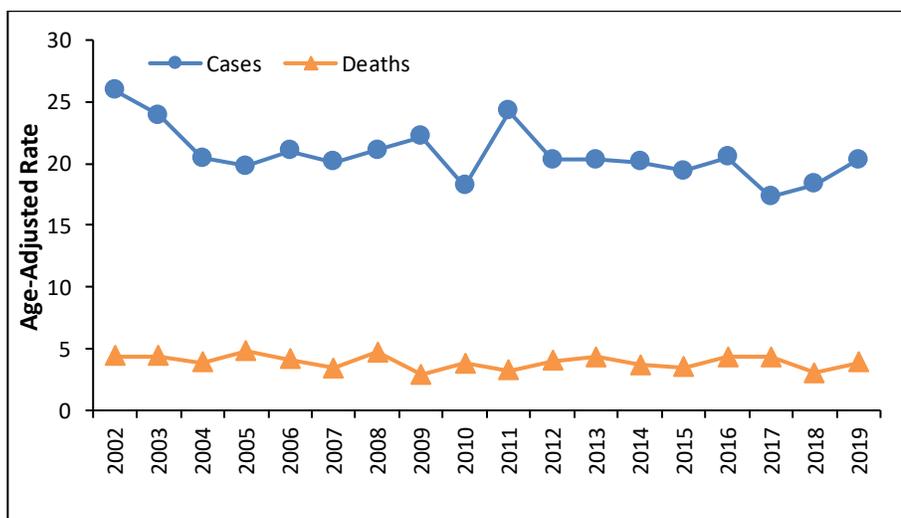**Figure 10: Bladder Cancer Number of Cases and Deaths by Age, South Dakota, 2019**
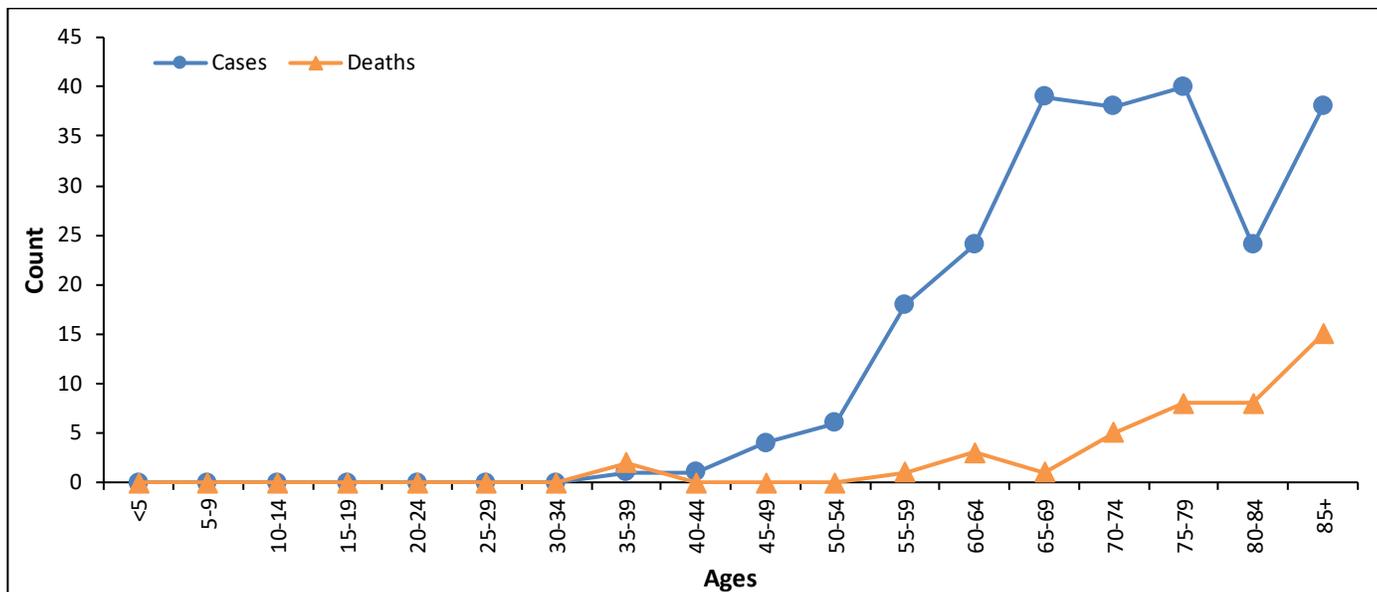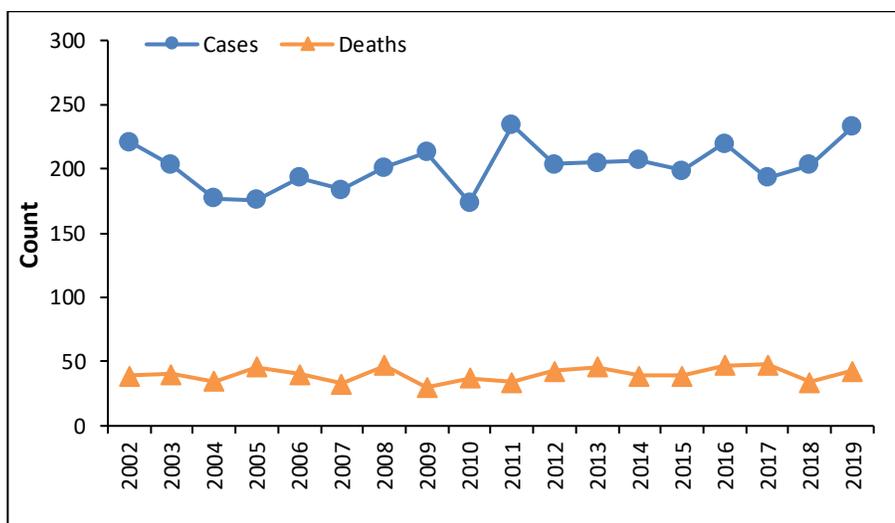
Figure 11: Bladder Cancer Cases and Deaths by Year, South Dakota, 2002 - 2019

Bladder cancer cases were at an all-time high in 2011 with 234 cases.

Figure 12: Bladder Cancer Age-Adjusted Incidence and Mortality Rates by Year, South Dakota, 2002 - 2019

Rates per 100,000 age-adjusted to 2000 US standard population and SD estimated populations.

Cancer in South Dakota 2019   April 2023

BREAST (FEMALE)

Table 11: Female Breast Incidence and Mortality Summary, 2019

Female Breast Cancer			Incidence	Mortality
South Dakota	**Total**	# Cases / Deaths	701	106
		Age-Adjusted Rate	126.6	18.0
	White	# Cases / Deaths	630	97
		Age-Adjusted Rate	127.5	17.6
	American Indian	# Cases / Deaths	40	6
		Age-Adjusted Rate	140.9	24.1
United States	**Total**	Age-Adjusted Rate	129.7	19.4
	White	Age-Adjusted Rate	130.3	18.8
	American Indian	Age-Adjusted Rate	73.1	11.9

Rates per 100,000 age-adjusted to 2000 US standard population and 2019 SD estimated population.
US rates www.seer.cancer.gov Source: South Dakota Department of Health

Figure 13: Female Breast Cancer Stage at Diagnosis, South Dakota, 2019
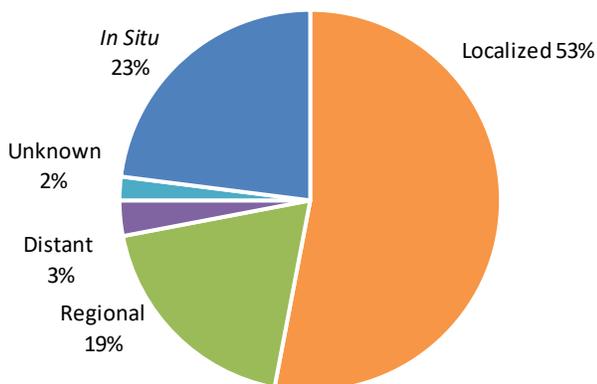
Source: South Dakota Department of Health

Descriptive Epidemiology

Stage at Diagnosis: Including *in situ* female breast cancer cases there were 905 cases diagnosed in 2019, of which 483 cases were diagnosed at a localized stage. This represents 53% of all reported breast cancer cases. There were 171 cases that had progressed beyond the breast. There were 30 that were diagnosed as a distant stage and 17 that were staged as unknown. The 204 *in situ* female breast cancer cases were reported but were not used in calculating incidence rates.

Incidence: National statistics report that female breast cancer is the most common malignant tumor among women. The incidence rate increased from 1947-1990. The rates fell 3.5% per year from 2001-2005. This decrease may be in part due to the lower number of women using hormone replacement therapy. South Dakota had 678 cases of invasive

female breast cancer reported in 2019. These cases represented 13.6% of all invasive cancer cases reported in 2016 versus 15% nationally. When just looking at South Dakota women, breast cancer represented 29.7% of the cancer cases for woman diagnosed in 2019.

Mortality: Breast cancer is the second leading cause of death attributed to cancer in South Dakota. Nationwide, breast cancer mortality has been relatively stable overall since 1950. In cancers only of women, it is the second leading cause of cancer deaths. Although mortality has increased among women older than 55 years, it has decreased among women younger than 55 years of age. In 2019, there were 106 deaths. Of those deaths, 97 were white and six were American Indian.

Risk and Associated Factors: Studies have shown that breast cancer risk is due to a combination of factors. The main factors that influence your risk include being a woman and getting older. Most breast cancers are found in women who are 50 years old or older. Lifestyle factors that contribute to an increased risk include: drinking alcohol, being overweight or obese, and being physically inactive. If you have a family history of breast cancer or inherited changes in your BRCA1 and BRCA2 genes, you may have a high risk of getting breast cancer.

Prevention and Early Detection: Prevention and early detection is the key to the survival of breast cancer. Breast cancers found during mammograms are more likely to be smaller and still confined to the breast. The US Preventive Services Task Force (USPSTF) recommends biennial screening mammography for women aged 50 to 74 years.

Figure 14: Female Breast Cancer Number of Cases and Deaths by Age, South Dakota, 2019
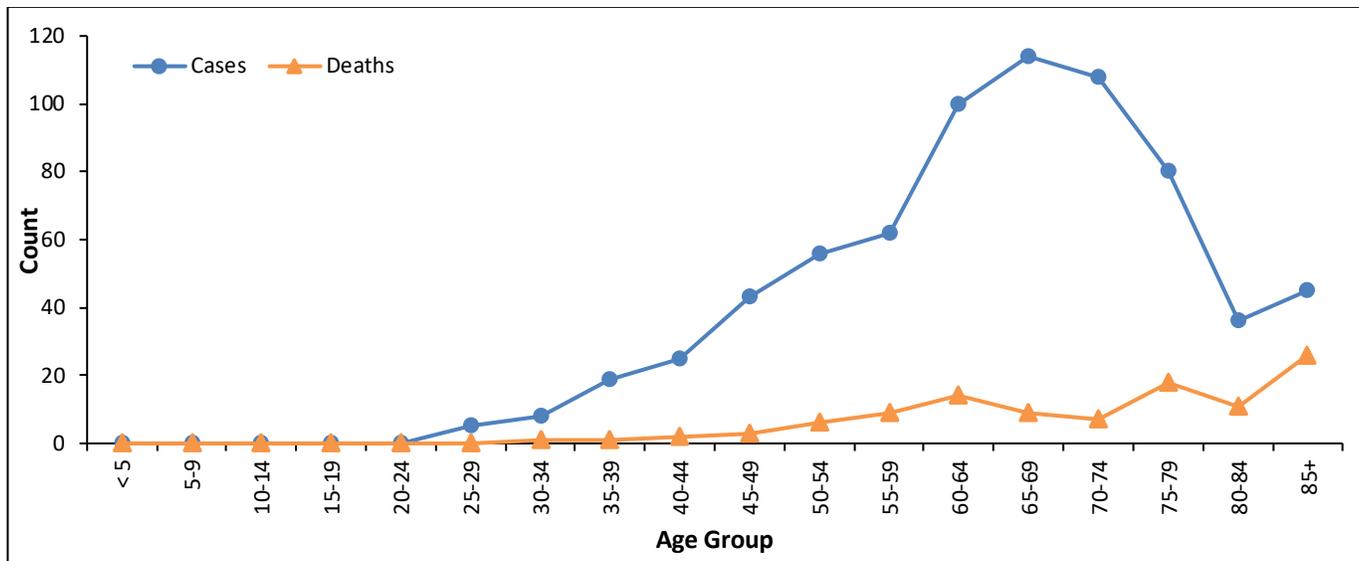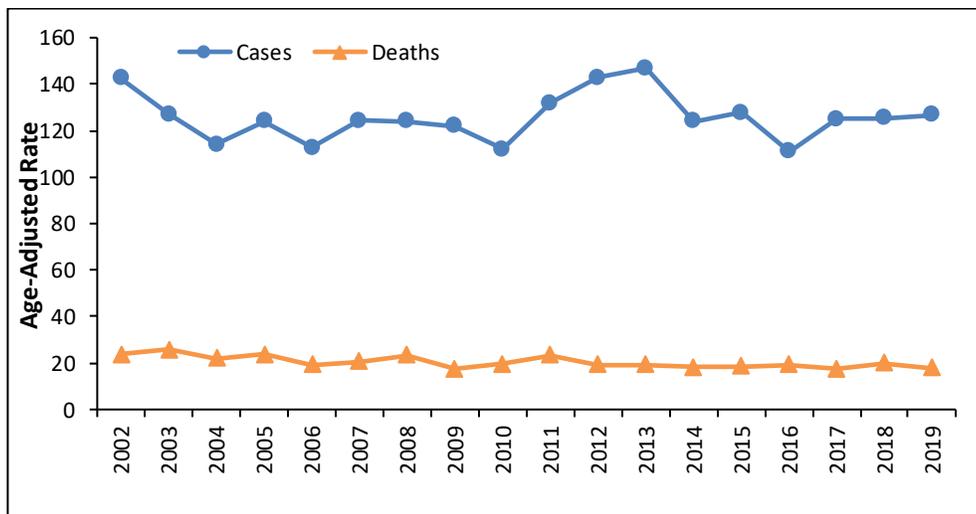

Source: South Dakota Department of Health
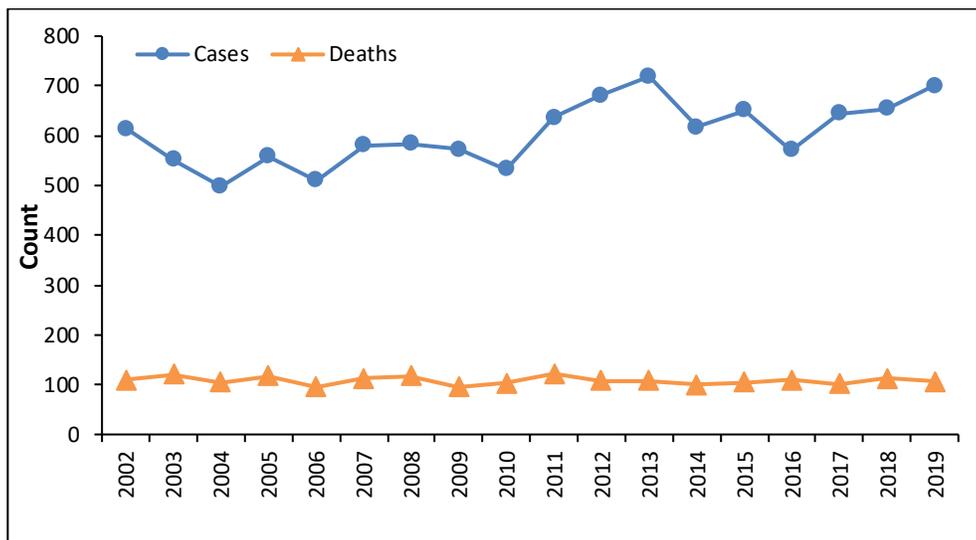
Source: South Dakota Department of Health

**Figure 15: Female Breast Cancer Cases and Deaths by Year, South Dakota, 2002 - 2019**

The incidence of female breast cancer was at an all-time high in 2013.

Figure 16: Female Breast Cancer Age-Adjusted Incidence and Mortality Rates by Year, South Dakota, 2002 - 2019

Rates per 100,000 age-adjusted to 2000 US standard population and SD estimated populations.
Source: South Dakota Department of Health

CERVIX UTERI

Table 12: Cervix Uteri Incidence and Mortality Summary, 2019

Cervix Uteri Cancer			Incidence	Mortality
South Dakota	Total	# Cases / Deaths	26	10
		Age-Adjusted Rate	5.6	2.0
	White	# Cases / Deaths	16	9
		Age-Adjusted Rate	3.9	1.9
	American Indian	# Cases / Deaths	9	1
		Age-Adjusted Rate	32.8	4.1
United States	Total	Age-Adjusted Rate	7.5	2.2
	White	Age-Adjusted Rate	7.4	2.1
	American Indian	Age-Adjusted Rate	5.8	1.6

Rates per 100,000 age-adjusted to 2000 US standard population and 2019 SD estimated population.
US rates www.seer.cancer.gov Source: South Dakota Department of Health

Figure 17: Cervix Uteri Cancer Stage at Diagnosis, South Dakota, 2019
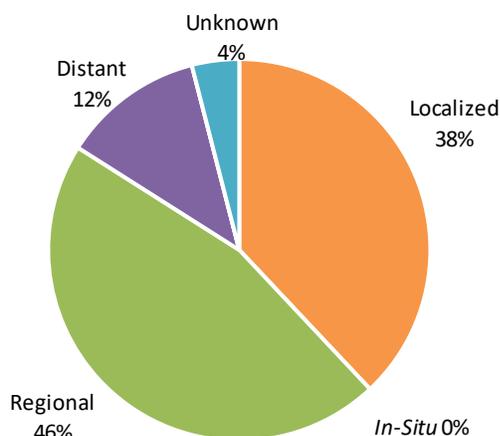
Source: South Dakota Department of Health

Descriptive Epidemiology

Stage at Diagnosis: Early stage of diagnosis clearly provides the best opportunity for cure. In South Dakota, 38% of the cases reported were diagnosed at a localized stage. SEER reports that 44.2% of the cases diagnosed nationally were at a localized stage.

Incidence: In 2019, the incidence rate in South Dakota was 5.6 and the United States rate was 7.5. Both nationally and in South Dakota, cervical cancer was the third most common female genital tract malignancy. Cervical cancer accounted for 0.5% of all cases reported and 1.1% of all females diagnosed with cancer in South Dakota in 2019. SEER incidence reports that 0.1% of cases were younger than 20 years of age.

Mortality: In 2019, the mortality rate in South Dakota was 2.0 for cancer of the cervix uteri. The United States rate was 2.2. The stage of disease at diagnosis affects the mortality rate. Cases diagnosed at a localized stage have an 90.5% survival rate according to the American Cancer Society. Nationally, when diagnosed at a distant stage, the percentage of survival drops to 18.9% at five years. In South Dakota, there were three cases in 2019 diagnosed at a distant stage.

Risk and Associated Factors: Almost all cervical cancers are caused by human papillomavirus (HPV). HPV is so common that most people get it at some time in their lives.

Prevention and Early Detection: The US Preventive Services Task Force (USPSTF) recommends screening for cervical cancer in women aged 21 to 65 years with cytology (Pap test) every three years or, for women age 30 to 65 years who want to lengthen the screening interval, screening with a combination of cytology and human papillomavirus (HPV) testing every five years.

The HPV vaccine protects against the types of HPV that most often cause cervical, vaginal, and vulvar cancers. Many of these cancers could be prevented with vaccination. Vaccination is recommended for boys and girls ages 11 to 12 years but can be given at age 9 through 26.

