South Dakota

South Dakota Cancer Registry
April 2015

Cancer In South Dakota 2012

South Dakota Cancer Registry, South Dakota Department of Health

Preface

"Cancer in South Dakota, 2012," is the 20th annual report from the South Dakota Cancer Registry (SDCR) in the Office of Chronic Disease Prevention and Health Promotion in the Division of Health and Medical Services within the South Dakota Department of Health (DOH). The report contains 2012 cancer incidence and mortality data of South Dakota residents.

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Changes in Report

Age-adjusted rates were calculated using the 2000 US standard million and the US Census Bureau 2002 - 2012 population estimates for South Dakota. Reports published before 2012 used the 2000 South Dakota census population for age-adjusted calculations. Any comparison to reports published before 2012 with this report would not be compatible.

Requests for Information

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Web Access: This report is available on the internet at the following URL: http://getscreened.sd.gov/documents/Cancer2012.pdf

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I. EXECUTIVE SUMMARY

This report summarizes the state of cancer in South Dakota and includes cancer incidence and mortality data. The data will enable the many organizations working with cancer prevention and control to identify public health problems, target goals for cancer control, and to inform citizens and health care professionals about risks, early detection, and treatment.

Incidence 2012

- 4,184 South Dakotans were diagnosed with invasive, reportable cases of cancer, which excludes the less life-threatening cancers such as *in situ* cancers (except *in situ* bladder cases) and the common skin cancers.
- Each day 11 cases of cancer are diagnosed in residents of South Dakota; this includes only cases of invasive cancer and *in situ* bladder.
- The five most diagnosed cancer sites (female breast, lung, prostate, colorectal, melanoma) accounted for 55% of all cancer cases.
- Female breast cancer was the most common reportable malignancy with 672 cases among women, accounting for 16.1% of all cases and 32.5% of cases for women.
- Lung cancer was the second most common reportable malignancy with 539 cases, 12.9% of all cases.
- Prostate cancer was the third most common reportable cancer with 490 cases, 11.7% of all cases and 23.2% of cases for men.
- Colon and rectal cancers were the fourth most common malignancy with 398 cases, 9.5% of all cases.
- Melanoma cancers were the fifth most common malignancy with 205 cases, 4.9% of all reported cases.
- 51% of all new cancers were diagnosed in males and 49% were in females.
- Males had an age-adjusted incidence rate of 462.4 per 100,000, which was higher than females who had an age-adjusted rate of 418.8 per 100,000.
- Whites accounted for 93.6% of cancer cases with 3,918 cases whereas American Indians were 5.4% with 228 cases.
- The American Indian age-adjusted incidence rate was 493.1, which is higher than the age-adjusted rate among whites of 462.4.
- The South Dakota age-adjusted incidence rate for 2012 was 435.1, lower than the US SEER 2011* age-adjusted incidence rate of 443.7 per 100,000 persons.

*2011 was the latest available national rate at the time of this publication.

Mortality 2012

- Overall, cancer was the second leading cause of death in South Dakota.
- In 2012, 1,623 South Dakotans died from cancer, accounting for one in every four deaths.
- Each day five South Dakotans died from cancer.
- The five cancer sites (lung, colorectal, female breast, pancreas, prostate) caused 54.5% of all cancer deaths.
- Lung and bronchus cancers were the leading cause of cancer deaths at 433 deaths or 26.7% 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 164 deaths, 10.1% of all cancer deaths.
- Female breast cancer was the third leading cause of cancer deaths with 107 deaths, 6.6% of all cancer deaths and 13.9% of all female cancer deaths.
- Pancreatic cancer was the fourth leading cause of death with 105 deaths, 6.5% of all cancer deaths.
- Prostate cancer was the fifth leading cause of death with 75 deaths, 4.6% of all cancer deaths, and 8.8% 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 191.1 per 100,000 males, 36.4% higher than females with an age-adjusted rate of 140.1 deaths per 100,000 females.
- Whites accounted for 90.6% of deaths with 1,501 deaths, whereas American Indians were 6.3% with 112 deaths.
- The American Indian age-adjusted death rate was 298.4 which is 87.4% higher than the rate among whites at the age-adjusted death rate of 159.2.
- South Dakota's age-adjusted death rate for 2012 was 161.2, lower than the US SEER 2011* rate of 168.7.

Trends

- For the last decade, female breast cancer mortality rates have remained steady.
- Ovarian cancer incidence and mortality rates have declined over the past 12 years.
- Colorectal cancer incidences have declined from a high of 551 cases in 2002 to 398 cases in 2012.