Figure 18: Cervix Uteri Cancer Number of Cases and Deaths by Age, South Dakota, 2019
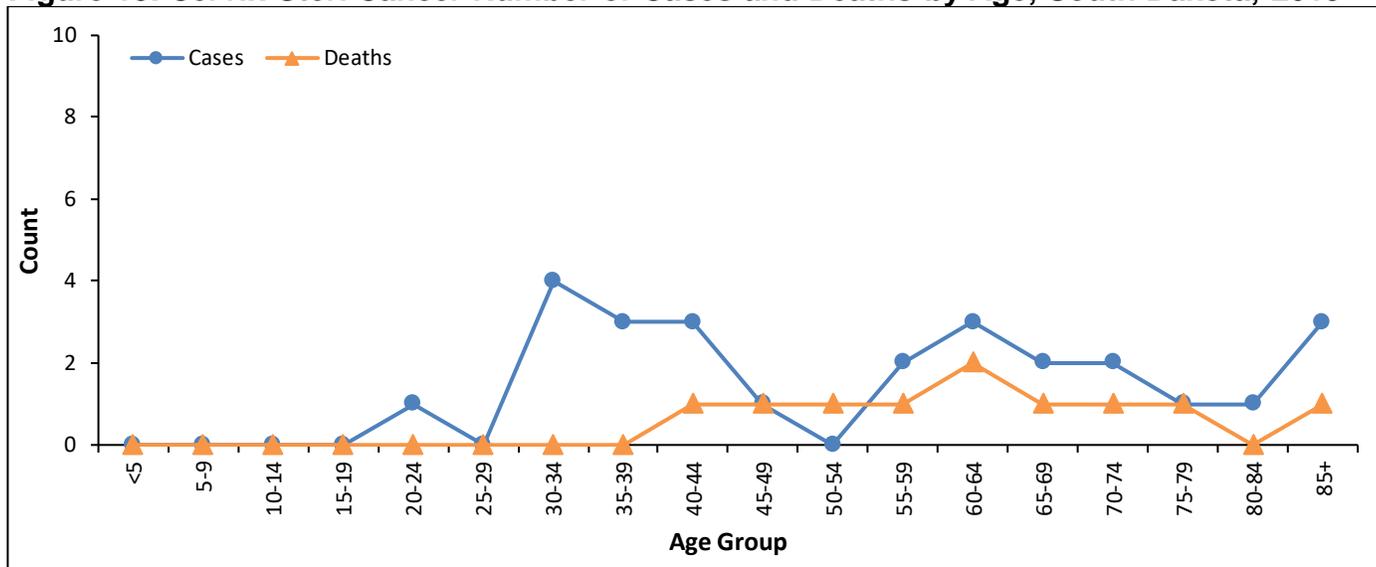
Source: South Dakota Department of Health
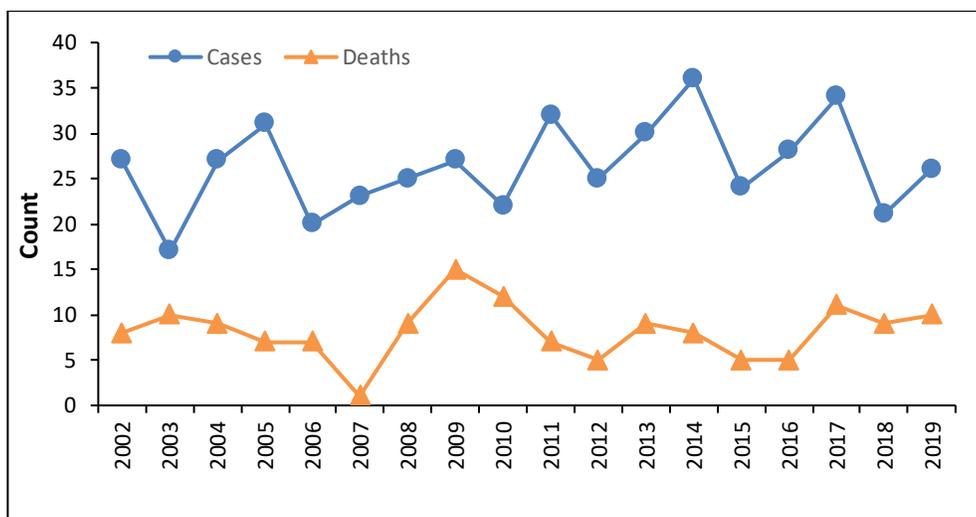
Source: South Dakota Department of Health

Figure 19: Cervix Uteri Cancer Cases and Deaths by Year, South Dakota, 2002 - 2019

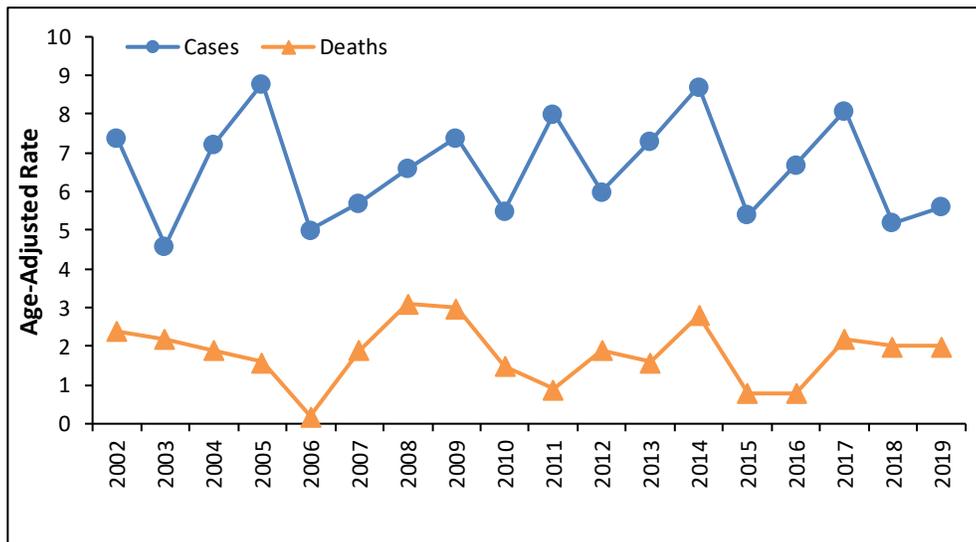The incidence peak for female cervix uteri cancer was in 2014.

Figure 20: Cervix Uteri Cancer Age-Adjusted Incidence and Mortality Rates by Year, South Dakota, 2002 – 2019

Half of the incidence of cervical cancer occurred in women under the age of 50.

Rates per 100,000 age-adjusted to 2000 US standard population and SD estimated populations.
Source: South Dakota Department of Health

COLORECTAL

Table 13: Colorectal Incidence and Mortality Summary, 2019

Colorectal Cancer			Incidence			Mortality		
			Total	Male	Female	Total	Male	Female
South Dakota	Total	# Cases / Deaths	**440**	234	206	**153**	74	79
		Age-Adjusted Rate	**41.0**	44.9	33.8	**13.7**	14.9	12.6
	White	# Cases / Deaths	**394**	209	185	**144**	69	75
		Age-Adjusted Rate	**39.3**	44.8	33.8	**14.0**	14.9	13.1
	American Indian	# Cases / Deaths	**27**	15	12	**6**	4	2
		Age-Adjusted Rate	**56.1**	78.5	42.0	**10.2**	13.1	6.8
United States	Total	Age-Adjusted Rate	**36.3**	41.6	31.8	**12.8**	15.2	10.8
	White	Age-Adjusted Rate	**35.7**	40.6	31.3	**12.6**	14.9	10.6
	American Indian	Age-Adjusted Rate	**27.0**	31.1	23.5	**9.1**	10.1	8.3

Rates per 100,000 age-adjusted to 2000 US standard population and 2019 SD estimated population.
US rates www.seer.cancer.gov Source: South Dakota Department of Health

Figure 21: Colorectal Cancer Stage at Diagnosis, South Dakota, 2019
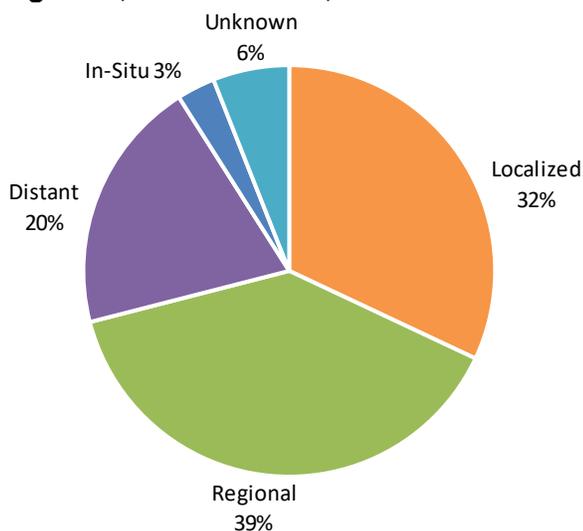
Source: South Dakota Department of Health

Descriptive Epidemiology

Stage at Diagnosis: The prognosis of the patient is greatly influenced by the stage of disease at diagnosis. In 2019, 32% (142) of the cases of colorectal cancer were diagnosed at a localized stage. Localized is defined as when the disease is still confined to the colon. The remaining 269 invasive cases (59%) were diagnosed after the disease had spread beyond the colon. Of those 246 cases, 92 were diagnosed at a distant stage when the disease had spread further involving other organs. The SEER National Cancer Institute website states that the five-year survival rate for those who have a distant stage at diagnosis is 15.7% for the 2012-2018 time period.

Incidence: Colorectal cancer accounted for 9% of all cases reported in South Dakota in 2019. There were 234 men and 206 women diagnosed with colorectal cancer in 2019 in South Dakota. In both South Dakota and the U.S., colorectal cancer was the fourth most diagnosed cancer. When reviewed by gender, it was the third most diagnosed cancer with 8.7% of the cancers reported in males and 8.3% of the cancers reported in females.

Mortality: Overall incidence and mortality rates for colorectal cancer are decreasing. The overall five-year survival rate for 2012-2018 from SEER was 63.7% for men and women. In 2019, there were a total of 153 deaths that were attributed to colorectal cancer in South Dakota. Of that number, 144 were white and six were American Indian. The median age at death was 75. The SEER National Cancer Institute website states that the United States mortality rate was 12.8.

Risk and Associated Factors: Risk for colorectal cancer increases with age. Over 90% of cases occur in people who are 50 years old or older. Lifestyle factors that may contribute to an increased risk include lack of regular physical activity, a diet low in fruit and vegetables, a low-fiber and high-fat diet, overweight and obesity, alcohol consumption, and tobacco use.
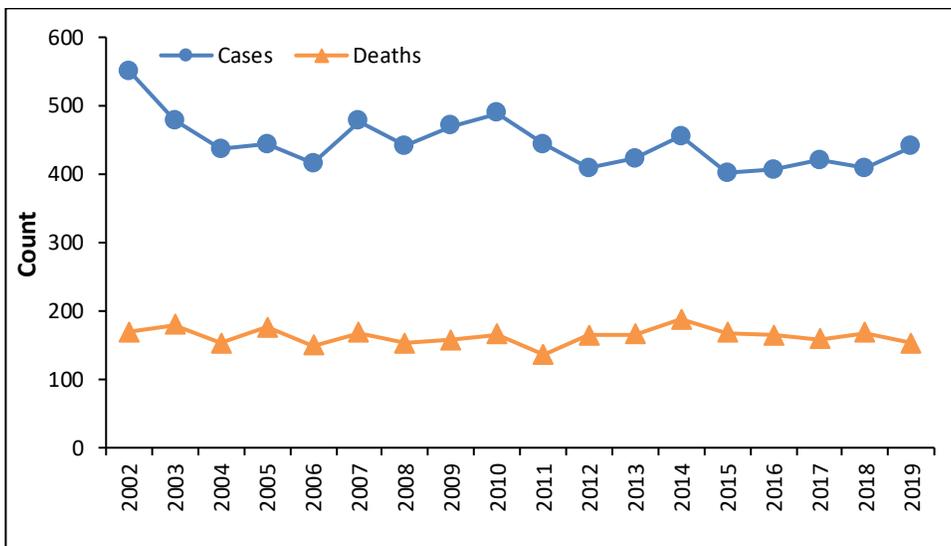
Prevention and Early Detection: The USPSTF recommends screening for colorectal cancer starting at age 45 and continuing until age 75. Recommended screening methods include high-sensitivity fecal occult blood test (FOBT), fecal immunochemical test (FIT), FIT-DNA, colonoscopy,

Figure 22: Colorectal Cancer Number of Cases and Deaths by Age, South Dakota, 2019
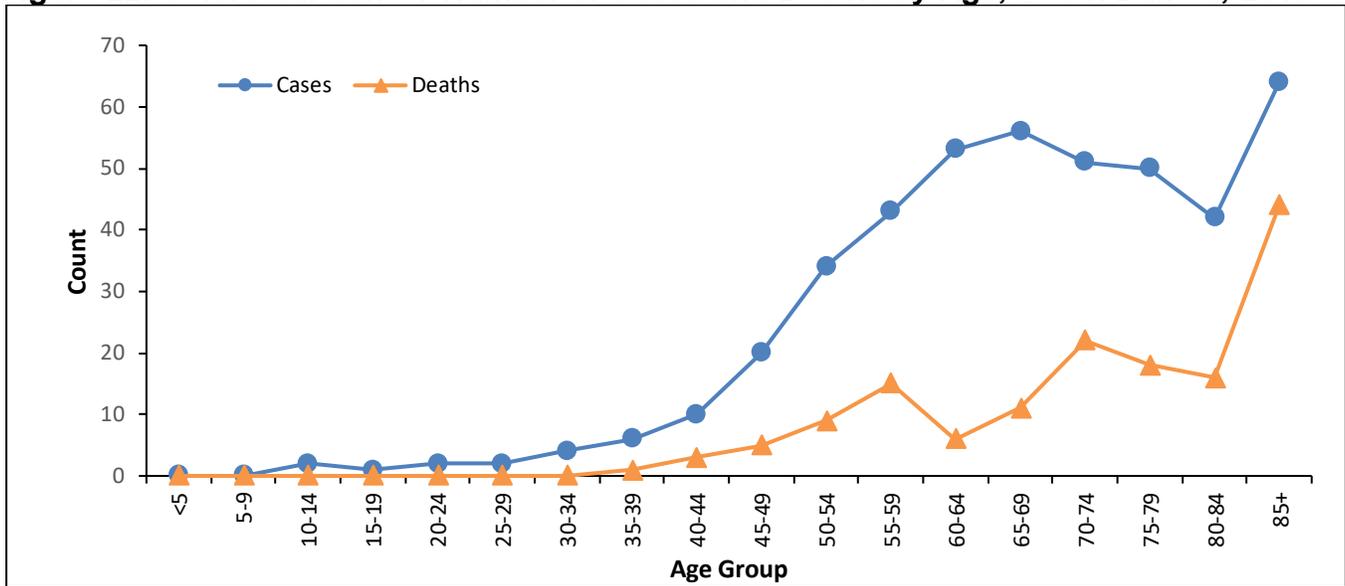
Source: South Dakota Department of Health

Figure 23: Colorectal Cancer Cases and Deaths by Year, South Dakota, 2002 – 2019

The incidence peak for colorectal cancer occurred in 2002. Incidences of colorectal cancer appear to escalate after age 50.
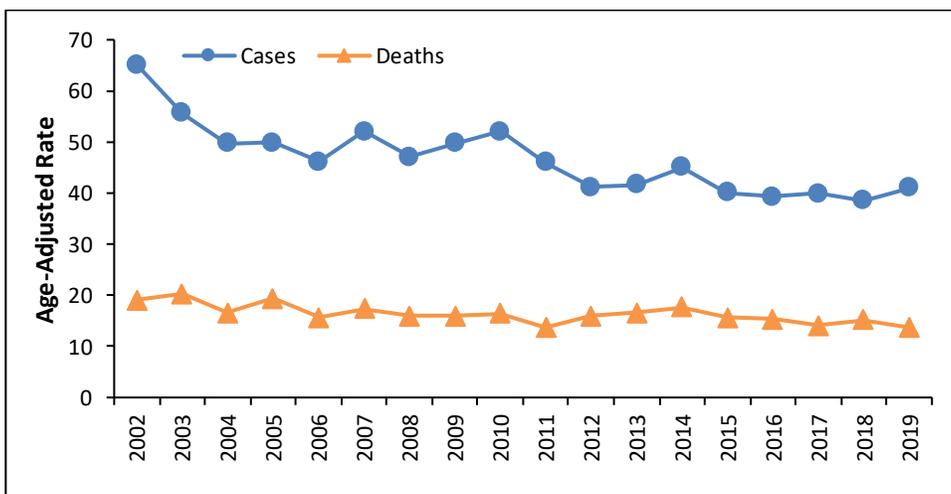
Source: South Dakota Department of Health

Figure 24: Colorectal Cancer Age-Adjusted Incidence and Mortality Rates by Year, South Dakota, 2002 - 2019

CORPUS and UTERUS, NOS

Table 14: Corpus and Uterus, NOS Incidence and Mortality Summary, 2019

Corpus and Uterus, NOS Cancer			Incidence	Mortality
South Dakota	Total	# Cases / Deaths	156	31
		Age-Adjusted Rate	28.1	4.6
	White	# Cases / Deaths	139	29
		Age-Adjusted Rate	26.9	4.6
	American Indian	# Cases / Deaths	12	2
		Age-Adjusted Rate	39.3	5.7
United States	Total	Age-Adjusted Rate	27.7	5.1
	White	Age-Adjusted Rate	27.6	4.6
	American Indian	Age-Adjusted Rate	17.8	3.3

Rates per 100,000 age-adjusted to 2000 US standard population and 2019 SD estimated population.
US rates www.seer.cancer.gov Source: South Dakota Department of Health

Figure 25: Corpus and Uterus, NOS Cancer Stage at Diagnosis, South Dakota, 2019
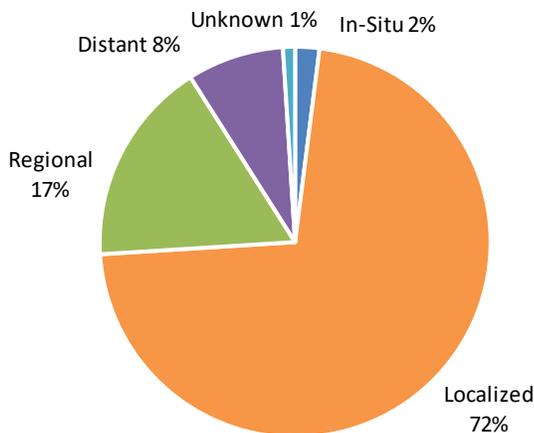
Source: South Dakota Department of Health

Descriptive Epidemiology

Stage at Diagnosis*:* Cancer in the uterus is treated surgically. Staging for these diseases is done following surgery, unless it is obvious that the disease has progressed and advanced. Cases with obvious advanced disease do not benefit from surgical procedures and are staged by physical examination. These cases are treated without operative staging. In South Dakota, during 2019, 72% of corpus uteri cases were diagnosed at a localized stage. Thirteen cases were diagnosed at a distant stage.

Incidence: The uterine cervix is the small cylindrical neck that leads from the uterus, or womb, into the vagina. A knob of the cervix protrudes into the vagina and can be visualized on physical examination. It is lined with epithelial and stromal cells creating a site for epithelial, stromal, and mixed cell malignancies.

Endometrial carcinoma is one of the female genital cancers. It is ranked seventh among females reported with cancer in South Dakota in 2019. Cancer of the corpus uteri represented 6.7% of all the cancers diagnosed in South Dakota females in 2019. Endometrial cancer affects primarily postmenopausal women. The median age at diagnosis in South Dakota is 68 years of age.

Mortality: The mortality rate in South Dakota for the reporting period was 4.6 for deaths attributed to uterine cancer. In the United States the rate was 5.1. South Dakota had 31 female deaths attributed to cancer of the uterus in 2019. The stage of disease at diagnosis affects the mortality rate. Overall (all stages included), the five-year relative survival rate was 80.7% in the United States.

Risk and Associated Factors: Risk factors associated with corpus uteri cancer suggest that exposure to estrogen for long periods of time play a critical role. The use of exogenous estrogen replacement therapy accounted for a dramatic rise in the incidence of endometrial cancer in the United States in the 1970s. The use of combination estrogen-progesterone oral contraceptive pills confers protection against

endometrial hyperplasia and subsequent development of cancer.

Prevention and Early Detection: Other factors associated with an increased risk of developing uterine cancer include obesity, a high-fat diet and prolonged exposure to the female hormone, estrogen. One pregnancy appears to lower the risk of uterine cancer by 50%.

Figure 26: Corpus and Uterus, NOS Cancer Number of Cases and Deaths by Age, South Dakota, 2019
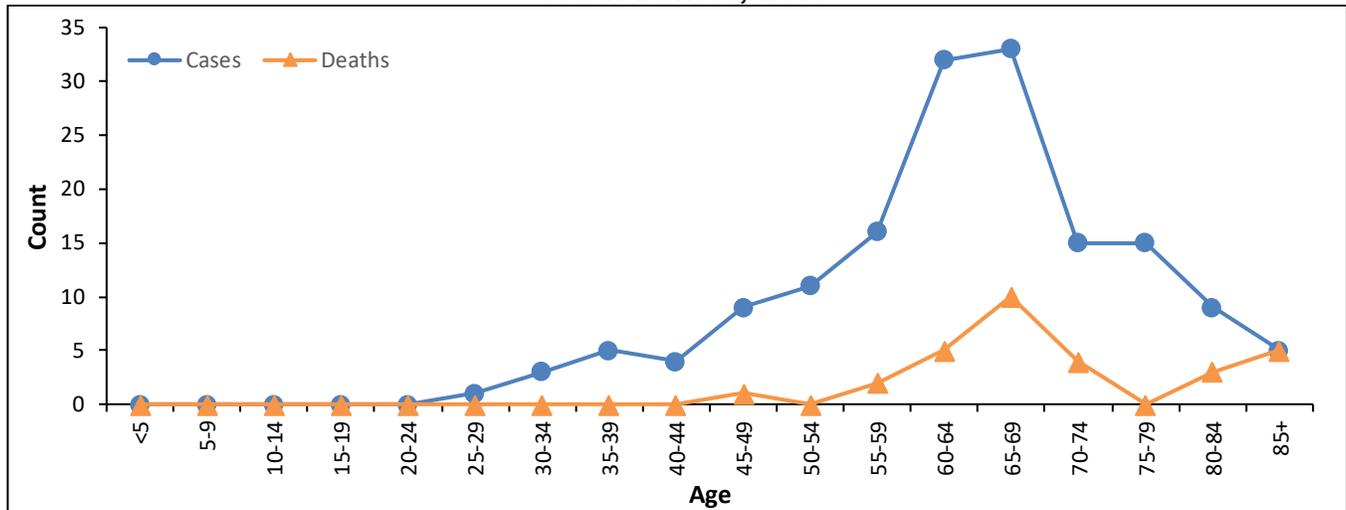
In South Dakota, in 2019 the incidences were the highest in the 60-64 and 65-69 age groups.
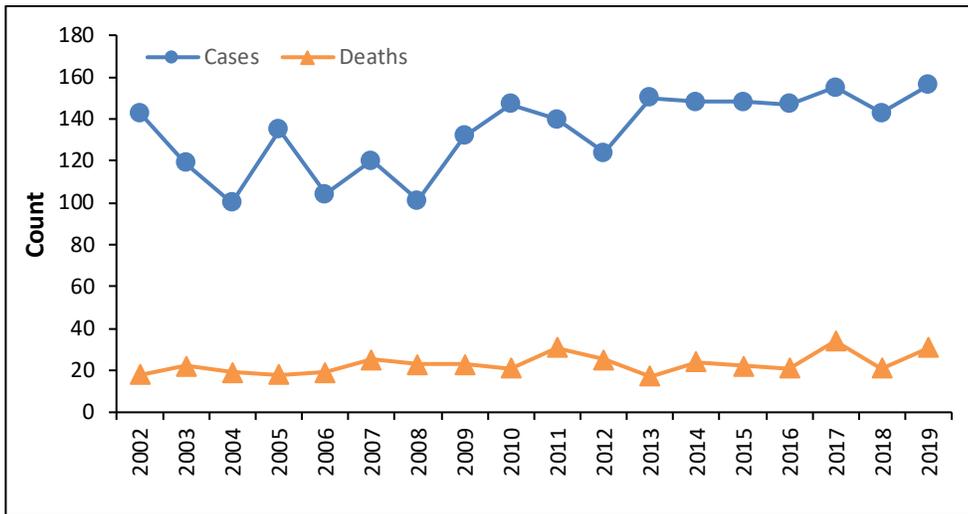
Figure 27: Corpus and Uterus, NOS Cancer Cases and Deaths by Year, South Dakota, 2002 - 2019

The incidence peak for female corpus and uterus, NOS cancer was in 2019

Source: South Dakota Department of Health
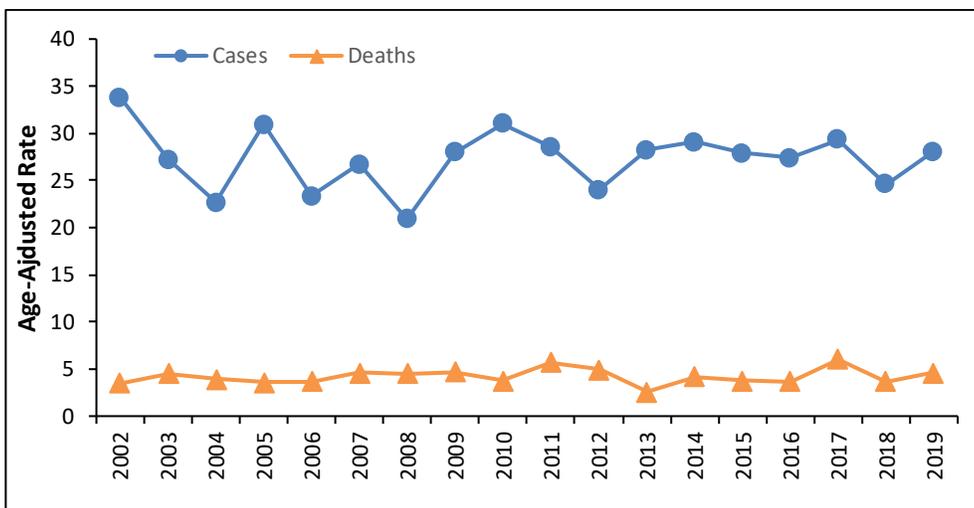
Figure 28: Corpus and Uterus, NOS Cancer Age-Adjusted Incidence and Mortality Rates by Year, South Dakota, 2002 - 2019

Rates per 100,000 age-adjusted to 2000 US standard population and SD estimated populations.
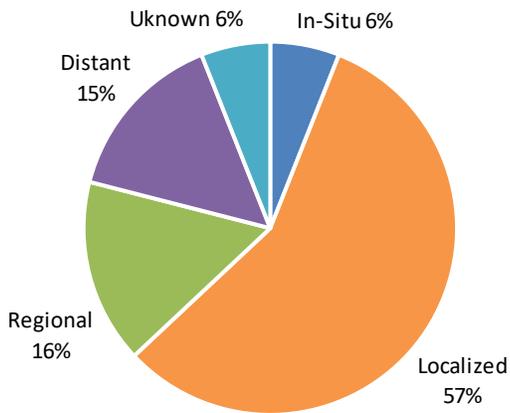Source: South Dakota Department of Health.

KIDNEY AND RENAL PELVIS

Table 15: Kidney and Renal Pelvis Incidence and Mortality Summary, 2019

Kidney and Renal Pelvis Cancer			Incidence			Mortality		
			Total	Male	Female	Total	Male	Female
South Dakota	Total	# Cases / Deaths	**175**	101	74	**64**	43	21
		Age-Adjusted Rate	**16.3**	18.5	14.1	**5.3**	7.7	3.2
	White	# Cases / Deaths	**155**	87	68	**58**	38	20
		Age-Adjusted Rate	**15.5**	17.0	14.1	**5.0**	7.4	3.1
	American Indian	# Cases / Deaths	**17**	11	6	**5**	4	1
		Age-Adjusted Rate	**33.1**	47.1	22.8	**8.4**	14.2	4.1
United States	Total	Age-Adjusted Rate	**17.2**	23.4	11.8	**3.4**	5.0	2.1
	White	Age-Adjusted Rate	**17.3**	23.4	11.9	**3.6**	5.2	2.2
	American Indian	Age-Adjusted Rate	**16.4**	21.3	12.0	**3.2**	4.2	2.4

Rates per 100,000 age-adjusted to 2000 US standard population and 2019 SD estimated population.
US rates www.seer.cancer.gov Source: South Dakota Department of Health

Figure 29: Kidney and Renal Pelvis Cancer Stage at Diagnosis, South Dakota, 2019

Cancer in South Dakota 2019 *April 2022*

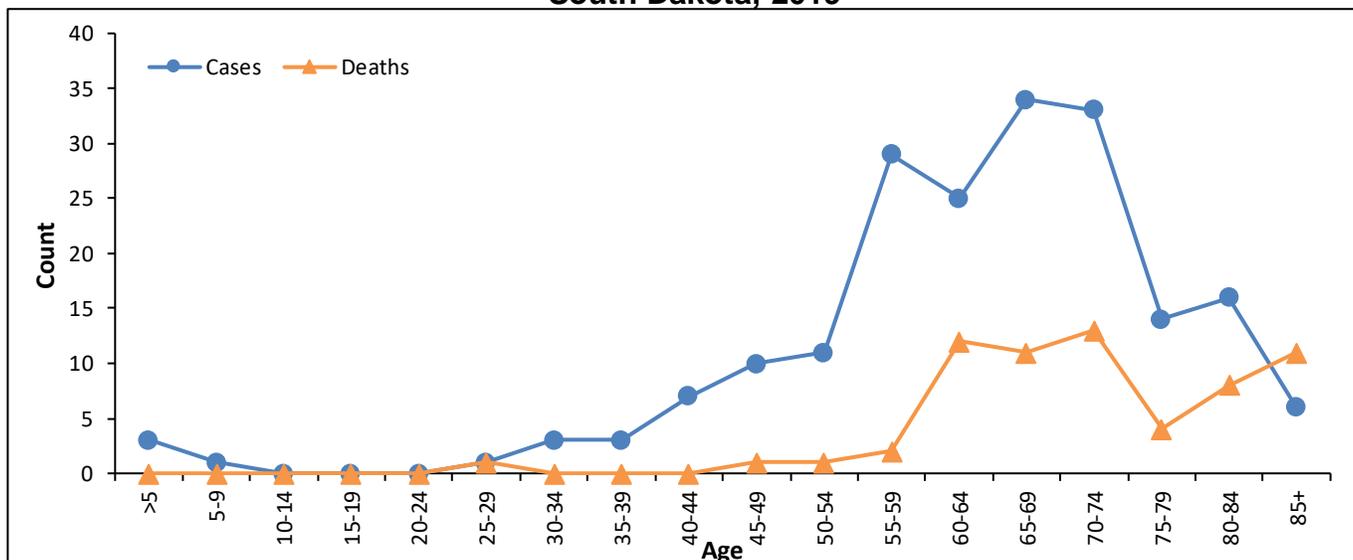Source: South Dakota Department of Health

Incidence: In 2019, the American Cancer Society estimated there would be 73,820 new cases of kidney cancer in the United States. This accounts for 3.9% of all reported malignancies in the United States. In South Dakota there were 175 reported cases of kidney cancer in 2019, representing 3.7% of all cancer cases with an age-adjusted rate of 16.3 per 100,000 persons. Kidney cancer develops most often in people over 40.

Mortality: This cancer was the ninth leading cause of cancer death for South Dakota in 2019. In the United States, it was the 12th leading cause of death. The South Dakota median age of death was 70 years.

Descriptive Epidemiology

Stage at Diagnosis: As with all malignancies, early diagnosis is the key to better prognosis and possible cure. In 2019, 57% of the cases were diagnosed at a localized stage, with another 15% diagnosed at a distant stage. Unfortunately, symptoms do not always reflect the stage of the disease. Blood in the urine is one of the symptoms that frequently present at diagnosis. As with other cancers, renal cancer can spread through the bloodstream and/or lymphatic system. Survival rates associated with kidney cancer depend on how far the disease has progressed, the size of the tumor, and whether or not it has metastasized. The latest five-year survival rate for localized stage kidney cancer is 90.7%. The survival rate for distant stage is 15.9%.

Risk and Associated Factors: About half of kidney cancers could potentially be prevented with the elimination of excess body weight and tobacco smoking, which are the strong risk factors. Additional risk factors include high blood pressure; chronic renal failure; and occupational exposure to certain chemicals, such as trichloroethylene. A small proportion of renal cell cancers are the result of rare hereditary conditions (e.g., von Hippel-Lindau disease)

Prevention and Early Detection: The main preventive measure is to stop smoking and maintain a healthy weight. It is difficult to diagnose kidney cancer until it becomes symptomatic. There are no known screenings recommended at this time.

Figure 30: Kidney and Renal Pelvis Cancer Number of Cases and Deaths by Age, South Dakota, 2019
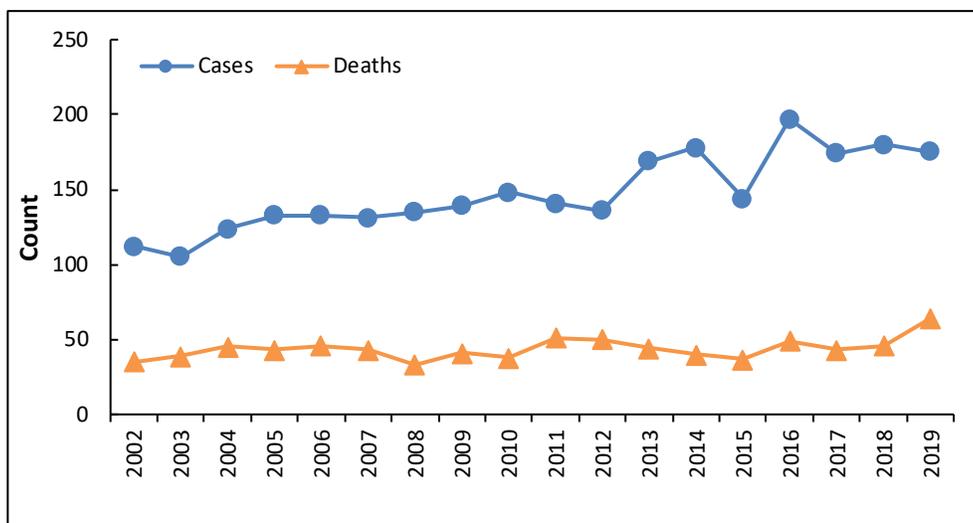
Figure 31: Kidney and Renal Pelvis Cancer Cases and Deaths by Year, South Dakota, 2002 - 2019

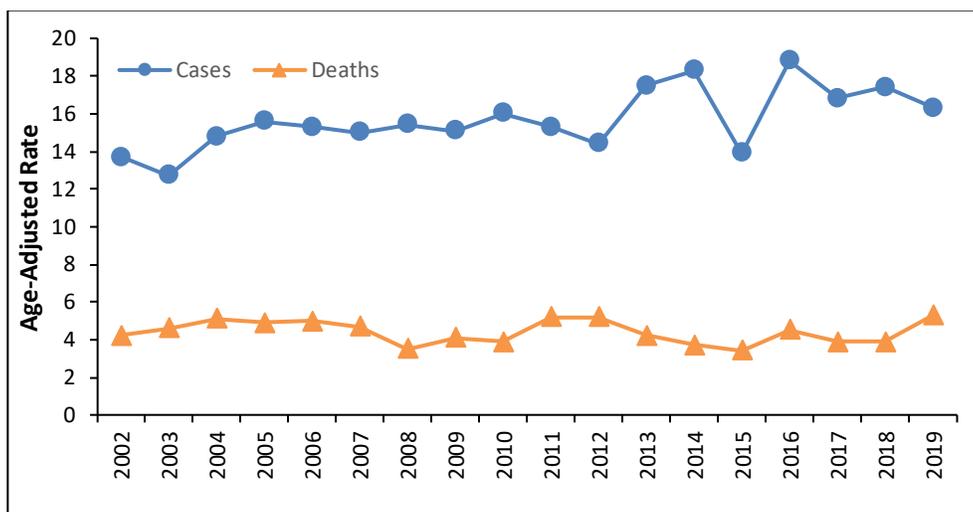The incidence peak for kidney and renal pelvis cancer occurred in 2016

Figure 32: Kidney and Renal Pelvis Cancer Age-Adjusted Incidence and Mortality Rates by Year, South Dakota, 2002 - 2019

Rates per 100,000 age-adjusted to 2000 US standard population and SD estimated populations.

LEUKEMIA

Table 16: Leukemia Incidence and Mortality Summary, 2019

Leukemia			Incidence			Mortality		
			Total	Male	Female	Total	Male	Female
South Dakota	Total	# Cases / Deaths	**157**	90	67	**73**	38	35
		Age-Adjusted Rate	**14.9**	17.2	12.9	**6.6**	7.5	6.1
	White	# Cases / Deaths	**144**	87	57	**69**	36	33
		Age-Adjusted Rate	**14.5**	17.8	11.6	**6.7**	7.7	6.1
	American Indian	# Cases / Deaths	**11**	2	9	**4**	2	2
		Age-Adjusted Rate	**24.9**	6.0	39.7	**8.6**	5.9	10.7
United States	Total	Age-Adjusted Rate	**13.2**	16.8	10.3	**5.9**	7.8	4.4
	White	Age-Adjusted Rate	**13.7**	17.3	10.6	**6.1**	8.2	4.5
	American Indian	Age-Adjusted Rate	**7.0**	8.9	5.5	**2.8**	3.0	2.7

Rates per 100,000 age-adjusted to 2000 US standard population and 2019 SD estimated population.

Descriptive Epidemiology

Stage at Diagnosis: Leukemias are not staged because they may involve bone marrow throughout the body. Doctors classify them by type and subtype in an attempt to determine the prognosis and a recommended level of treatment. Chronic myelogenous leukemia is grouped by phases and chronic lymphocytic leukemia (CLL) uses a Rai classification. Leukemia is a type of cancer of the blood. It is defined by how quickly the disease progresses. Leukemia is either chronic (disease progresses slowly) or acute (progresses quickly).

Incidence: Leukemias are a diverse group of cancers and are subtyped by histology. Subtypes have different etiology, treatment, and prognosis. Leukemias accounted for 3.1% of the cancers reported in 2019 for South Dakota. The American Cancer Society estimated that there would be 200 new cases of leukemia in South Dakota during 2019 and 61.880 cases nationwide.

Mortality: Leukemia accounted for 4.1% of the cancer deaths in South Dakota in 2019. The subtype of acute myeloid leukemia was the most frequent cause of leukemia death. About 78% of the deaths associated with leukemia occurred at the age of 65 or older.

Leukemia is clinically and pathologically subdivided into a variety of large groups. The first division is between the acute and chronic forms.

Chronic Leukemia: Early in the disease process, the abnormal blood cells still have normal processes. Slowly, chronic leukemia does get worse. It causes symptoms as the number of abnormal cells in the blood rises. In South Dakota in 2018, there were 96 new cases of chronic leukemia.

Acute Leukemia: The blood cells are very abnormal. The blood cells cannot carry out their normal processes. The number of abnormal cells increases rapidly. Acute leukemia worsens quickly as do the symptoms. There were 69 new cases of acute leukemia in South Dakota in 2019.

These types of leukemia are further divided by the type of white blood cell that is affected.

Risk and Associated Factors: People who are exposed to very high levels of radiation are more likely to develop leukemia. Working with certain chemicals and exposure to high levels of benzene in the workplace can cause leukemia. Benzene is used widely in the chemical industry. Workers exposed to formaldehyde may also be at greater risk of leukemia. Chromosomal abnormalities, such as Down's syndrome and certain other genetic diseases may increase the risk of leukemia.

Prevention and Early Detection: There are no early detection or prevention strategies. Often symptoms are the same as for many other health problems, thus early detection is difficult. Diagnosis is made using blood tests and bone marrow biopsies.

Figure 33: Leukemia Number of Cases and Deaths by Age, South Dakota, 2019
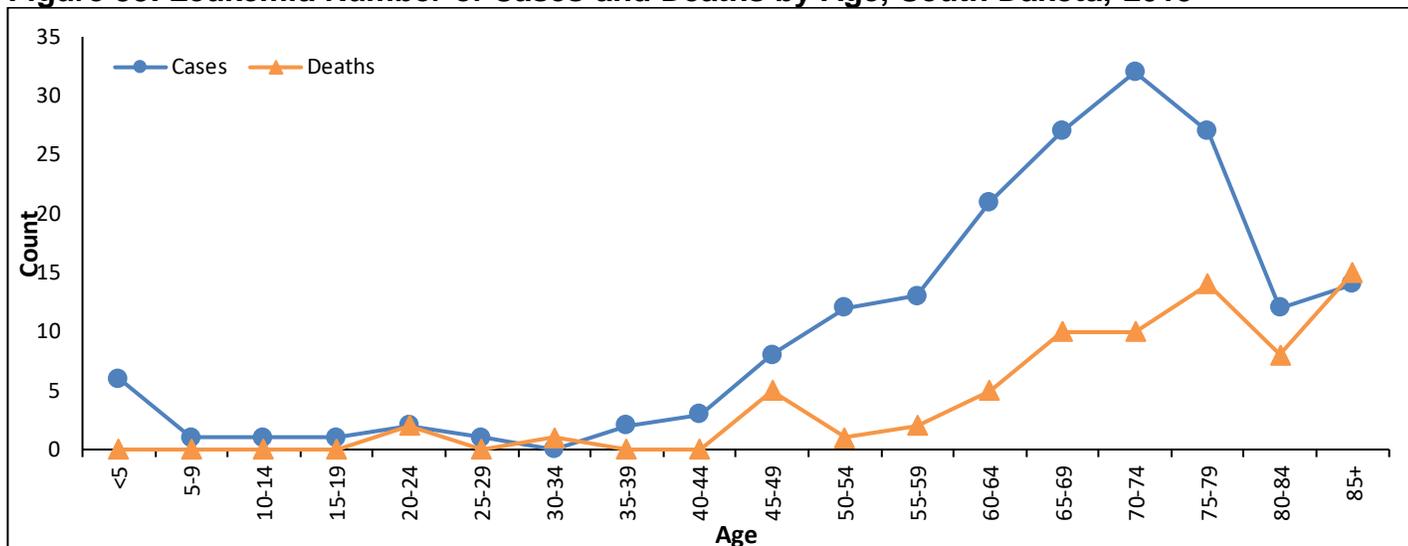
Source: South Dakota Department of Health

Leukemia is frequently diagnosed in children, but as with all malignancies it is a disease of the elderly. Deaths from leukemia increase after the age of 64.
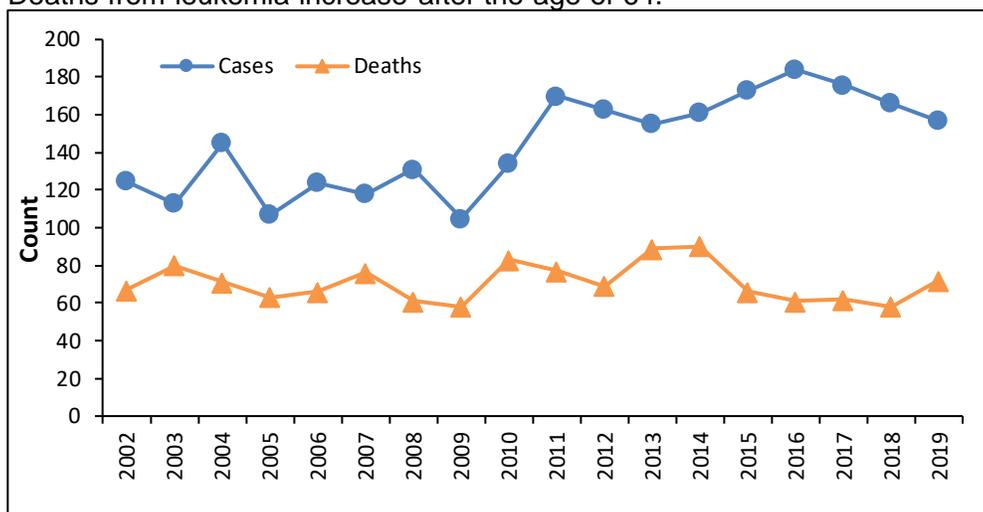
Figure 34: Leukemia Cases and Deaths by Year, South Dakota, 2002 - 2019

The incidence peak for leukemia occurred in 2016.
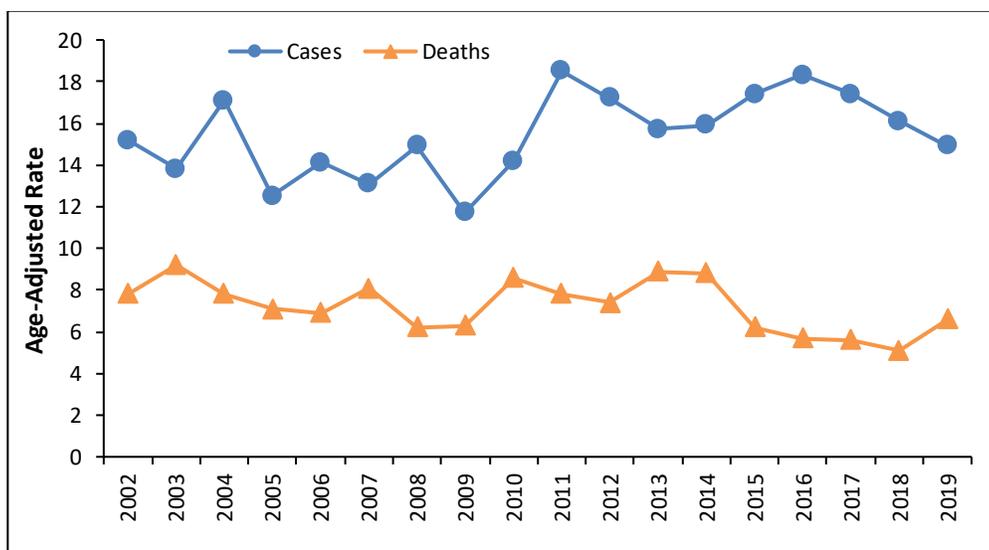
Source: South Dakota Department of Health

Figure 35: Leukemia Age-Adjusted Incidence and Mortality Rates by Year, South Dakota, 2002 - 2019

Rates per 100,000 age-adjusted to 2000 US standard population and SD estimated populations.
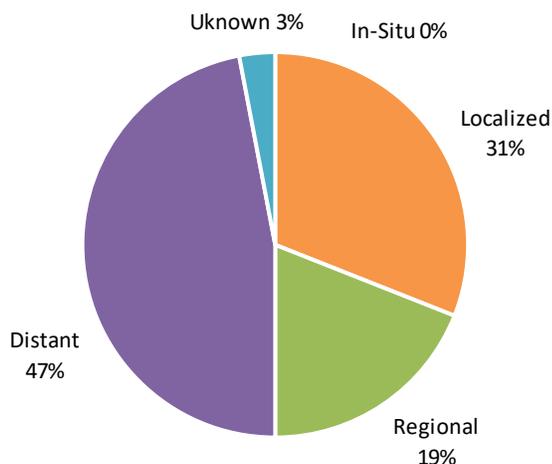Source: South Dakota Department of Health

LUNG AND BRONCHUS

Table 17: Lung and Bronchus Incidence and Mortality Summary, 2019

Lung and Bronchus Cancer			Incidence			Mortality		
			Total	Male	Female	Total	Male	Female
South Dakota	Total	# Cases / Deaths	**675**	320	355	**430**	212	218
		Age-Adjusted Rate	**58.0**	58.9	57.5	**37.3**	40.0	35.0
	White	# Cases / Deaths	**571**	275	296	**403**	203	200
		Age-Adjusted Rate	**52.0**	52.7	51.2	**36.6**	40.1	33.7
	American Indian	# Cases / Deaths	**24**	10	14	**26**	7	18
		Age-Adjusted Rate	54.2	58.6	58.6	60.6	31.0	75.9
United States	Total	Age-Adjusted Rate	**52.9**	59.2	48.1	**33.4**	40.1	28.1
	White	Age-Adjusted Rate	**53.7**	59.0	49.6	**34.2**	40.3	29.3
	American Indian	Age-Adjusted Rate	**37.3**	41.9	34.0	**22.1**	25.6	19.6

Rates per 100,000 age-adjusted to 2000 US standard population and 2019 SD estimated population.
US rates www.seer.cancer.gov Source: South Dakota Department of Health

Figure 36: Lung and Bronchus Cancer Stage at Diagnosis, South Dakota, 2019

Source: South Dakota Department of Health

Descriptive Epidemiology

***Stage at Diagnosis*:** The presentation of lung cancer is extremely variable and depends on local manifestations of the tumor, distant metastases or associated paraneoplastic syndromes. In 2019, 31% of lung cancer patients were diagnosed at a localized stage. The more advanced the stage, the poorer the prognosis is for the patient. In 2019, 314 (47%) cases were diagnosed when the disease had progressed beyond the lung and metastasized to a distant location. Approximately 66% of cases in 2019 were diagnosed after the disease had progressed beyond the lung to lymph nodes, regional areas, or distant sites, such as brain or bone.