*2011 was the latest available national mortality rate at the time of publication.

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. 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 2012 include benign brain, 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 are valid. The data are run through numerous edits and consolidated if received from more than one reporting source. In addition, the SDCR links the incidence data with mortality files to identify persons whose death records show cancer as a cause of death, but these cancers were not reported to the central registry. 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 is able to 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. The Harvard Report on Cancer Prevention in 1996 researched the risk factors for cancer. The estimated percentages (which are still relevant today) of total cancer deaths attributed to established causes of cancer were:

Risk Factor	Percentage
Tobacco	30%
Adult diet/obesity	30%
Sedentary lifestyle	5%
Occupational factors	5%
Family history of cancer	5%
Viruses/biological agents	5%
Perinatal factors/growth	5%
Reproductive factors	3%
Alcohol	3%
Socioeconomic status	3%
Environmental pollution	2%
Ionizing /UV radiation	2%
Prescription drugs/medical	1%
Salt/food additives/contaminants	1%

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
- 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: National Cancer Institute

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.

III. TECHNICAL NOTES

Age-adjusted death rates: Death rates are calculated for total cases and separately for males and females. The death rates are age-adjusted to the 2000 US standard population using five-year groups and are per 100,000 persons. Rates are presented for 2012 and for the five-year period, 2008-2012.

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-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.

Average years of life lost (AYLL): This is the extent to which life is cut short due to premature death. This is obtained by dividing the years of potential life lost (YPLL) by the number of deaths. On average each person who dies from cancer loses 15 years of their life.

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 2012* or *SEER Cancer Statistics Review 1975-2011* 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 an increased survival and reduction of mortality.

Limitations to data interpretation and comparison: A number of 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.

Percent change: This is the difference between two rates expressed as a percentage.

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 your body's 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 mestastases 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.

Years of life potential life lost (YPLL): The years of potential life lost is calculated for each individual who dies of a cancer of interest by determining the number of years of additional expected life if that person had lived to 75 years. The YPLL in the general population associated with a particular cancer is the sum of this expectation over all those individuals who died of that cancer in a particular year. YPLL reflects the burden of cancer on younger persons while death rates reflect the burden on older persons.

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[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 4,184 new reportable cancer cases in 2012. Data at the county level ranged from a low incidence rate of 174.6 in Jones County to a high of 722.0 in Haakon County. There were 10 counties with rates significantly lower than the state incidence rate of 435.1. Two counties had a significantly higher rate, compared to no counties in 2011.

The United States incidence rate for 2011 was 443.7 and the 2012 South Dakota incidence rate was 435.1 per 100,000 persons.

On page 14 of this report a map displaying the 2012 incidence rates by county can be located. On page 15 is a map displaying the mortality rates by county.

Table 1 : Cancer Cases and Incidence Rates by County
South Dakota, 2012 and 2008-2012 Average

County	2012			2008-2012^		
	Cases	Rate		Cases	Rate	
South Dakota	4,184	435.1		4,182	448.0	
Aurora	18	513.3		18	457.6	
Beadle	100	435.0		100	440.3	
Bennett	17	516.3		13	396.9	
Bon Homme	41	411.1		38	401.1	
Brookings	125	465.5		113	429.8	
Brown	200	432.7		184	413.8	▼
Brule	17	249.5	▼	31	454.0	
Buffalo	5	361.9		7	509.2	
Butte	57	429.5		59	465.4	
Campbell	8	273.8		8	283.7	▼
Charles Mix	51	443.2		54	474.3	
Clark	23	399.7		25	446.8	
Clay	49	380.0		46	403.4	
Codington	151	478.3		137	440.2	
Corson	10	242.9	▼	14	398.0	
Custer	40	306.8	▼	49	376.8	▼
Davison	131	516.7		119	490.5	
Day	37	397.5		43	486.9	
Deuel	20	308.1		25	406.3	
Dewey	32	673.1		25	552.4	▲
Douglas	15	302.1		23	495.6	
Edmunds	35	590.8		29	471.0	
Fall River	50	411.4		62	512.8	▲
Faulk	19	461.7		17	446.1	
Grant	41	393.3		46	437.4	
Gregory	39	537.2		38	535.7	▲
Haakon	22	722.0		17	560.0	
Hamlin	28	382.5		30	423.7	
Hand	13	219.4	▼	20	361.5	▼
Hanson	19	595.6		19	528.0	
Harding	3	193.1	▼	5	328.5	
Hughes	99	496.4		102	513.4	▲
Hutchinson	56	515.6		50	440.5	
Hyde	13	607.6		9	418.7	
Jackson	7	206.5	▼	10	319.9	▼
Jerauld	10	251.4	▼	15	466.2	
Jones	3	174.6	▼	6	356.2	
Kingsbury	34	457.2		45	570.4	▲
Lake	53	311.5	▼	66	429.1	
Lawrence	125	384.8		120	393.9	▼
Lincoln	143	344.8	▼	157	445.2	
Lyman	19	399.6		20	456.2	
McCook	42	594.1		34	466.2	
McPherson	17	403.2		13	291.5	▼
Marshall	37	543.6		28	431.6	
Meade	110	387.2		110	420.0	
Mellette	14	630.3		11	478.7	
Miner	16	454.3		16	438.5	
Minnehaha	899	510.6	▲	855	486.8	▲
Moody	37	449.8		32	415.4	
Oglala Lakota	37	375.5		34	412.1	
Pennington	470	402.3		503	447.2	
Perkins	17	411.5		21	426.9	
Potter	25	698.3		18	431.9	
Roberts	46	351.1		48	377.7	▼
Sanborn	13	350.0		17	526.6	
Spink	33	346.4		39	399.7	
Stanley	23	538.9		22	576.0	▲
Sully	11	525.6		8	437.7	
Todd	23	390.4		25	417.2	
Tripp	34	431.7		35	419.9	
Turner	45	368.3		52	445.9	
Union	106	637.5	▲	89	537.8	▲
Walworth	33	348.6		35	391.8	▼
Yankton	112	394.7		116	411.9	▼
Ziebach	6	248.7		5	291.2	▼