Incidence: Lung cancer is a major public health concern, with an estimated 228,150 new cases in the United States in 2019. Despite the well documented link between tobacco product use and respiratory diseases, including cancer, the outcomes of such efforts to curb the use of tobacco products have been mixed. In South Dakota, there were 675 new invasive lung cancer cases diagnosed in 2019.

Mortality: There were 430 lung cancer deaths in South Dakota in 2019. Incidence and mortality rates have significantly increased during the last century. Lung cancer accounts for approximately 23.3% of all United States deaths attributed to cancer. In South Dakota, lung cancer accounts for 24.8% of deaths from cancer. Lung cancer is the leading cause of cancer deaths in both men and women.

Risk and Associated Factors: Cigarette smoking is the number one risk factor for lung cancer and is linked to approximately 90% of lung cancers. Other risk factors include secondhand smoke exposure, occupational or environmental exposures to substances such as radon, arsenic, benzene, and asbestos, a personal or family history of lung cancer, and previous radiation therapy to the chest.

Prevention and Early Detection: The USPSTF recommends annual screening for lung cancer with low-dose computed tomography (LDCT) in adults aged 50 to 80 years who have a 20 pack/ year smoking history and currently smoke or have quit within the past 15 years. Screening should be discontinued once a person has not smoked for 15 years or develops a health problem that

substantially limits life expectancy or the ability or
willingness to have curative lung surgery.

Figure 37: Lung and Bronchus Cancer Number of Cases and Deaths by Age, South Dakota, 2019
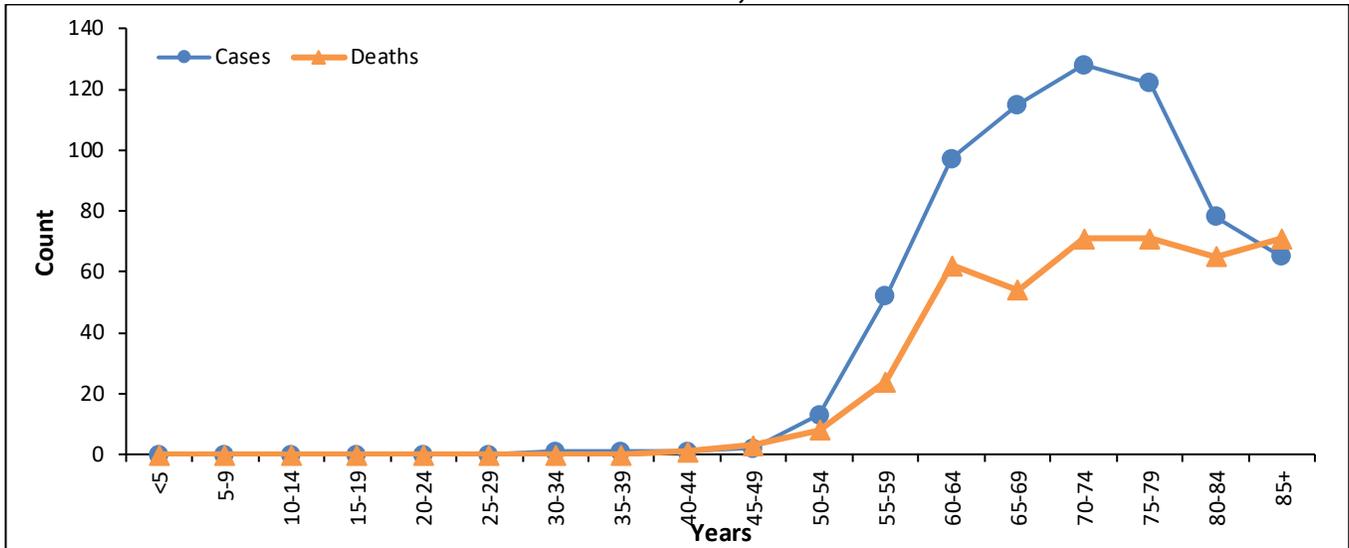
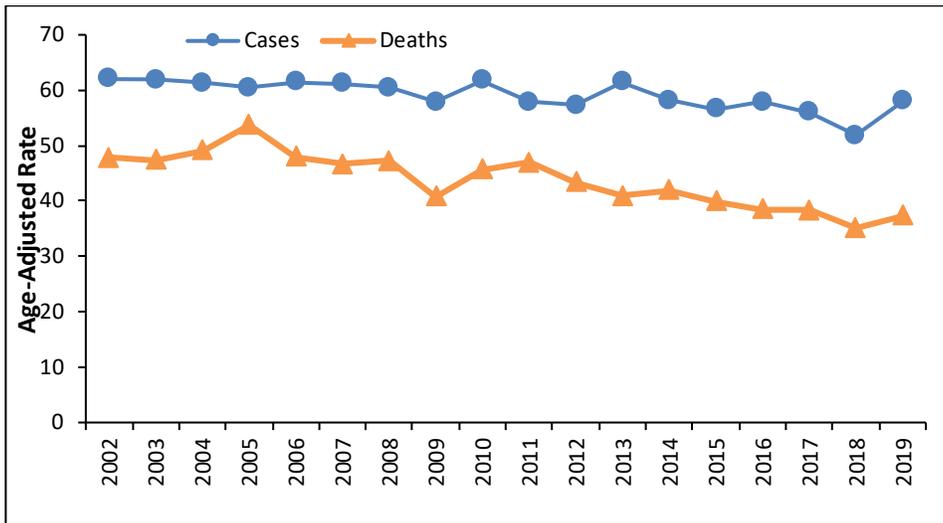Source: South Dakota Department of Health
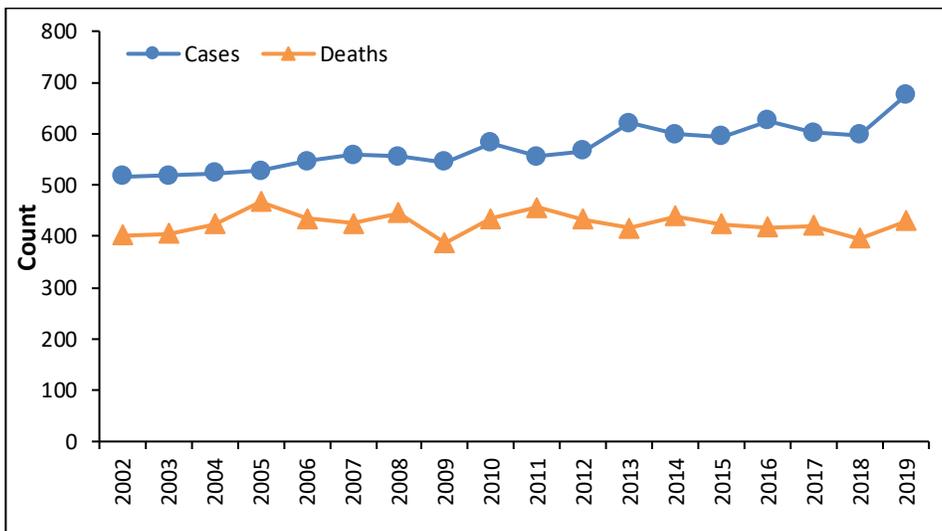
Source: South Dakota Department of Health

Figure 38: Lung and Bronchus Cancer Cases and Deaths by Year, South Dakota, 2002 - 2019

The number of cases and deaths associated with lung and bronchus cancer remain constant.

Figure 39: Lung and Bronchus Cancer Age-Adjusted Incidence and Mortality Rates by Year, South Dakota, 2002 - 2019

Rates per 100,000 age-adjusted to 2000 US standard population and SD estimated populations.
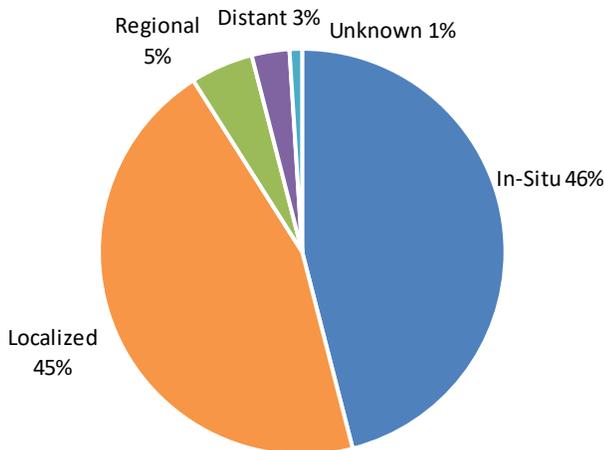Source: South Dakota Department of Health

MELANOMA OF THE SKIN

Table 18: Melanoma of the Skin Incidence and Mortality Summary, 2019

Melanoma of the Skin			Incidence			Mortality		
			Total	Male	Female	Total	Male	Female
South Dakota	**Total**	# Cases / Deaths	**249**	137	112	**17**	11	6
		Age-Adjusted Rate	**23.2**	25.5	21.6	**1.5**	1.9	1.0
	White	# Cases / Deaths	**246**	136	110	**17**	11	6
		Age-Adjusted Rate	**25.0**	27.4	23.3	**1.6**	2.1	1.1
	American Indian	# Cases / Deaths	**2**	1	1	**0**	0	0
		Age-Adjusted Rate	**3.8**	4.0	4.1	**0.0**	0.0	0.0
United States	**Total**	Age-Adjusted Rate	**22.7**	28.7	18.2	**1.3**	3.0	1.3
	White	Age-Adjusted Rate	**29.4**	36.1	24.4	**1.7**	3.8	1.7
	American Indian	Age-Adjusted Rate	**7.9**	8.1	7.9	*	*	*

Rates per 100,000 age-adjusted to 2000 US standard population and 2019 SD estimated population.
US rates www.seer.cancer.gov *=rates suppressed. Source: South Dakota Department of Health
.

Figure 40: Melanoma of the Skin Stage at Diagnosis, South Dakota, 2019

Source: South Dakota Department of Health

Descriptive Epidemiology

***Stage at Diagnosis*:** Melanoma is staged by the depth of invasion and the extension of the lesion. In 2019, 45% of the melanoma of the skin cases reported for South Dakota were localized. Another 46% were staged as *in situ* disease. The survival rate for localized melanoma is 98.1%. For distant disease, the five-year survival rate is 33.4%.

Incidence: In the United States in 2018, the American Cancer Society estimated that there would be 96,480 new cases of melanoma of the skin. There are three forms of skin cancer: basal cell, squamous cell, and melanoma. Melanoma is by far the most dangerous form of skin cancer. Melanoma is primarily a cancer of the White

populations. In 2019, South Dakota's incidence rate was 23.2 and the United States had an incidence rate of 22.7.

Mortality: There were 17 deaths attributed to melanoma of the skin in South Dakota in 2019 with a mortality rate of 1.5 and the United States mortality rate was 1.3. The median age for death in South Dakota for this cancer was 69.

Risk and Associated Factors: Certain factors are more likely to contribute to a higher risk:

- Lighter natural skin color
- Family history of skin cancer
- Personal history of skin cancer
- Exposure to the sun

- History of sunburns early in life
- Skin that burns, freckles, reddens easily
- Blue or green eyes, blond or red hair
- Large number of moles

Prevention and Early Detection: The best way to prevent skin cancer is to protect the skin from the sun. The CDC recommends five easy options for protection from sunburn:

- use sunglasses
- use sunscreen regularly
- stay in the shade
- cover skin
- wear a hat

Figure 41: Melanoma of the Skin Number of Cases and Deaths by Age, South Dakota, 2019
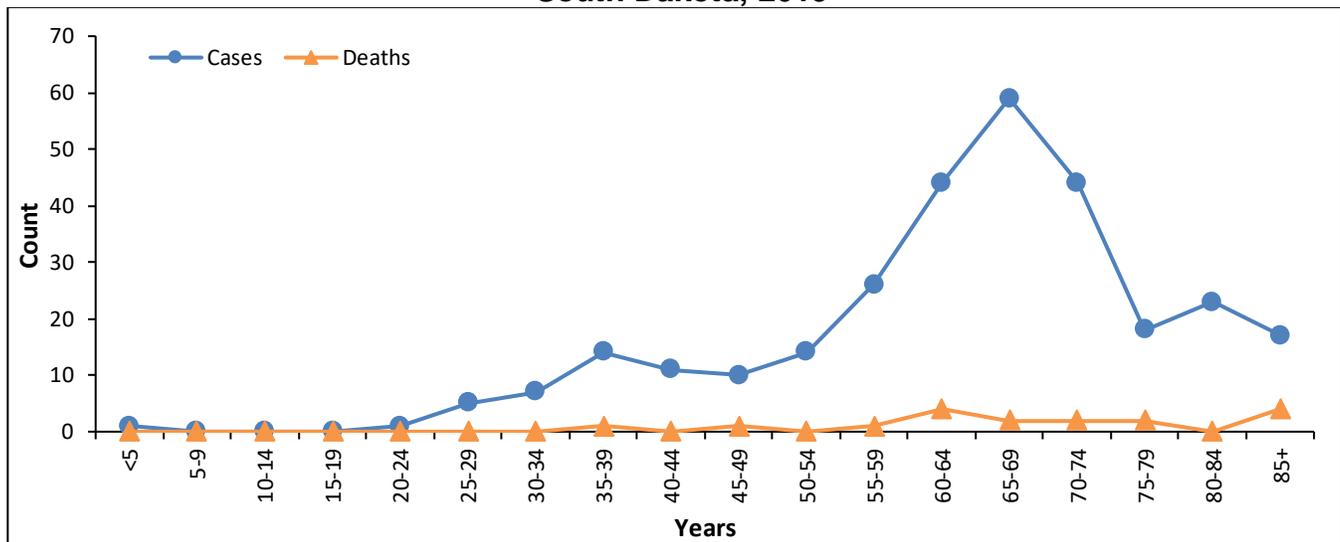
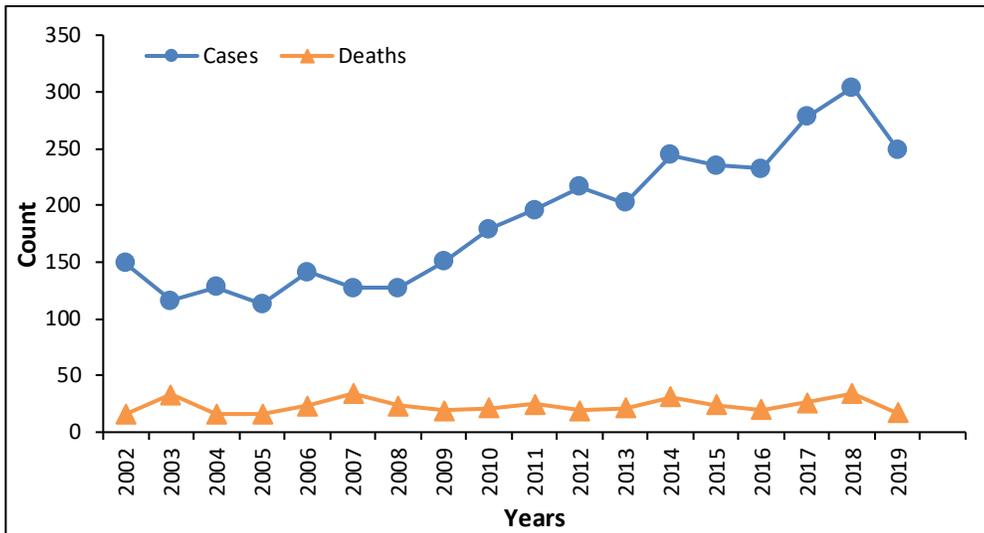Source: South Dakota Department of Health

Figure 42: Melanoma of the Skin Cases and Deaths by Year, South Dakota, 2002 - 2019

The incidence count for melanoma cancers reached an all-time high in 2018.

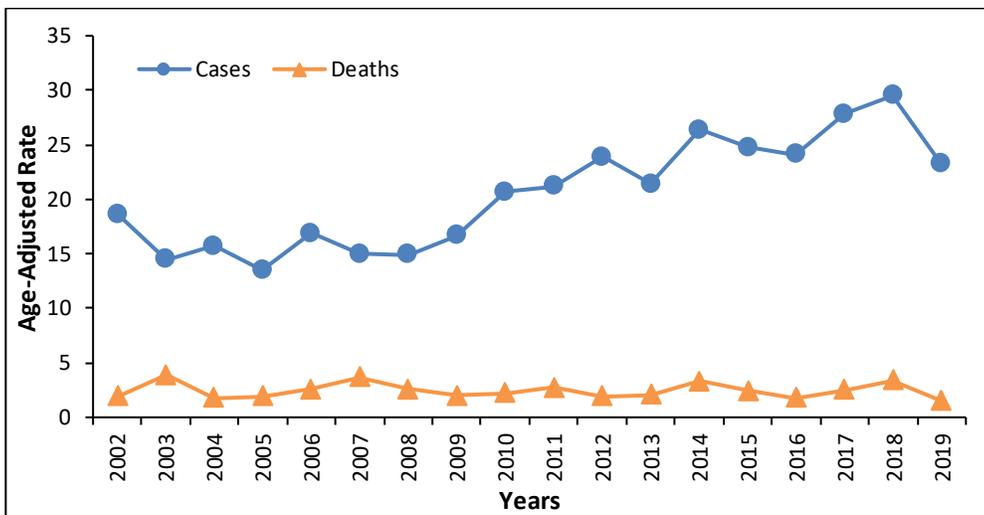Source: South Dakota Department of Health

Figure 43: Melanoma of the Skin Age-Adjusted Rates, Cases, and Deaths by Year, South Dakota, 2002 - 2019

Rates per 100,000 age-adjusted to 2000 US standard population and SD estimated populations.
Source: South Dakota Department of Health

MYELOMA §

Table 19: Myeloma Incidence and Mortality Summary, 2019

Myeloma §			Incidence			Mortality		
			Total	Male	Female	Total	Male	Female
South Dakota	**Total**	# Cases / Deaths	**75**	52	23	**35**	24	11
		Age-Adjusted Rate	**6.6**	9.9	3.6	**3.0**	4.7	1.6
	White	# Cases / Deaths	**69**	46	23	**34**	23	11
		Age-Adjusted Rate	**6.3**	9.1	3.8	**3.0**	4.6	1.7
	American Indian	# Cases / Deaths	**4**	3	1	**1**	1	0
		Age-Adjusted Rate	**8.6**	11.9	5.3	**3.9**	13.0	0.0
United States	**Total**	Age-Adjusted Rate	**6.8**	8.3	5.6	**3.0**	3.9	2.4
	White	Age-Adjusted Rate	**6.0**	7.5	4.7	**2.8**	3.7	2.1
	American Indian	Age-Adjusted Rate	**5.9**	6.7	5.2	**2.0**	2.9	1.3

Rates per 100,000 age-adjusted to 2000 US standard population and 2019 SD estimated population.
§ can include NOS, multiple, plasma cell and solitary. US rates www.seer.cancer.gov Source:
South Dakota Department of Health

Descriptive Epidemiology

Stage at Diagnosis: Stage of disease for myeloma is always distant per the SEER Summary Staging Manual.

Incidence: Myeloma is a systemic malignancy of plasma cells that is highly treatable, but rarely curable. It is potentially curable when it presents as a solitary plasmacytoma of the bone or as an extramedullary plasmacytoma. In South Dakota during 2019, myeloma accounted for 1.5% of total cancer cases reported. The South Dakota 2019 median age at diagnosis was 71. The national incidence rate is higher in men (8.3) than women (5.6). In South Dakota the incidence rate is also higher in men (9.9) than women (3.6). Myeloma is more common among the elderly. Nationally, African Americans have approximately twice the incidence and mortality rates of whites.

Mortality: The median survival prior to the common use of chemotherapy was about seven months. After the introduction of chemotherapy, prognosis improved significantly with a median 5-year survival rate of 56.3%. During 2019, there were 35 deaths attributed to myeloma in South Dakota. Twenty-four were male and 11 were female. The mortality rate for South Dakota was 3.0. The rate for men was 4.7 and 1.6 for women.

These rates compare to United States mortality rates of 3.0 overall, 3.9 for men and 2.4 for women.

Risk and Associated Factors: The etiology of myeloma is relatively unknown. There are many research studies evaluating the exposure of individuals with myeloma to various substances.

Early Detection and Prevention: There is no known test for screening for early detection. Some cases of myeloma progress very slowly, and they are referred to as smoldering or indolent myeloma. The presence of plasma cells and proteinuria do not automatically lead to myeloma, but it can be an early symptom. This disease is often asymptomatic in early stages of the disease. Myeloma is most often diagnosed clinically by radiological procedures and through cytology.

Figure 44: Myeloma Number of Cases and Deaths by Age, South Dakota, 2019
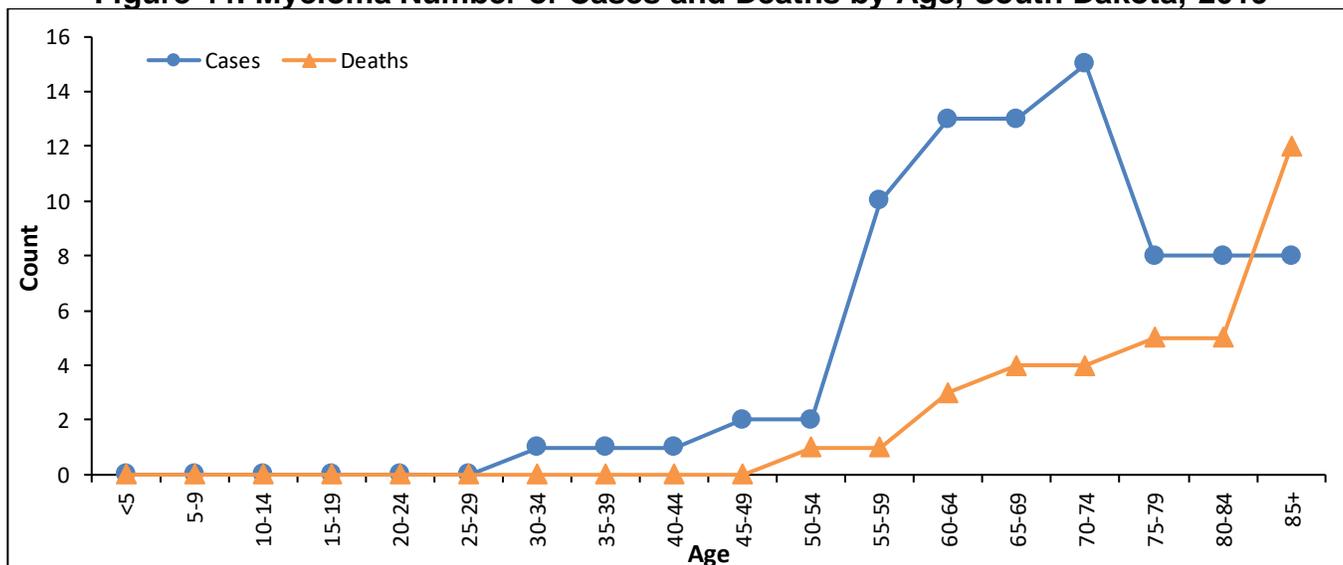
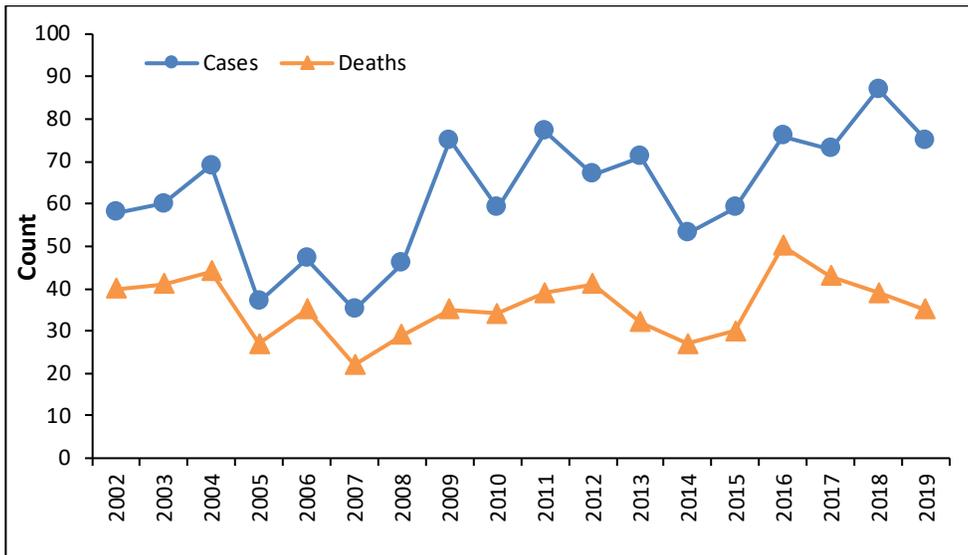Source: South Dakota Department of Health

Figure 45: Myeloma Cancer Cases and Deaths by Year, South Dakota, 2002 – 2019

The incidence count for myeloma cancers took a sharp drop from 2004 to 2005 and 2013 to 2014, with an all-time high in 2018. Death counts were at an all-time high in 2016.

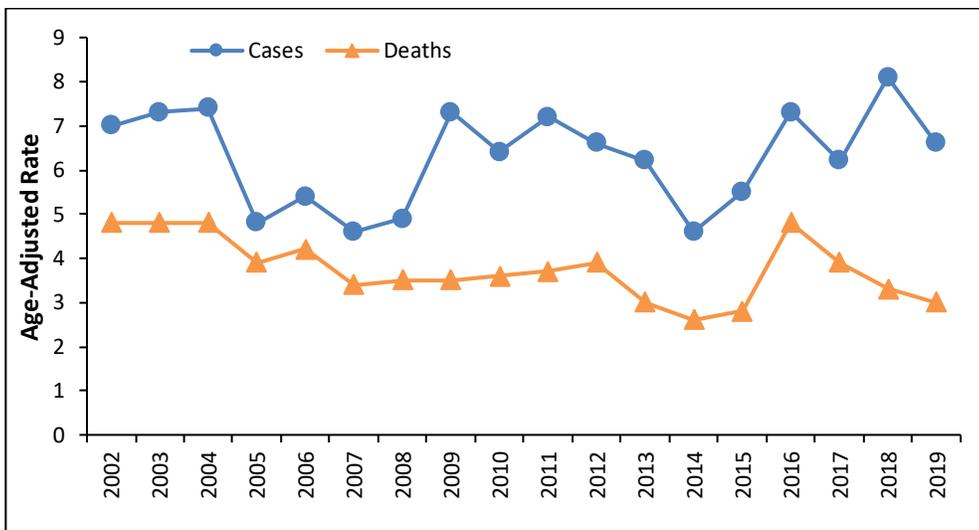Source: South Dakota Department of Health

Figure 46: Myeloma Cancer Age-Adjusted Incidence and Mortality Rates by Year, South Dakota, 2002 - 2019

Rates per 100,000 age-adjusted to 2000 US standard population and SD estimated populations.
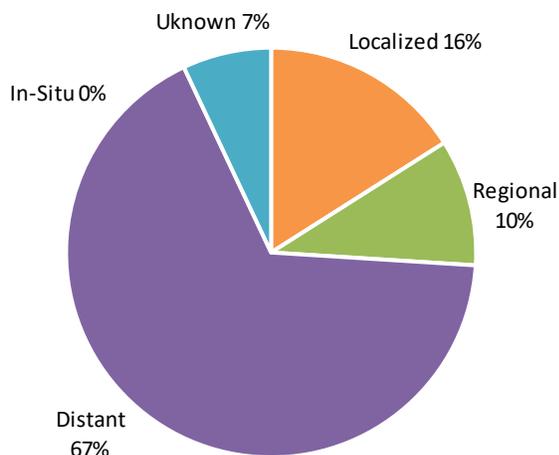Source: South Dakota Department of Health

NON-HODGKIN'S LYMPHOMA

Table 20: Non-Hodgkin's Lymphoma Incidence and Mortality Summary, 2019

Non-Hodgkin's Lymphoma			Incidence			Mortality		
			Total	Male	Female	**Total**	Male	Female
South Dakota	**Total**	# Cases / Deaths	**188**	123	65	**69**	47	22
		Age-Adjusted Rate	**16.5**	22.3	11.2	**6.3**	9.3	3.6
	White	# Cases / Deaths	**223**	147	76	**68**	47	21
		Age-Adjusted Rate	**22.1**	29.4	15.0	**6.4**	9.7	3.5
	American Indian	# Cases / Deaths	**11**	4	7	**1**	0	1
		Age-Adjusted Rate	**21.3**	25.2	21.9	**1.8**	0.0	3.4
United States	**Total**	Age-Adjusted Rate	**18.1**	22.0	15.0	**5.0**	6.5	3.9
	White	Age-Adjusted Rate	**18.7**	22.6	15.4	**5.3**	6.8	4.0
	American Indian	Age-Adjusted Rate	**10.3**	11.6	9.3	**3.6**	4.5	2.8

Rates per 100,000 age-adjusted to 2000 US standard population and 2019 SD estimated population.
US rates www.seer.cancer.gov Source: South Dakota Department of Health

Figure 47: Non-Hodgkin's Lymphoma Stage at Diagnosis, South Dakota, 2019

Source: South Dakota Department of Health

Descriptive Epidemiology

Stage at Diagnosis: Stage is based on where lymphoma cells are found (in the lymph or in other organs or tissues). The stage also depends on how many areas are involved. Localized stage only involves a single lymph node region or single extra lymphatic organ. When two or more lymph node regions are involved and the regions are on both sides of the diaphragm, the cancer is staged as distant. In 2019, 67% of the cases were diagnosed at a distant stage, an increase from 2018 when 56% were diagnosed at a distant stage.

Incidence: Non-Hodgkin's lymphoma is a cancer that originates in the lymphatic system, the disease-fighting network that spreads throughout the body. It develops in lymphocytes, a type of white blood cell. Non-Hodgkin's lymphoma is more than five times as common as the other general type of lymphoma, Hodgkin's disease. The incidence rate has been increasing in the United States since the 1970s. The incidence of non-Hodgkin's lymphoma in South Dakota was 188 cases in 2019. The 2019 median age at diagnosis in South Dakota was 74.

Mortality: There were 69 deaths reported in South Dakota that were attributed to non-Hodgkin's lymphoma. For those whose death was attributed to non-Hodgkin's lymphoma in South Dakota, the median age was 76 years. Nationally, the five-year survival rate is 71.6% for non-Hodgkin's lymphoma.

Risk and Associated Factors: Age is a strong risk factor for this disease, with most cases occurring from age 60 and older. Some studies suggest that exposure to chemicals such as benzene and certain herbicides and insecticides may be linked to an increased risk. Some chemotherapy used to treat other cancers can increase the risk as well as patients having been treated with radiation. The risk is higher for those having been treated with both. Certain infections increase the risk, such as HIV, Epstein - Barr virus, H. pylori bacteria, and Hepatitis C virus.

***Early Detection and Prevention:*** Non-Hodgkin's lymphoma may present with various symptoms. Symptoms may include signs resulting from local effects of cancer growth. Non-Hodgkin's lymphoma can also produce generalized symptoms, such as unexplained weight loss, fever, drenching night sweats, and severe itching.

Figure 48: Non-Hodgkin's Lymphoma Number of Cases and Death by Age, South Dakota, 2019
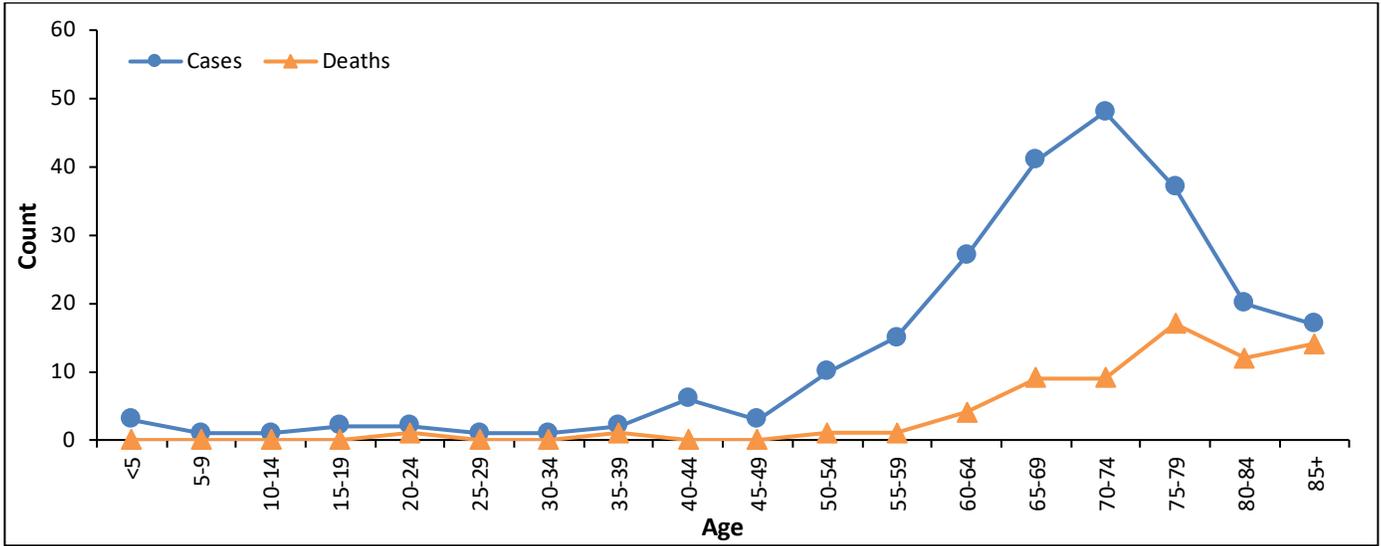
Source: South Dakota Department of Health

Figure 49: Non-Hodgkin's Lymphoma Cases and Deaths by Year, South Dakota, 2002 – 2019
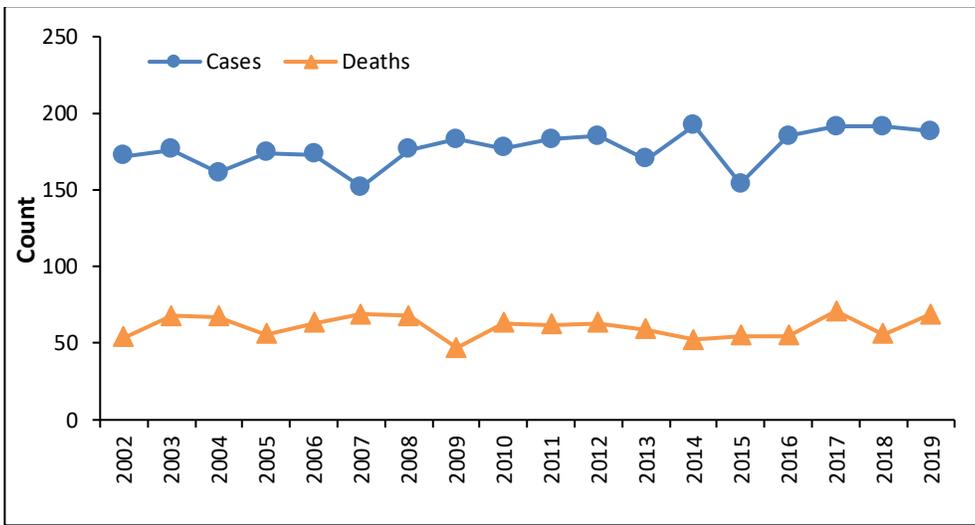
The number of cases associated with non-Hodgkin's lymphoma cancer remains constant.
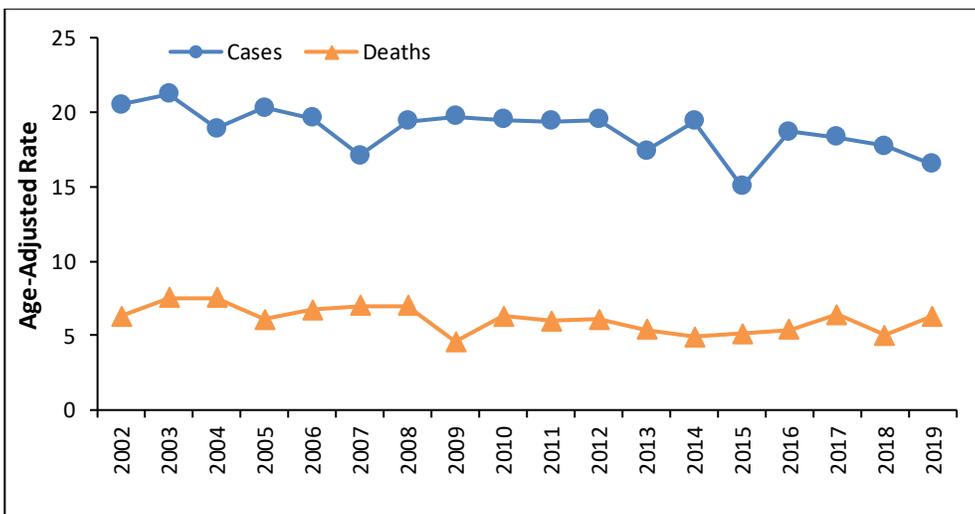
Source: South Dakota Department of Health

Figure 50: Non-Hodgkin's Lymphoma Age-Adjusted Incidence and Mortality Rates by Year, South Dakota, 2002 - 2019

Rates per 100,000 age-adjusted to 2000 US standard population and SD estimated populations.
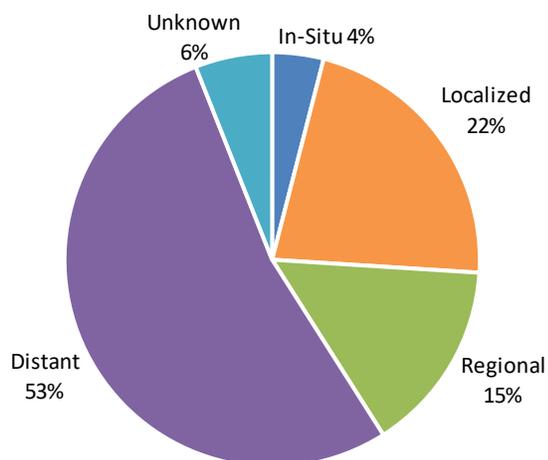Source: South Dakota Department of Health

OVARY

Table 21: Ovarian Incidence and Mortality Summary, 2019

Ovarian Cancer			Incidence	Mortality
South Dakota	**Total**	# Cases / Deaths	51	35
		Age-Adjusted Rate	9.8	5.8
	White	# Cases / Deaths	47	33
		Age-Adjusted Rate	10.0	6.1
	American Indian	# Cases / Deaths	3	2
		Age-Adjusted Rate	11.9	8.5
United States	**Total**	Age-Adjusted Rate	9.6	6.0
	White	Age-Adjusted Rate	9.8	6.3
	American Indian	Age-Adjusted Rate	8.3	3.8

Rates per 100,000 age-adjusted to 2000 US standard population and 2019 SD estimated population.
US rates www.seer.cancer.gov Source: South Dakota Department of Health

Figure 51: Ovarian Cancer Stage at Diagnosis, South Dakota, 2019

Source: South Dakota Department of Health

Descriptive Epidemiology

***Stage at Diagnosis*:** Staging of ovarian cancer is done by a surgical procedure to remove as much of the cancer as possible. Surgical staging is of critical importance in the management of this disease. The morbidity associated with ovarian carcinoma is partially attributable to the fact that in the United States two-thirds of the patients present with advanced-stage disease at the time of diagnosis. In 2019, in South Dakota, 28 (53%) of the 51 cases were diagnosed at a distant stage.

Incidence: The incidence of ovarian cancer varies greatly. There were 51 invasive cases of ovarian cancer reported in 2019 in South Dakota. This accounted for 2.2% of the cancer cases diagnosed in 2019 for South Dakota women. The lifetime risk of a woman developing ovarian cancer is 1.2%. There were eleven cases diagnosed at younger than 49 years of age. There were 14 cases diagnosed in the 70-79 age group. The median age at diagnosis in South Dakota was 70.

Mortality: Doctors are using dramatic new therapies to fight ovarian cancer, extending the lives of women who five or 10 years ago would have died from the disease. Survival rates for the last several decades are only about 30.5% for those with advanced disease. Most ovarian cancer presents at advanced disease. Only 15.7% of those diagnosed at late stage survive five years. For those who are diagnosed early, before the disease spreads beyond the ovaries, the disease is 91.1% curable. In South Dakota, 35 patients died in 2019. The mortality rate was 5.8 for women in South Dakota and 6.0 in the United States.

Risk and Associated Factors: Women who have a higher risk for developing ovarian cancer are those with a family history of the disease, those who have used fertility drugs, those who had their first baby after age 30, and those over the age of 65.

Prevention and Early Detection: Factors that may reduce the risk of ovarian cancer are pregnancy lasting full term, use of oral contraceptives, breastfeeding, tubal ligation, hysterectomy, or removal of ovaries in women with inherited risks.