* 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 2012 estimated population. Source: South Dakota Department of Health

Table 2: Age-adjusted Incidence Rates by County for Selected Sites, 2012

	Colorectal		Lung & Bronchus		Female Breast		Prostate		Bladder		NHL	
	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate
South Dakota	**398**	**40.1**	**539**	**54.6**	**672**	**141.4**	**490**	**102.4**	**194**	**19.3**	**179**	**19.0**
Aurora	7	162.3	0	0.0	3	146.5	*	86.4	0	0.0	0	0.0
Beadle	7	32.0	9	37.5	15	119.9	9	84.9	6	21.7	6	20.5
Bennett	*	31.0	*	38.7	3	62.6	*	88.5	0	0.0	*	29.7
Bon Homme	4	38.9	6	57.4	3	62.6	4	88.5	4	35.8	*	19.7
Brookings	11	37.9	23	87.7	13	94.8	10	78.6	8	32.4	7	25.3
Brown	20	38.4	35	74.4	31	129.3	16	67.4	8	17.6	8	20.0
Brule	3	37.1	3	51.0	0	0.0	3	95.3	0	0.0	0	0.0
Buffalo	*	68.4	0	0.0	*	177.9	*	153.0	0	0.0	0	0.0
Butte	8	55.2	9	59.6	3	56.2	6	102.7	*	7.7	3	26.6
Campbell	*	31.0	*	31.0	*	48.2	*	157.6	0	0.0	0	0.0
Charles Mix	5	40.9	7	53.5	11	190.6	3	49.6	3	18.9	3	33.5
Clark	3	38.9	*	34.4	5	176.4	5	148.7	*	36.6	0	0.0
Clay	3	17.5	5	41.4	8	119.3	5	67.3	7	58.7	0	0.0
Codington	11	29.7	12	38.9	28	174.2	19	119.2	9	28.0	4	12.9
Corson	*	64.5	0	0.0	*	43.9	*	44.1	0	0.0	*	46.8
Custer	4	25.6	4	23.7	8	133.4	4	46.6	*	10.2	0	0.0
Davison	9	32.2	19	71.7	18	137.8	21	170.6	4	12.5	5	14.5
Day	*	27.3	*	25.5	4	61.4	5	100.7	3	24.1	*	22.3
Deuel	*	14.1	*	17.3	*	22.9	3	90.2	*	11.3	0	0.0
Dewey	4	92.1	*	44.8	5	190.8	9	412.9	*	16.6	*	38.3
Douglas	*	19.7	4	88.6	0	0.0	*	92.8	0	0.0	*	42.7
Edmunds	3	63.0	4	66.8	4	148.4	5	159.7	*	19.3	3	70.2
Fall River	6	48.7	6	52.2	9	147.7	6	92.8	5	32.5	*	22.9
Faulk	*	54.7	0	0.0	3	185.8	3	142.7	*	38.5	*	23.9
Grant	7	60.2	4	35.3	8	178.4	4	62.3	0	0.0	0	0.0
Gregory	*	32.6	5	58.8	7	211.5	5	142.9	4	46.0	5	66.1
Haakon	*	63.5	*	67.4	7	350.0	4	273.7	*	33.1	*	107.8
Hamlin	3	49.9	5	83.2	3	83.3	3	82.6	*	22.4	3	37.9
Hand	*	39.7	*	26.7	4	135.3	3	130.6	0	0.0	0	0.0
Hanson	4	123.1	*	40.3	3	151.6	4	298.3	*	23.2	0	0.0
Harding	0	0.0	0	0.0	*	141.0	0	0.0	*	43.1	0	0.0
Hughes	8	39.9	10	45.3	20	196.8	8	74.6	*	7.5	7	32.1
Hutchinson	8	55.1	4	35.5	11	280.3	10	167.7	*	25.1	4	41.7
Hyde	*	56.6	0	0.0	*	118.2	4	368.4	0	0.0	*	22.8
Jackson	*	30.9	*	66.4	*	61.2	*	96.2	0	0.0	0	0.0
Jerauld	*	34.1	4	93.4	0	0.0	*	55.1	0	0.0	0	0.0
Jones	*	114.6	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Kingsbury	7	89.7	4	48.4	*	54.0	4	93.5	*	14.4	*	14.4
Lake	*	11.1	3	21.7	7	74.8	9	104.2	4	21.9	0	0.0
Lawrence	14	40.0	13	36.8	12	79.3	15	98.8	7	16.6	7	24.0
Lincoln	12	33.2	17	43.1	33	142.4	21	107.8	10	24.4	4	10.4
Lyman	4	79.5	*	40.9	4	197.6	4	191.4	0	0.0	*	20.8
McCook	6	75.8	5	64.7	4	166.2	4	102.8	*	12.2	*	38.0
McPherson	*	44.6	5	103.1	*	188.8	5	198.5	*	23.2	*	23.2
Marshall	4	54.7	4	59.6	3	88.8	7	198.9	*	11.5	*	32.9
Meade	11	39.0	15	50.6	16	112.0	12	87.2	7	24.0	5	17.4
Mellette	*	77.9	*	88.5	*	165.8	4	378.7	0	0.0	*	51.1
Miner	*	14.6	*	31.4	*	99.5	4	215.0	0	0.0	0	0.0
Minnehaha	79	46.2	124	71.3	153	165.2	94	117.2	37	21.5	39	22.5
Moody	*	22.7	9	107.5	7	160.4	5	122.7	0	0.0	0	0.0
Oglala Lakota	7	64.8	5	54.1	7	128.7	*	19.5	0	0.0	0	0.0
Pennington	41	35.6	65	52.4	81	140.7	38	68.0	19	16.7	13	11.4
Perkins	3	51.8	*	24.4	3	213.0	3	114.0	*	24.4	0	0.0
Potter	0	0.0	5	109.0	6	294.0	4	193.9	*	23.2	*	29.2
Roberts	3	17.7	4	27.0	9	148.4	6	82.6	*	13.8	3	32.7
Spink	5	54.0	8	84.6	3	70.5	3	57.0	3	28.3	3	45.7
Stanley	0	0.0	3	58.2	4	222.7	6	247.9	*	18.3	*	36.6
Sanborn	0	0.0	*	43.8	3	166.4	*	82.5	0	0.0	0	0.0
Sully	*	43.4	*	49.4	3	342.1	0	0.0	0	0.0	0	0.0
Todd	4	66.9	*	21.3	*	27.9	3	161.8	0	0.0	*	10.6
Tripp	3	36.8	*	40.1	7	193.7	6	140.5	*	6.4	*	13.5
Turner	*	12.3	5	47.8	12	193.4	6	94.0	*	18.2	3	23.8
Union	10	54.9	19	112.0	14	176.3	8	98.9	9	53.5	*	10.1
Walworth	*	22.4	4	41.7	3	67.4	9	209.2	*	6.8	4	39.8
Yankton	8	24.6	16	55.5	25	185.3	13	91.3	6	18.2	6	22.0
Ziebach	*	34.6	0	0.0	0	0.0	*	85.0	0	0.0	*	102.3

Note: * Counts less than 3 are suppressed. Incidence rates with counts less than 20 are generally considered unstable.
Rates per 100,000 age-adjusted to the 2000 US standard population and 2012 SD estimated population.
Source: South Dakota Department of Health.