No early stage screening tests have been proven for ovarian cancer and it can be difficult to detect until it has advanced. A combination of imaging and lab tests are the most useful diagnostic tools.

Figure 52: Ovarian Cancer Number of Cases and Deaths by Age, South Dakota, 2019
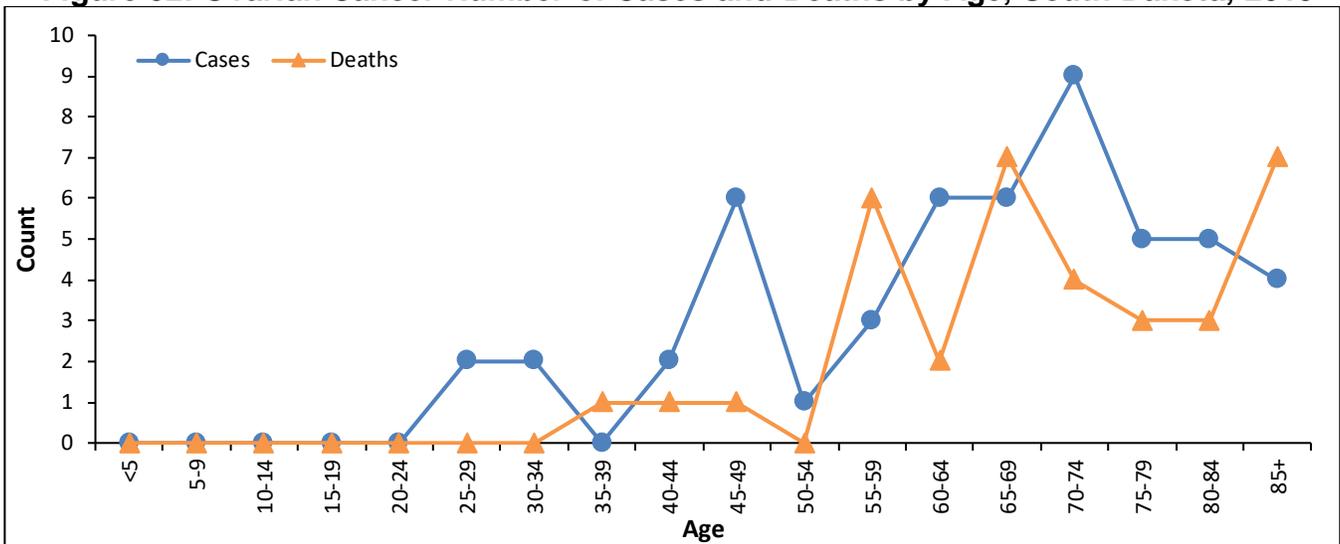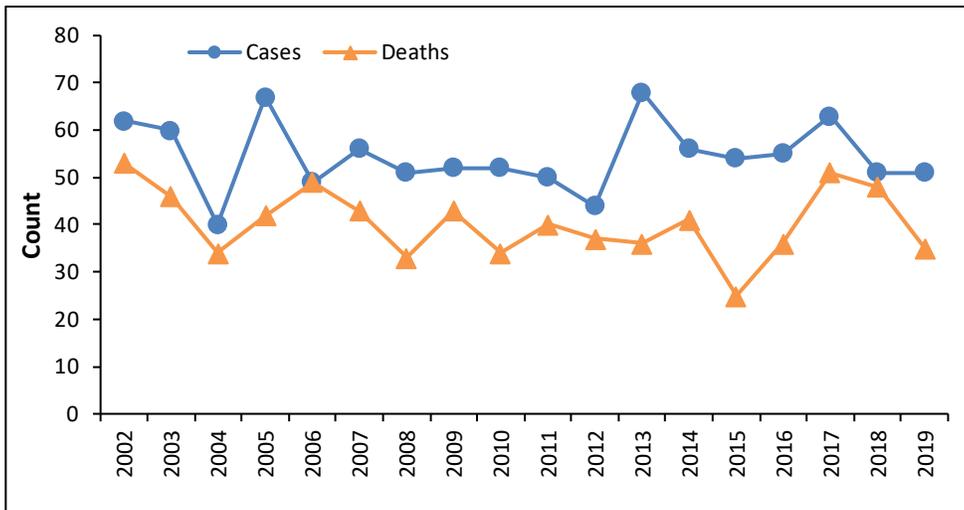
Source: South Dakota Department of Health

Figure 53: Ovarian Cancer Cases and Deaths by Year, South Dakota, 2002 - 2019

The incidence count for ovarian cancer peaked in 2013. The number of deaths rose to an all-time high in 2017.
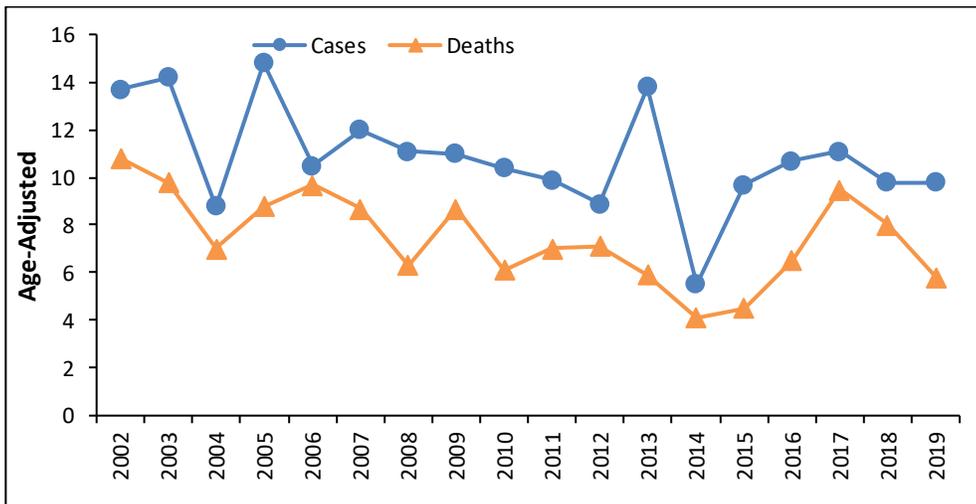
Source: South Dakota Department of Health

Figure 54: Ovarian Cancer Age-Adjusted Incidence and Mortality Rates by Year, South Dakota,   2002 - 2019

Rates per 100,000 age-adjusted to 2000 US standard population and SD estimated populations.
Source: South Dakota Department of Health

PANCREAS

Table 22: Pancreas Incidence and Mortality Summary, 2019

Pancreas Cancer			Incidence			Mortality		
			Total	Male	Female	Total	Male	Female
South Dakota	Total	# Cases / Deaths	**132**	83	49	**142**	86	56
		Age-Adjusted Rate	**11.7**	15.1	8.6	**12.3**	15.9	9.5
	White	# Cases / Deaths	**117**	75	42	**135**	82	53
		Age-Adjusted Rate	**11.2**	14.6	8.2	**12.4**	15.9	9.6
	American Indian	# Cases / Deaths	**10**	6	4	**6**	3	3
		Age-Adjusted Rate	**22.5**	29.1	16.1	**13.5**	17.6	10.9
United States	Total	Age-Adjusted Rate	**13.2**	15.0	11.6	**11.0**	12.7	9.6
	White	Age-Adjusted Rate	**13.2**	15.2	11.4	**11.2**	13.0	9.7
	American Indian	Age-Adjusted Rate	**11.4**	11.2	11.4	**7.9**	8.6	7.2

Rates per 100,000 age-adjusted to 2000 US standard population and 2019 SD estimated population.
US rates www.seer.cancer.gov Source: South Dakota Department of Health

Figure 55: Pancreatic Cancer Stage at Diagnosis, South Dakota, 2019
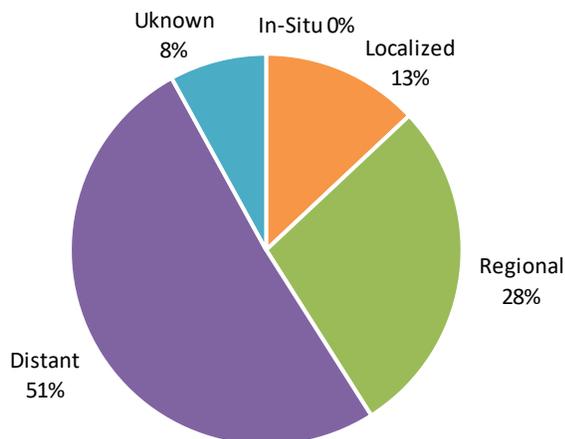
Source: South Dakota Department of Health

Descriptive Epidemiology

Stage at Diagnosis: Pancreatic cancer is often diagnosed late in the disease process. Patients who have local stage disease may be acceptable for resection. Only 10% to 20% of patients with pancreatic cancer are candidates for surgical resection. In South Dakota, 79% of new cases were diagnosed at a late stage (regional and distant) in 2019.

Incidence: The incidence of pancreatic cancer increases steadily with age. An estimated 56,770 new cases of pancreatic cancer were expected to be diagnosed in 2019 in the United States. The majority of the cases occurred in South Dakotans 65 years old or older. Ninety-five cases (73.6%) were diagnosed in 2019 in that age group. This cancer usually occurs more in males than in females; in 2019 there were 83 men and 49 women diagnosed with pancreatic cancer in South Dakota. Nationally, there were higher incidence rates in blacks of both genders. The median age at diagnosis was 66 years in South Dakota.

Mortality: The overall survival for cancer of the pancreas is poor. Studies show that the five-year survival rate is approximately 12.3%. More recently, prospective studies have shown survival improvement with postoperative chemotherapy. In 2019, there were 142 deaths and the median age at death was 67 in South Dakota.

Risk and Associated Factors: The exact causes of pancreatic cancer are unknown. Studies have found that certain factors increase a person's risk of developing pancreatic cancer. As one ages, the incidence of pancreatic cancer increases, especially after the age of 60. Cigarette smokers are twice as likely than nonsmokers to develop this cancer. Pancreatic cancer frequently occurs in those with diabetes. Also, African Americans are more likely than Asians, Hispanics, American Indians, or Whites to have pancreatic cancer. The risk triples if the person's mother, father, sister, or brother had the disease. Also, a history of colon or ovarian cancer increases the risk. Some evidence shows that chronic pancreatitis may increase the risk.

Prevention and Early Detection: Currently, there are no known screenings for pancreatic cancer. Also, there is no specific prevention except to avoid smoking.

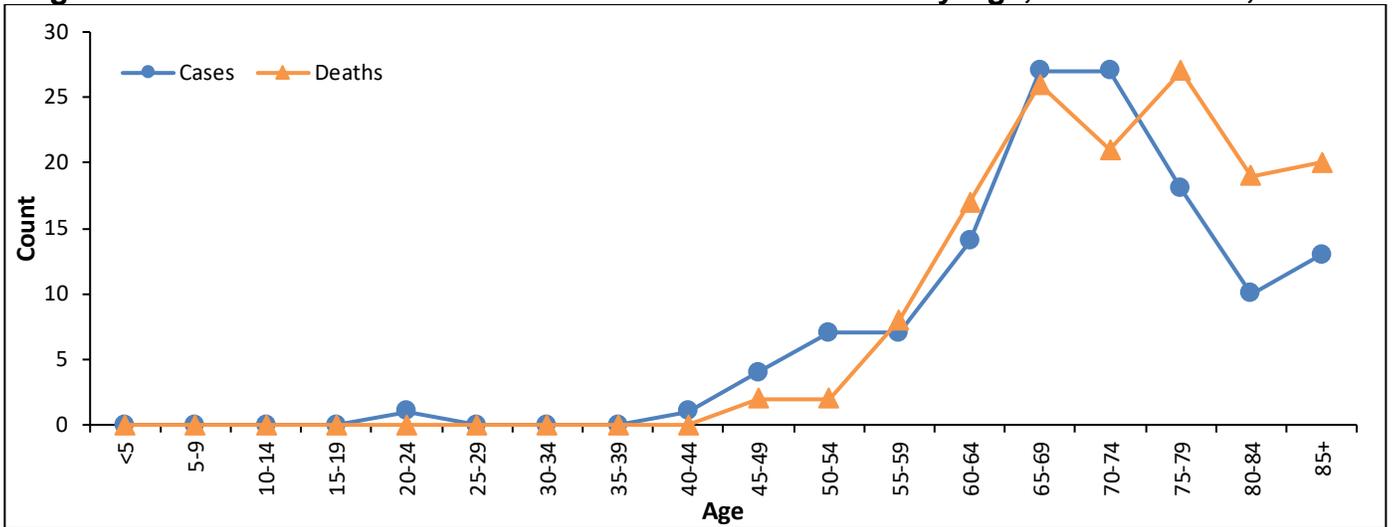**Figure 56: Pancreatic Cancer Number of Cases and Deaths by Age, South Dakota, 2019**

Figure 57: Pancreatic Cancer Cases and Deaths by Year, South Dakota, 2002 – 2019
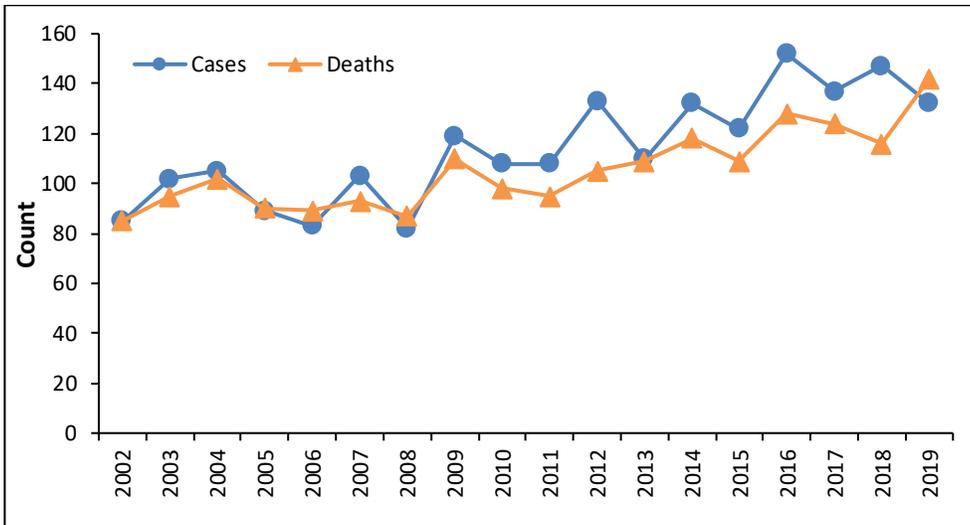
The number of cases associated with cancer of the pancreas reached an all-time high in 2016. The number of deaths reached an all time high in 2019.

Figure 58: Pancreatic Cancer Age-Adjusted Incidence and Mortality Rates by Year, South Dakota, 2002 - 2019

PROSTATE
Table 23: Prostate Incidence and Mortality Summary, 2019

Prostate Cancer			Incidence	Mortality
South Dakota	**Total**	# Cases / Deaths	756	86
		Age-Adjusted Rate	131.7	17.7
	White	# Cases / Deaths	704	82
		Age-Adjusted Rate	133.0	17.6
	American Indian	# Cases / Deaths	35	4
		Age-Adjusted Rate	166.3	23.7
United States	**Total**	Age-Adjusted Rate	111.6	18.4
	White	Age-Adjusted Rate	102.1	17.3
	American Indian	Age-Adjusted Rate	54.0	12.2

Rates per 100,000 age-adjusted to 2000 US standard population and 2019 SD estimated population.
US rates www.seer.cancer.gov Source: South Dakota Department of Health

Figure 59: Prostate Cancer Stage at Diagnosis, South Dakota, 2019
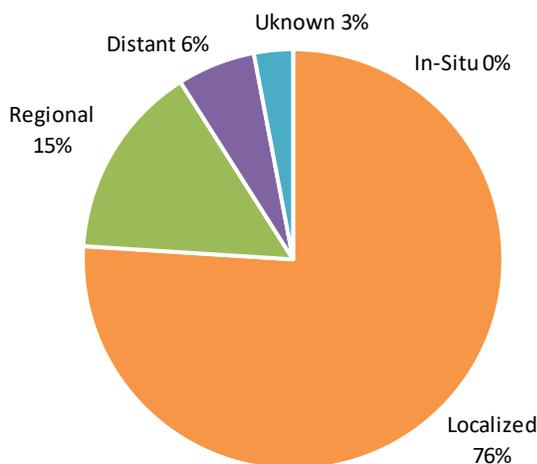
Source: South Dakota Department of Health

Descriptive Epidemiology

Stage at Diagnosis: The greatest number of prostate cases were diagnosed at an early stage. In 2019, 76% of the cases were diagnosed as localized (not extending outside the prostate). Frequently older cases may simply be monitored (watchful waiting) by their physician to assess the rate of growth; others may be given hormonal therapy. New treatments for prostate cancer include the da Vinci Robotic assisted prostatectomy, proton therapy, and brachytherapy radiation.

Incidence: Cancer of the prostate is predominately a tumor of older men. The median age at diagnosis in South Dakota is 68. Also, in South Dakota the incidence of prostate cancer begins to increase in the 60's age group. Prostate cancer is the most diagnosed site of all cancers reported in the state in 2019.

Mortality: Prostate cancer was the second leading cause of death from cancer in men in South Dakota in 2019. Prostate cancer can be a slow progressing disease and can be cured or at least controlled in the early stages. The median age of death in South Dakota in 2019 was 80 years old. Many patients have co-morbid conditions and will die of other causes rather than prostate cancer.

Risk and Associated Factors: A number of risk factors for prostate cancer have been identified. Studies suggest that prostate cancer risk is increased two to five-fold in relatives of men with prostate cancer. Environmental factors, including exposure to heavy metals may increase risk. Smoking has also been indicated as a risk. Diets high in saturated fat intake may also contribute.

Early Detection and Prevention: The availability of the Prostate Specific Antigen (PSA) test as a diagnostic test coupled with increased awareness by the public of the disease has produced an increase in the number of new cases diagnosed each year in the United States. Disease detected by elevated PSA in the presence of a normal palpable gland is the most common presentation of prostate cancer. The American Cancer Society recommends the PSA and digital rectal exam should be offered annually beginning at the age of 45.

Figure 60: Prostate Cancer Number of Cases and Deaths by Age, South Dakota, 2019

Source: South Dakota Department of Health

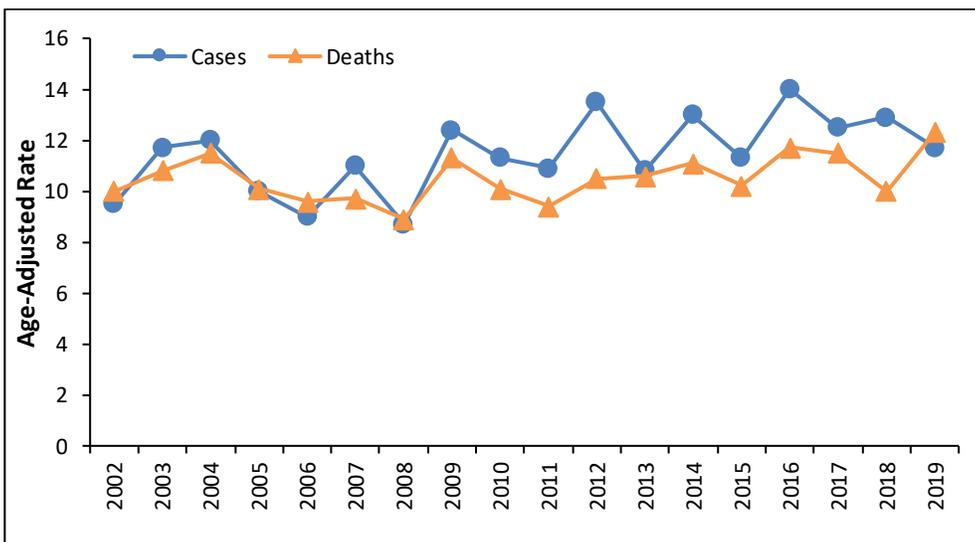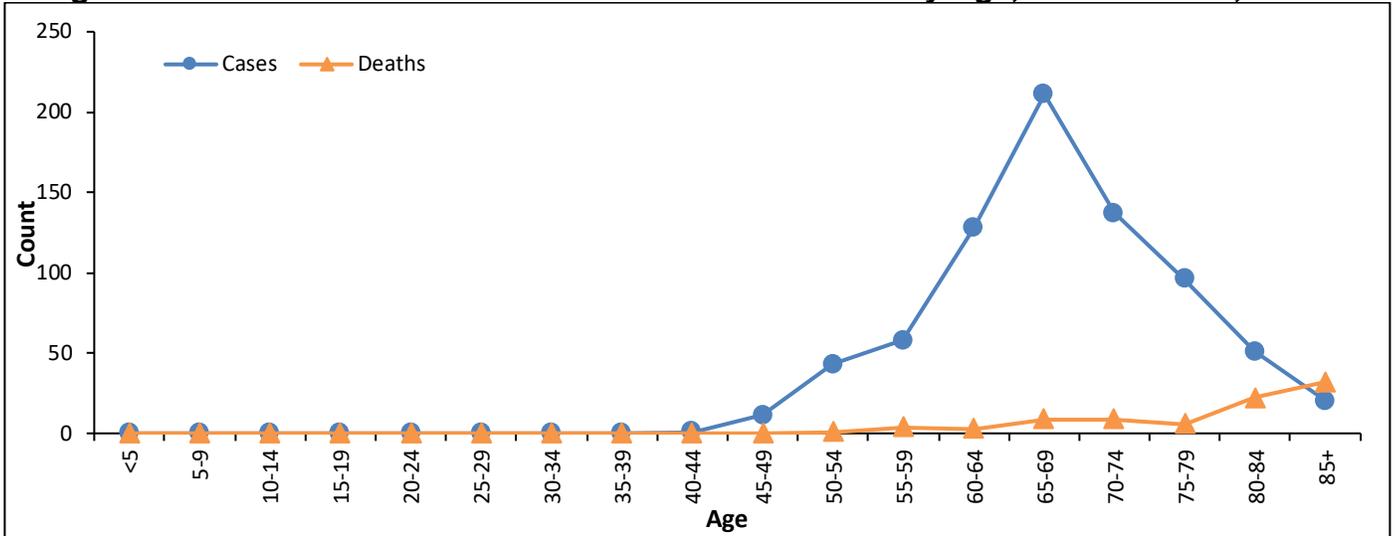Source: South Dakota Department of Health

Figure 61: Prostate Cancer Cases and Deaths by Year, South Dakota, 2002 - 2019
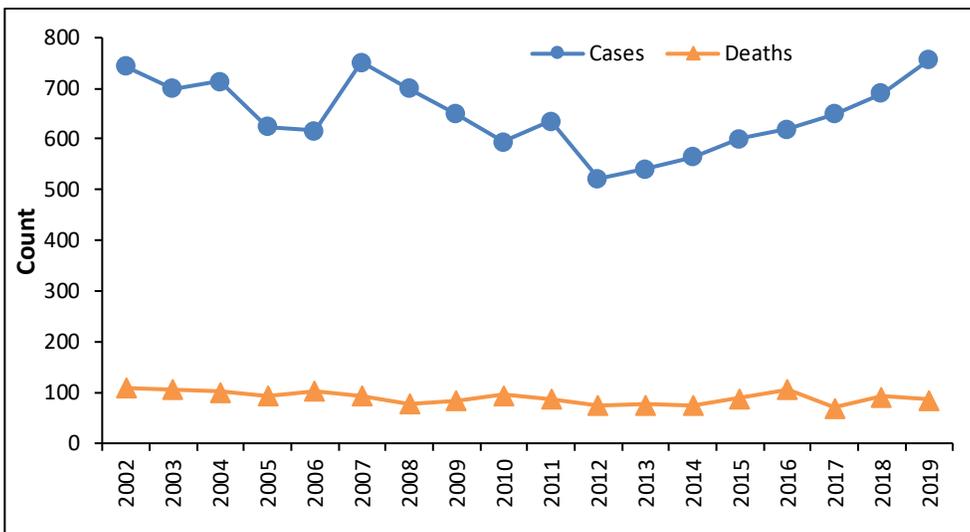
The number of deaths associated with prostate cancer remains constant

Figure 62: Prostate Cancer Age-Adjusted Incidence and Mortality Rates by Year, South Dakota 2002 - 2019

Rates per 100,000 age-adjusted to 2000 US standard population and SD estimated populations.
Source: South Dakota Department of Health

Table 24: Stomach Incidence and Mortality Summary, 2019

Stomach Cancer			Incidence			Mortality		
			Total	Male	Female	**Total**	Male	Female
South Dakota	**Total**	# Cases / Deaths	**48**	32	16	**23**	16	7
		Age-Adjusted Rate	**4.6**	6.4	3.0	**2.4**	3.4	1.4
	White	# Cases / Deaths	**39**	27	12	**19**	14	5
		Age-Adjusted Rate	**4.1**	5.9	2.4	**2.0**	3.1	1.0
	American Indian	# Cases / Deaths	**6**	4	2	**2**	1	1
		Age-Adjusted Rate	**10.7**	16.2	6.4	**3.3**	3.1	3.6
United States	**Total**	Age-Adjusted Rate	**6.1**	8.1	4.5	**2.8**	3.7	2.1
	White	Age-Adjusted Rate	**4.9**	6.8	3.3	**2.1**	2.8	1.5
	American Indian	Age-Adjusted Rate	**6.7**	9.1	4.8	**4.1**	5.5	2.9

Rates per 100,000 age-adjusted to 2000 US standard population and 2019 SD estimated population.
US rates www.seer.cancer.gov Source: South Dakota Department of Health

Figure 63: Stomach Cancer Stage of Diagnosis, South Dakota, 2019
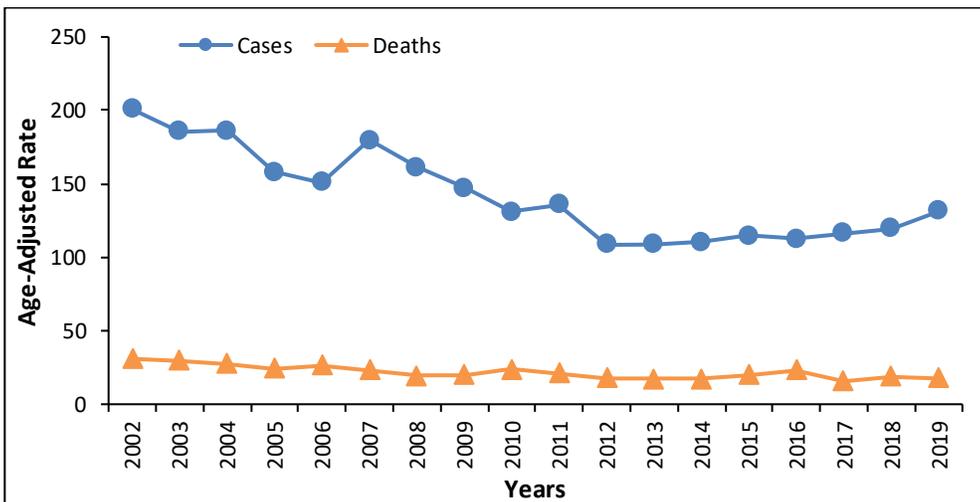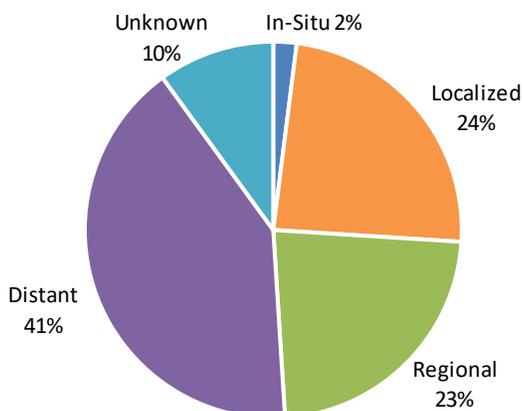

Source: South Dakota Department of Health

Descriptive Epidemiology

Stage at Diagnosis: In 2019, data demonstrates that 12 (24%) cases were diagnosed at a localized stage. When a patient is diagnosed at an early stage, prognosis is much better. Eleven cases (23%) were diagnosed at a regional stage. There were 20 (41%) of the cases in South Dakota diagnosed at a distant stage. The prognosis for the distant stage is very poor. The stage is based on whether the tumor has invaded nearby tissues, where the cancer has spread, and if so, to what extent.

Incidence: Stomach cancer only accounted for approximately 1.0% of all cancers in South Dakota in 2019. Of the 48 cases diagnosed in 2019, 32 were male and 16 were female. It is predominately a disease of men. Gastric (stomach) cancer is found more commonly in people between the ages of 50 and 79 years of age. The median age at diagnosis was 75 in South Dakota.

Mortality: Stomach cancer accounted for 1.3% of cancer deaths in South Dakota in 2019. The median age at death was 73 in South Dakota. The age-adjusted mortality rate was 3.4 for men and 1.4 in women in South Dakota. These rates are based on patients who died in 2019 in South Dakota. There were two American Indian stomach cancer deaths.

Risk and Associated Factors: Men have twice the risk of women for developing stomach cancer. In recent years, Helicobacter pylori bacteria have received considerable attention as a potential factor. Some researchers suspect this bacterium, which causes stomach inflammation and ulcers, may be an important stomach cancer risk factor. Individuals with pernicious anemia (a vitamin B-12-related disorder) and achlorhydria or gastric atrophy, both of which result in lower than normal amounts of gastric juices, may be at higher risk.

Prevention and Early Detection: Excessive salt intake has been identified as a possible risk factor for stomach cancer. Having a high intake of fresh fruits and vegetables may be associated with a decreased risk of stomach cancer. Studies have suggested that eating foods that contain **beta-carotene**[1] and **vitamin C**[2] may decrease the risk of stomach cancer.

Figure 64: Stomach Cancer Number of Cases and Deaths by Age, South Dakota, 2019
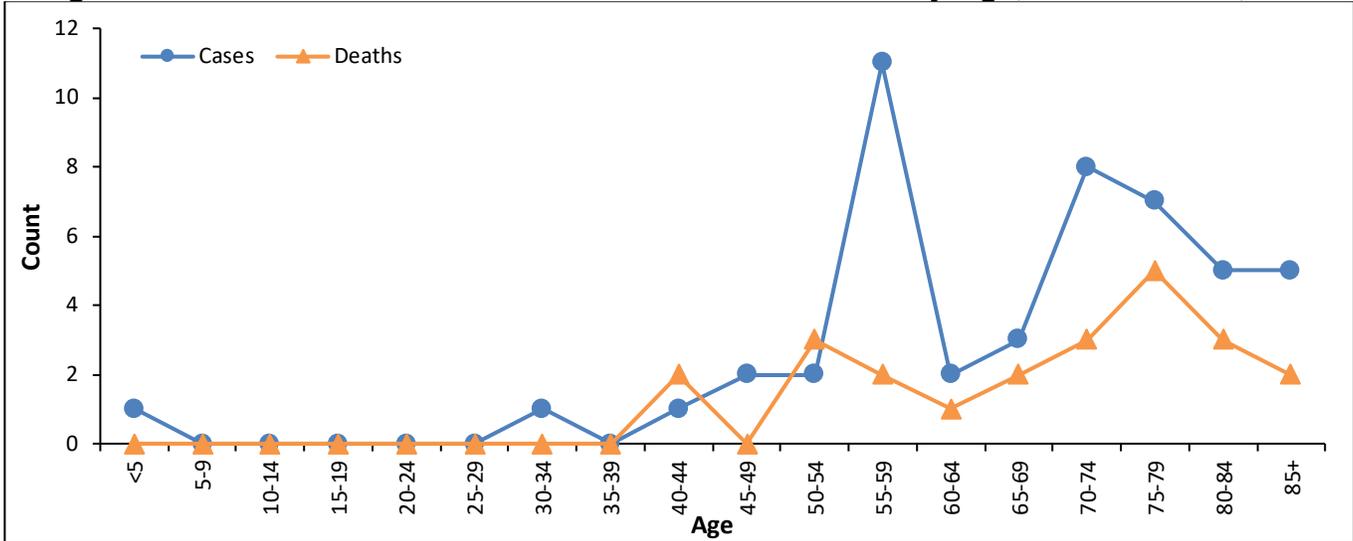
Source: South Dakota Department of Health
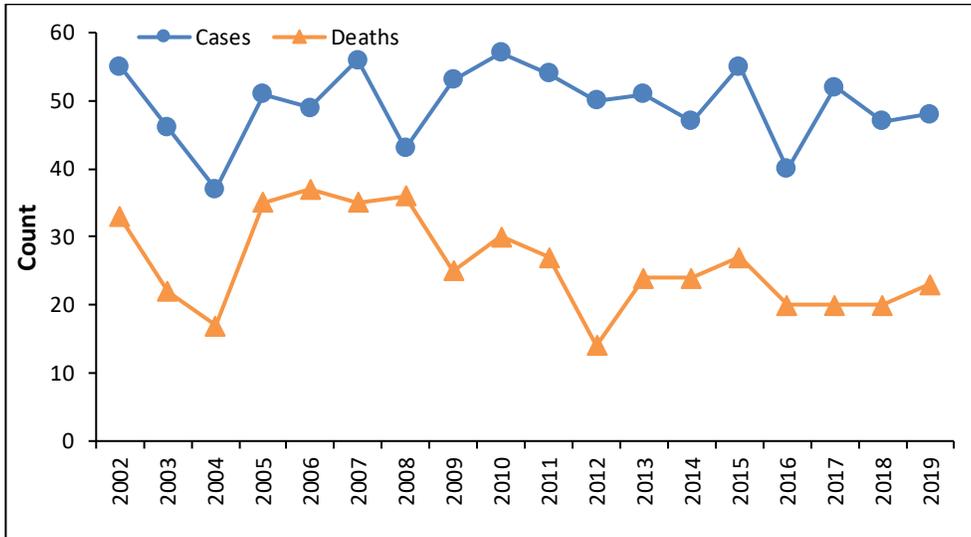
Source: South Dakota Department of Health

Figure 65: Stomach Cancer Cases and Deaths by Year, South Dakota, 2002 - 2019

The incidence peak for stomach cancer was in 2010.
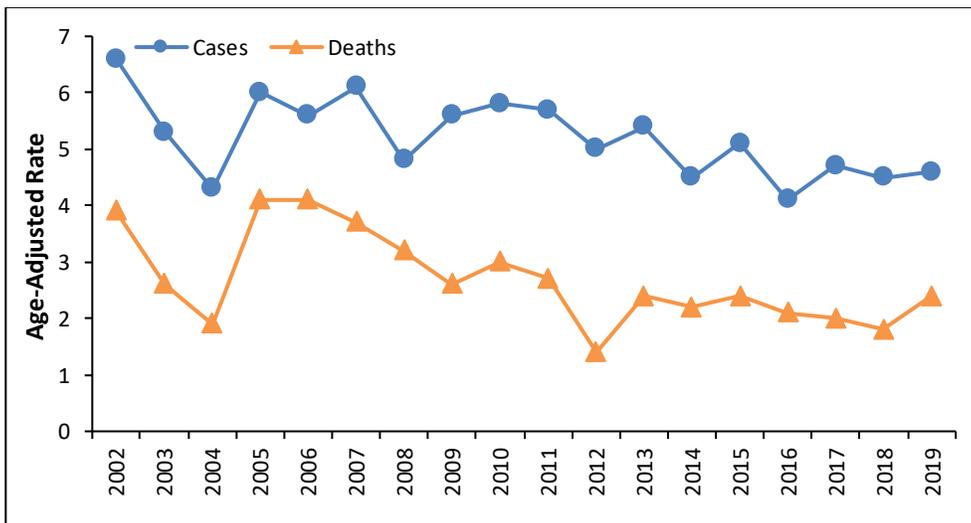
Figure 66: Stomach Cancer Age-Adjusted Incidence and Mortality Rates by Year, South Dakota, 2002 - 2019

Rates per 100,000 age-adjusted to 2000 US standard population and SD estimated populations.
Source: South Dakota Department of Health

THYROID

Table 25: Thyroid Incidence and Mortality Summary, 2019

Thyroid Cancer			Incidence			Mortality		
			Total	Male	Female	Total	Male	Female
South Dakota	**Total**	# Cases / Deaths	**138**	42	96	**2**	0	2
		Age-Adjusted Rate	**16.2**	9.2	23.7	**0.2**	0.0	0.3
	White	# Cases / Deaths	**122**	38	84	**2**	0	2
		Age-Adjusted Rate	**16.3**	9.4	23.4	**0.2**	0.0	0.3
	American Indian	# Cases / Deaths	**10**	4	6	**0**	0	0
		Age-Adjusted Rate	**19.8**	18.0	23.1	**0.0**	0.0	0.0
United States	**Total**	Age-Adjusted Rate	**13.1**	7.1	19.1	**0.5**	0.5	0.5
	White	Age-Adjusted Rate	**13.7**	7.8	19.7	**0.5**	0.5	0.4
	American Indian	Age-Adjusted Rate	**11.3**	4.9	17.5	*	*	*

Rates per 100,000 age-adjusted to 2000 US standard population and 2019 SD estimated population.
US rates www.seer.cancer.gov *=rate suppressed. Source: South Dakota Department of Health

Figure 67: Thyroid Cancer Stage at Diagnosis, South Dakota, 2019
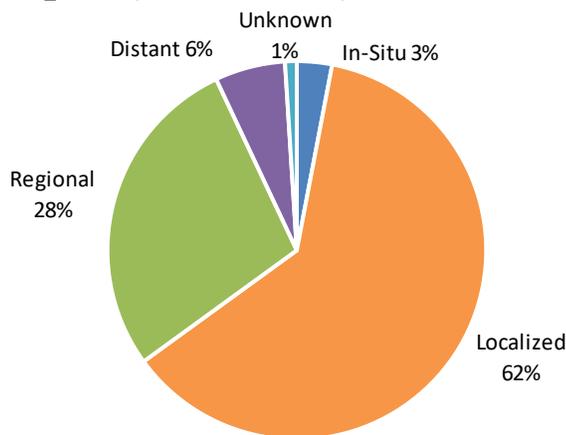
Source: South Dakota Department of Health

Descriptive Epidemiology

Stage at Diagnosis: In 2019, data demonstrated that 98 (62%) cases were diagnosed at a localized stage. When a patient is diagnosed at an early stage, the prognosis is much better for a cure. There were 44 (28%) cases diagnosed at a regional stage. Nine cases (6%) were diagnosed at a distant stage.

Incidence: The American Cancer Society estimated 52,070 thyroid cancer cases would be diagnosed in the United States in 2019. Thyroid cancer continues to account for approximately 3.1% of all cancers in South Dakota. Of the 138 cases diagnosed in 2019, 42 were male and 96 were female. The median age at diagnosis was 55.5 for South Dakota. Thyroid cancer is found more commonly in people between 44 and 69 years of age, with 78% diagnosed before age 65. It is predominately a disease of females as the statistics for South Dakota confirm.

Mortality: South Dakota had only two deaths attributed to thyroid cancer in 2019. Nationally, the five-year relative survival rates were 99.9% for localized, 96.8% for regional, and 52.6% for distant stage.

Risk and Associated Factors: Thyroid cancer accounted for only 3.1% of the cancer cases in South Dakota in 2019. Risk factors include being exposed to radiation to the head and neck in childhood. Other risk factors for the development of thyroid cancer include a history of goiter, family history of thyroid disease, and Asian race.

Early Detection and Prevention: Early detection of cancer of the thyroid is extremely important. There are currently no tests or screenings for early detection of thyroid cancer. Physical examinations may reveal a lump on the side of the neck, hoarseness of the voice, and difficulty swallowing. Most cancerous thyroid tumors are slow growing and curable. Prompt attention to signs and symptoms is the best approach to early diagnosis of most thyroid cancers. Signs or symptoms include:

- A lump in the neck, sometimes growing rapidly
- Pain in the neck, sometimes going up to the ears
- Hoarseness
- Trouble swallowing
- Breathing problems (feeling as if one were breathing through a straw)
- A cough that persists and is not due to a cold

Figure 68: Thyroid Cancer Number of Cases and Deaths by Age, South Dakota, 2019
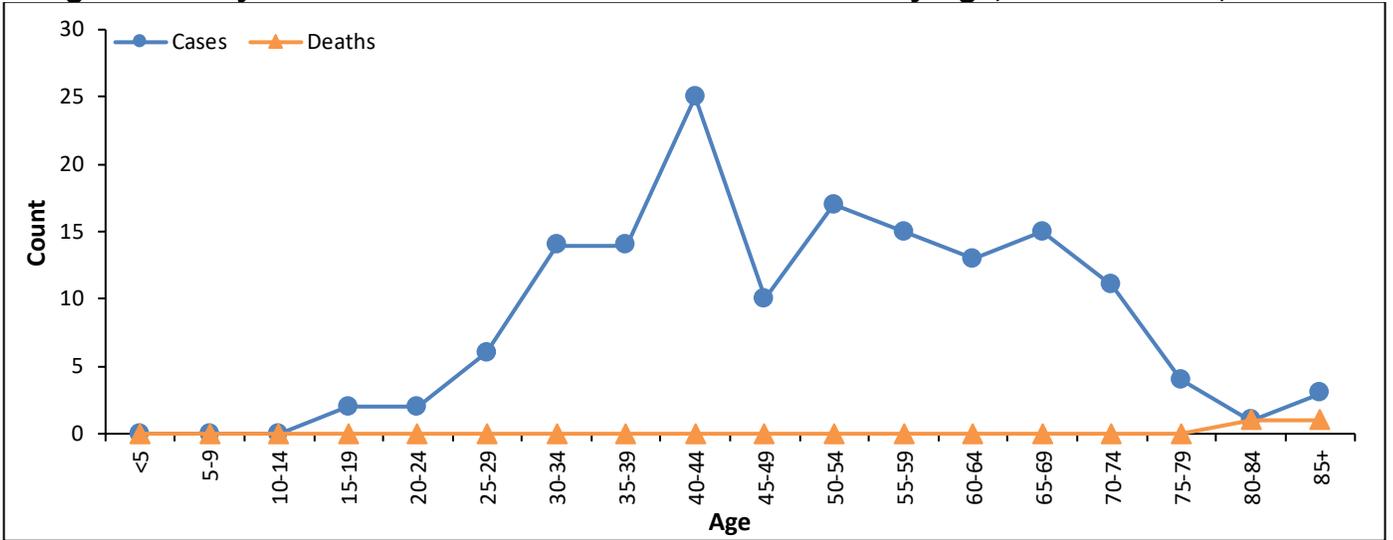
Source: South Dakota Department of Health

Figure 69: Thyroid Cancer Cases and Deaths by Year, South Dakota, 2002 - 2019
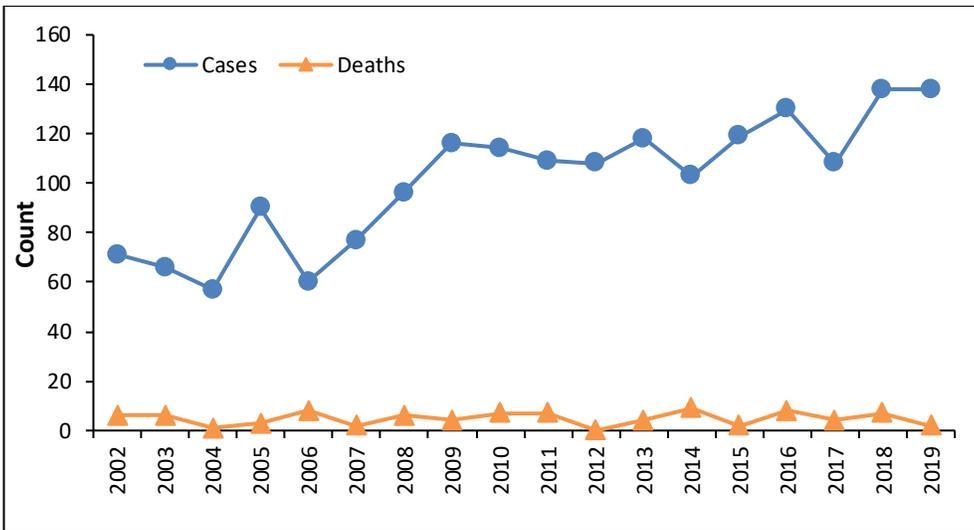
The incidence count for thyroid cancers peaked in 2018 and 2019

Source: South Dakota Department of Health

**Figure 70: Thyroid Cancer Age-Adjusted Incidence and Mortality Rates by Year, South Dakota, 2002 - 2019**
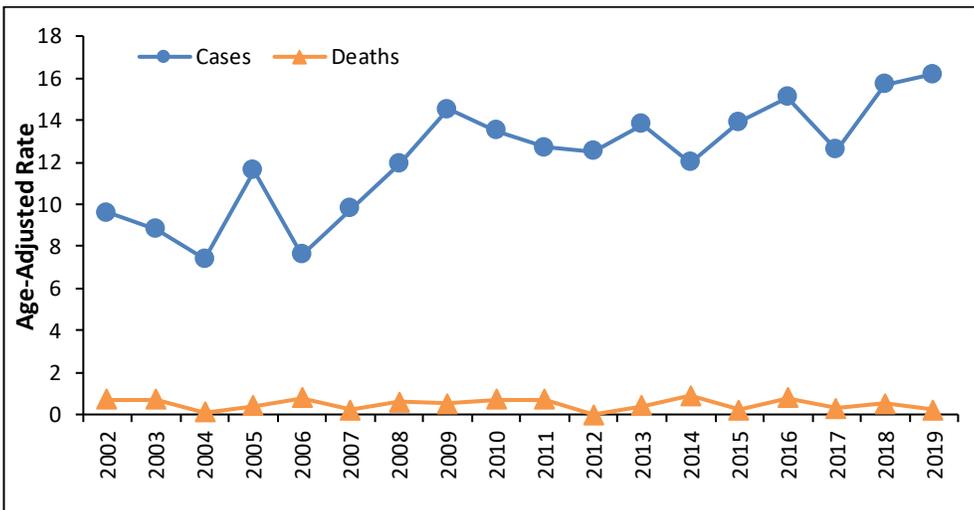
Rates per 100,000 age-adjusted to 2000 US standard population and SD estimated populations.
Source: South Dakota Department of Health

Appendix A: 2000 United States Standard Million Population

Age Group	Number in Group
Total	1,000,000
<5	69,135
5-9	72,533
10-14	73,032
15-19	72,169
20-24	66,478
25-29	64,529
30-34	71,044
35-39	80,762
40-44	81,851
45-49	72,118
50-54	62,716
55-59	48,454
60-64	38,793
65-69	34,264
70-74	31,773
75-79	26,999
80-84	17,842
85+	15,508

Appendix B: 2010-2019 South Dakota Estimated Population

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Total	814,180	824,082	833,354	844,877	853,175	858,469	865,454	869,666	882,235	884,659
<5	59,621	59,591	59,202	59,957	60,610	61,244	61,369	61,759	62,132	61,167
5-9	55,531	56,389	58,010	59,832	60,148	60,266	60,477	60,372	60,762	60,934
10-14	53,960	54,096	53,956	54,899	55,807	56,525	57,842	59,303	60,882	60,732
15-19	57,628	57,916	57,439	57,419	57,823	56,581	56,838	56,675	57,674	57,734
20-24	57,596	58,178	59,174	60,849	61,697	61,382	61,366	59,550	59,585	58,930
25-29	55,570	56,020	56,397	56,103	55,859	55,656	55,852	57,257	58,754	57,986
30-34	49,859	52,216	53,875	55,411	56,075	56,436	56,414	56,348	57,341	57,078
35-39	45,766	45,524	46,326	47,452	49,007	50,813	52,857	54,536	56,007	56,899
40-44	47,346	47,375	47,570	47,255	46,709	46,136	45,735	46,458	47,902	48,965
45-49	57,519	54,849	52,681	50,182	48,446	47,650	47,699	47,425	47,241	46,641
50-54	59,399	59,960	60,037	59,699	58,976	57,094	54,496	52,109	49,840	48,224
55-59	54,231	56,261	57,577	58,434	58,768	59,517	59,850	59,476	59,311	58,789
60-64	43,573	47,054	48,927	51,222	53,027	54,749	55,854	56,774	57,950	58,709
65-69	31,944	33,144	35,738	37,753	40,473	43,381	46,846	48,277	50,160	52,022
70-74	25,683	25,882	26,396	27,834	28,875	29,750	30,618	32,952	34,890	37,194
75-79	21,724	21,660	21,766	21,939	22,209	22,305	22,243	22,463	23,666	24,442
80-84	18,004	18,102	18,112	18,017	17,795	17,616	17,582	17,151	17,147	17,228
85+	19,226	19,865	20,171	20,620	20,871	21,368	21,516	20,781	20,991	20,985

Appendix C: Race in South Dakota by County, 2019 Estimated Population

	Total	White		Black		American Indian		Asian		Other	
South Dakota	884,659	721,053	82%	19,447	2%	73,447	8%	13,393	2%	19,938	2%
Aurora	2,554	2,415	95%	16	1%	74	3%	19	1%	30	1%
Beadle	16,474	13,872	84%	184	1%	206	1%	1840	11%	372	2%
Bennett	3,209	1,092	34%	19	1%	1,869	58%	19	1%	210	7%
Bon Homme	6,816	5,946	87%	89	1%	551	8%	13	0%	217	3%
Brookings	34,387	31,350	91%	455	1%	354	1%	979	3%	1,249	4%
Brown	38,089	33,469	88%	842	2%	1,230	3%	1,076	3%	1,472	4%
Brule	5,105	4,412	86%	29	1%	471	9%	20	0%	173	3%
Buffalo	1,916	293	15%	13	1%	1,502	78%	1	0%	107	6%
Butte	10,198	9,495	93%	49	1%	207	2%	45	0%	402	4%
Campbell	1,365	1,305	96%	3	0%	16	1%	4	0%	37	3%
Charles Mix	8,797	5,769	66%	55	1%	2,818	32%	24	0%	345	4%
Clark	3,705	3,487	94%	54	2%	9	0%	24	1%	131	4%
Clay	13,770	12,263	89%	223	2%	461	4%	372	3%	451	3%
Codington	27,633	25,899	94%	206	1%	652	2%	192	1%	684	2%
Corson	3,958	1,184	30%	18	1%	2,515	64%	24	1%	217	5%
Custer	8,801	8,006	91%	53	1%	296	3%	51	1%	395	4%
Davison	19,428	17,785	92%	158	1%	609	3%	129	1%	747	3%
Day	5,324	4,625	87%	23	0%	507	10%	34	1%	135	3%
Deuel	4,300	4,061	94%	34	1%	26	1%	9	0%	170	4%
Dewey	5,646	1,158	21%	33	1%	4,150	74%	12	0%	293	5%
Douglas	2,882	2,737	95%	13	1%	70	2%	3	0%	59	2%
Edmunds	3,796	3,640	96%	12	0%	38	1%	21	1%	85	2%
Fall River	6,502	5,654	87%	75	1%	401	6%	108	2%	264	4%
Faulk	2,289	2,233	98%	17	1%	7	0%	9	0%	23	1%
Grant	6,704	6,495	97%	33	1%	70	1%	21	0%	85	1%
Gregory	4,073	3,669	90%	17	0%	294	7%	21	1%	72	2%
Haakon	1,835	1,739	95%	4	0%	52	3%	5	0%	35	2%
Hamlin	6,097	5,727	94%	32	1%	42	1%	20	0%	276	5%
Hand	3,196	3,082	96%	5	0%	52	2%	13	0%	44	1%
Hanson	3,404	3,292	97%	21	1%	24	1%	16	0%	51	2%
Harding	1,275	1,191	93%	16	1%	31	2%	3	0%	34	3%
Hughes	17,109	14,301	84%	118	1%	1,997	12%	134	1%	559	3%
Hutchinson	7,217	6,879	95%	76	1%	75	1%	18	0%	169	2%
Hyde	1,269	1,128	89%	10	1%	108	9%	3	0%	20	2%
Jackson	3,181	1,314	41%	29	1%	1,700	53%	4	0%	134	4%
Jerauld	1,990	1,870	94%	3	0%	15	2%	5	0%	97	5%
Jones	867	791	91%	3	0%	47	5%	0	0%	26	3%
Kingsbury	4,876	4,651	95%	24	0%	41	1%	35	1%	125	3%
Lake	12,607	11,847	94%	144	1%	150	1%	108	1%	358	3%
Lawrence	25,353	23,410	92%	190	1%	525	2%	315	1%	913	4%
Lincoln	60,157	56,371	94%	1,052	2%	355	1%	881	2%	1,498	2%
Lyman	3,664	2,068	56%	21	1%	1,462	40%	14	0%	99	3%
McCook	5,528	5,190	94%	37	1%	51	1%	9	0%	241	4%
McPherson	2,350	2,283	97%	14	1%	6	0%	8	0%	39	2%
Marshall	4,863	4,102	84%	25	1%	331	17%	8	0%	397	8%
Meade	27,555	24,717	90%	533	2%	766	3%	283	1%	1,256	4%
Mellette	1,935	755	39%	10	1%	1,093	57%	5	0%	72	4%
Miner	2,188	2,079	95%	17	1%	11	1%	10	0%	71	3%
Minnehaha	188,663	158,275	84%	11,670	6%	4,686	3%	4,020	2%	10,012	5%
Moody	6,370	5,036	79%	87	1%	815	13%	131	2%	301	5%
Oglala Lakota	13,441	669	5%	55	0%	12,647	94%	18	0%	52	0%
Pennington	109,918	90,741	83%	1,508	1%	10,079	9%	1,367	1%	6,223	6%
Perkins	2,826	2,682	95%	15	1%	67	2%	11	0%	51	2%
Potter	2,117	1,987	94%	11	1%	49	2%	18	1%	52	2%
Roberts	10,061	5,792	58%	75	1%	3,772	37%	24	0%	398	4%
Sanborn	2,309	2,209	96%	9	0%	12	1%	5	0%	74	3%
Spink	6,319	5,952	94%	41	1%	96	2%	11	0%	219	3%
Stanley	2,988	2,670	89%	21	1%	215	7%	8	0%	74	2%
Sully	1,367	1,291	94%	6	0%	36	3%	0	0%	34	3%
Todd	9,977	758	8%	55	1%	8,502	85%	239	2%	423	4%
Tripp	5,300	4,329	82%	26	1%	781	15%	20	0%	144	3%
Turner	8,289	7,943	96%	47	1%	56	1%	19	0%	224	3%
Union	15,684	14,505	92%	224	1%	118	1%	232	2%	605	4%
Walworth	5,268	4,263	81%	26	0%	743	14%	104	2%	132	3%
Yankton	22,449	20,005	89%	449	2%	631	3%	192	1%	1,172	5%
Ziebach	2,660	655	25%	15	1%	1,873	70%	7	0%	110	4%

US Census Bureau Estimated Race Population

Appendix D: SEER Incidence Site Analysis Categories

Site Group	ICD-O-3 Site	ICD-O-3 Histology (Type)	Recode
Oral Cavity and Pharynx			
Lip	C000-C009	excluding 9050-9055, 9140, 9590-9992	20010
Tongue	C019-C029		20020
Salivary Gland	C079-C089		20030
Floor of Mouth	C040-C049		20040
Gum and Other Mouth	C030-C039, C050-C059, C060-C069		20050
Nasopharynx	C110-C119		20060
Tonsil	C090-C099		20070
Oropharynx	C100-C109		20080
Hypopharynx	C129, C130-C139		20090
Other Oral Cavity and Pharynx	C140, C142, C148		20100
Digestive System			
Esophagus	C150-C159	excluding 9050-9055, 9140, 9590-9992	21010
Stomach	C160-C169		21020
Small Intestine	C170-C179		21030
Colon and Rectum			
Colon excluding Rectum			
Cecum	C180	excluding 9050-9055, 9140, 9590-9992	21041
Appendix	C181		21042
Ascending Colon	C182		21043
Hepatic Flexure	C183		21044
Transverse Colon	C184		21045
Splenic Flexure	C185		21046
Descending Colon	C186		21047
Sigmoid Colon	C187		21048
Large Intestine, NOS	C188-C189, C260		21049
Rectum and Rectosigmoid Junction			
Rectosigmoid Junction	C199	excluding 9050-9055, 9140, 9590-9992	21051
Rectum	C209		21052
Anus, Anal Canal and Anorectum	C210-C212, C218		21060
Liver and Intrahepatic Bile Duct			
Liver	C220	excluding 9050-9055, 9140, 9590-9992	21071
Intrahepatic Bile Duct	C221		21072
Gallbladder	C239		21080
Other Biliary	C240-C249		21090
Pancreas	C250-C259		21100
Retroperitoneum	C480		21110
Peritoneum, Omentum and Mesentery	C481-C482		21120
Other Digestive Organs	C268-C269, C488		21130
Respiratory System			
Nose, Nasal Cavity and Middle	C300-C301, C310-C319	excluding 9050-9055, 9140, 9590-9992	22010
Larynx	C320-C329		22020
Lung and Bronchus	C340-C349		22030
Pleura	C384		22050

Trachea, Mediastinum and Other Respiratory Organs	C339, C381-C383, C388, C390, C398, C399		22060

Site Group	ICD-O-3 Site	ICD-O-3 Histology (Type)	Recode
Bones and Joints	**C400-C419**	**excluding 9050-9055, 9140, 9590-9992**	**23000**
Soft Tissue including Heart	**C380, C470-C479, C490-C499**	**excluding 9050-9055, 9140, 9590-9992**	**24000**
Skin excluding Basal and Squamous			
Melanoma of the Skin	C440-C449	8720-8790	25010
Other Non-Epithelial Skin	C440-C449	excluding 8000-8005, 8010-8046, 8050-8084, 8090-8110, 8720-8790, 9050-9055, 9140, 9590-9992	25020
Breast	**C500-C509**	**excluding 9050-9055, 9140, 9590-9992**	**26000**
Female Genital System			
Cervix Uteri	C530-C539	excluding 9050-9055, 9140, 9590-9992	27010
Corpus and Uterus, NOS			
Corpus Uteri	C540-C549	excluding 9050-9055, 9140, 9590-9992	27020
Uterus, NOS	C559		27030
Ovary	C569		27040
Vagina	C529		27050
Vulva	C510-C519		27060
Other Female Genital Organs	C570-C579, C589		27070
Male Genital System			
Prostate	C619	excluding 9050-9055, 9140, 9590-9992	28010
Testis	C620-C629		28020
Penis	C600-C609		28030
Other Male Genital Organs	C630-C639		28040
Urinary System			
Urinary Bladder	C670-C679	excluding 9050-9055, 9140, 9590-9992	29010
Kidney and Renal Pelvis	C649, C659		29020
Ureter	C669		29030
Other Urinary Organs	C680-C689		29040
Eye and Orbit	**C690-C699**	**excluding 9050-9055, 9140, 9590-9992**	**30000**
Brain and Other Nervous System			
Brain	C710-C719	excluding 9050-9055,9140,9530-9539, 9590-9992	31010
Cranial Nerves Other Nervous System	C710-C719	9530-9539	31040
	C700-C709, C720-C729	excluding 9050-9055, 9140, 9590-9992	
Endocrine System			
Thyroid	C739	excluding 9050-9055, 9140, 9590-9992	32010
Other Endocrine including Thymus	C379, C740-C749, C750-C759		32020

Site Group	ICD-O-3 Site	ICD-O-3 Histology (Type)	Recode
Lymphoma			
Hodgkin's Lymphoma			
Hodgkin's - Nodal	C024,C098-C099,C111, C142,C379,C422,C770-C779	9650-9667	33011
Hodgkin's - Extranodal	All other sites		33012
Non-Hodgkin's Lymphoma			
NHL - Nodal	C024, C098, C099, C111, C142,C379, C422, C770-C779	9590-9597, 9670-9671, 9673, 9675, 9678-9680, 9684, 9687-9691, 9695, 9698-9702, 9705, 9708-9709, 9712, 9714-9719, 9724-9729, 9735, 9737-9738, 9811-9818, 9823, 9827, 9837	33041
NHL - Extranodal	All sites except C024, C098-C099, C111, C142, C379, C422, C770-C779	9590-9597, 9670-9671, 9673, 9675, 9678-9680, 9684, 9687, 9688, 9689-9691, 9695, 9698-9702,9705, 9708-9709, 9712, 9714-9719, 9724-9729, 9735, 9737,9738	33042
	All sites except C024, C098-C099, C111, C142, C379, C420-C422, C424, C770-C779	9811-9818, 9823, 9827, 9837	
Myeloma		**9731-9732, 9734**	**34000**
Leukemia			
Lymphocytic Leukemia			
Acute Lymphocytic Leukemia		9826, 9835-9836	35011
	C420, C421, C424	9811-9818, 9837	
Chronic Lymphocytic Leukemia	C420, C421, C424	9823	35012
Other Lymphocytic Leukemia		9820, 9832-9834, 9940	35013
Myeloid and Monocytic Leukemia			
Acute Myeloid Leukemia		9840, 9861, 9865-9867, 9869, 9871-9874, 9895-9897, 9898, 9910-9911, 9920	35021
Acute Monocytic Leukemia		9891	35031
Chronic Myeloid Leukemia		9863, 9875-9876, 9945-9946	35022
Other Myeloid/Monocytic Leukemia		9860, 9930	35023
Other Leukemia			
Other Acute Leukemia		9801, 9805-9809, 9931	35041
Aleukemic, subleukemic and NOS		9733, 9742, 9800, 9831, 9870, 9948, 9963-9964	35043
	C420, C421, C424	9827	
Mesothelioma +		**9050-9055**	**36010**
Kaposi Sarcoma +		**9140**	**36020**
Miscellaneous		**9740-9741, 9750-9769, 9950, 9960-9962, 9965-9967, 9970-9971, 9975, 9980, 9982-9987, 9989, 9991-9992**	**37000**
	C760-C768, C809	**Excluding 9050-9055, 9140, 9590-9992**	
	C420-C424		
	C770-C779		
Invalid		**Site or histology code not within valid range or site code not found in this table.**	**99999**

Appendix E: SEER Cancer Cause of Death Analysis Categories

Cancer Causes of Death	ICD-10
All Malignant Cancers	**C00-C97**
Oral Cavity and Pharynx	
Lip	C00
Tongue	C01-C02
Salivary Gland	C07-C08
Floor of Mouth	C04
Gum and Other Mouth	C03, C05-C06
Nasopharynx	C11
Tonsil	C09
Oropharynx	C10
Hypopharynx	C12-C13
Other Oral Cavity and Pharynx	C14
Digestive System	
Esophagus	C15
Stomach	C16
Small Intestine	C17
Colon and Rectum	
Colon Excluding Rectum	C18, C26.0
Rectum and Rectosigmoid Junction	C19-C20
Anus, Anal Canal and Anorectum	C21
Liver and Intrahepatic Bile Duct	
Liver	C22.0, C22.2-C22.4, C22.7, C22.9
Intrahepatic Bile Duct	C22.1
Gallbladder	C23
Other Biliary	C24
Pancreas	C25
Retroperitoneum	C48.0
Peritoneum, Omentum and Mesentery	C45.1+, C48.1-C48.2
Other Digestive Organs	C26.8-C26.9, C48.8
Respiratory System	
Nose, Nasal Cavity and Middle Ear	C30-C31
Larynx	C32
Lung and Bronchus	C34
Pleura	C38.4, C45.0+
Trachea, Mediastinum and Other Respiratory Organs	C33, C38.1-C38.3, C38.8, C39
Bones and Joints	C40-C41
Soft Tissue including Heart	C47, C49, C38.0, C45.2+
Skin excluding Basal and Squamous	
Melanoma of the Skin	C43
Other Non-Epithelial Skin	C44, C46+
Breast	C50
Female Genital System	
Cervix Uteri	C53
Corpus and Uterus, NOS	
Corpus Uteri	C54
Uterus, NOS	C55
Ovary	C56
Vagina	C52
Vulva	C51
Other Female Genital Organs	C57-C58

Cancer Causes of Death	ICD-10
Male Genital System	
Prostate	C61
Testis	C62
Penis	C60
Other Male Genital Organs	C63
Urinary System	
Bladder	C67
Kidney and Renal Pelvis	C64-C65
Ureter	C66
Other Urinary Organs	C68
Eye and Orbit	C69
Brain and Other Nervous System	C70, C71, C72
Endocrine System	
Thyroid	C73
Other Endocrine Including Thymus	C37, C74-C75
Lymphoma	
Hodgkin's Lymphoma	C81
Non-Hodgkin's Lymphoma	C82-C85, C96.3
Myeloma	C90.0, C90.2
Leukemia	
Lymphocytic Leukemia	
Acute Lymphocytic Leukemia	C91.0
Chronic Lymphocytic Leukemia	C91.1
Other Lymphocytic Leukemia	C91.2-C91.4, C91.7, C91.9
Myeloid and Monocytic Leukemia	
Acute Myeloid	C92.0, C92.4-C92.5, C94.0, C94.2
Acute Monocytic Leukemia	C93.0
Chronic Myeloid Leukemia	C92.1
Other Myeloid/Monocytic Leukemia	C92.2-C92.3, C92.7, C92.9, C93.1-C93.2, C93.7, C93.9
Other Acute Leukemia	C94.4, C94.5, C95.0
Aleukemic, Sub leukemic and NOS	C90.1, C91.5, C94.1, C94.3, C94.7, C95.1, C95.2, C95.7, C95.9
Mesothelioma (ICD-10 only)+	C45+
Kaposi Sarcoma (ICD-10 only)+	C46+
Miscellaneous Malignant Cancer	C26.1, C45.7**+**, C45.9**+**, C76-C80, C88, C96.0-C96.2, C96.7, C96.9, C97

Source: http://seer.cancer.gov/codrecode

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Surveillance, Epidemiology, and End Results (SEER) Program of the National Cancer Institute, Cancer Query Systems, http://seer.cancer.gov/canques/

April 2022