Table 3: Age-adjusted Incidence Rates by Site, Gender and Race, South Dakota, 2012

2012	TOTAL		MALE		FEMALE		WHITE		AMERICAN INDIAN	
	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate
Total	**4,184**	**435.1**	**2,115**	**462.4**	**2,069**	**418.8**	**3,918**	**437.4**	**228**	**493.1**
Oral Cavity	**118**	**11.7**	**90**	**18.5**	**28**	**5.9**	**110**	**11.8**	**8**	**18.5**
Lip	13	1.2	12	2.7	1	0.1	12	1.1	1	4.1
Tongue	40	4.0	28	5.5	12	2.6	40	4.4	0	0.0
Salviary Gland	8	0.8	5	1.0	3	0.7	8	0.9	0	0.0
Floor of Mouth	6	0.5	5	0.9	1	0.2	5	0.4	1	1.7
Gum and Other Mouth	18	1.8	14	3.0	4	0.7	18	1.9	0	0.0
Nasopharynx	3	0.4	2	0.4	1	0.4	2	0.3	1	1.6
Tonsil	21	2.1	18	3.7	3	0.7	16	1.8	5	11.1
Oropharynx	2	0.2	1	0.2	1	0.2	2	0.2	0	0.0
Hypopharynx	4	0.4	3	0.6	1	0.2	4	0.4	0	0.0
Other Oral Cavity and Pharynx	3	0.4	2	0.5	1	0.2	3	0.4	0	0.0
Digestive System	**720**	**72.6**	**387**	**83.9**	**333**	**62.5**	**669**	**71.5**	**45**	**100.4**
Esophagus	39	3.9	33	7.2	6	1.2	38	4.1	1	1.7
Stomach	47	4.8	34	7.3	13	2.6	44	4.6	2	4.1
Small Intestine	19	2.0	11	2.5	8	1.6	19	2.2	0	0.0
Colorectal	398	40.1	195	42.7	203	37.9	368	39.2	28	62.7
Colon Excluding Rectum	272	27.3	119	26.2	153	28.3	253	26.7	18	43.9
Rectum and Rectosigmoid	126	12.8	76	16.5	50	9.6	115	12.5	10	18.8
Anus, Anal Canal and Anorectum	12	1.4	3	0.7	9	2.2	12	1.5	0	0.0
Liver and Intrahepatic Bile Duct	49	4.8	30	6.2	19	3.4	41	4.3	7	15.5
Gallbladder	10	1.0	2	0.5	8	1.3	8	0.8	2	5.6
Other Biliary	14	1.4	11	2.2	3	0.7	13	1.4	1	1.6
Pancreas	125	12.6	68	14.6	57	10.3	120	12.9	3	7.4
Retroperitoneum	1	0.1	0	0.0	1	0.2	1	0.1	0	0.0
Peritoneum, Omentum and Mesentery	6	0.6	0	0.0	6	1.2	5	0.5	1	1.7
Respiratory	**576**	**58.2**	**325**	**71.0**	**251**	**48.1**	**535**	**57.4**	**36**	**91.0**
Nose, Nasal Cavity and Middle Ear	5	0.5	3	0.6	2	0.4	5	0.6	0	0.0
Larynx	30	2.9	20	4.1	10	1.9	28	2.9	2	7.2
Lung and Bronchus	539	54.6	300	65.8	239	45.8	500	53.8	34	83.8
Pleura	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Mediastinum and Other Resp Organs	2	0.2	2	0.4	0	0.0	2	0.2	0	0.0
Bones and Joints	**3**	**0.4**	**2**	**0.5**	**1**	**0.4**	**2**	**0.4**	**1**	**0.9**
Soft Tissue (Including Heart)	**30**	**3.1**	**20**	**4.2**	**10**	**2.0**	**26**	**2.9**	**4**	**9.5**
Skin	**226**	**25.0**	**129**	**28.9**	**97**	**22.5**	**222**	**26.9**	**4**	**6.9**
Melanomas of the Skin	205	22.6	115	25.6	90	20.9	203	24.6	2	3.7
Other Skin	21	2.4	14	3.3	7	1.6	19	2.3	2	3.1
Breast	**675**	**73.2**	**3**	**0.7**	**672**	**141.4**	**636**	**74.5**	**35**	**64.6**
Breast, Female	672	141.4			672	141.4	633	154.9	35	123.7
Breast, Male	3	0.7	3	0.7			3	0.8	0	0.0
Female	**205**	**41.2**			**205**	**41.2**	**191**	**44.3**	**12**	**49.6**
Vulva	11	1.9			11	1.9	10	2.4	1	6.4
Vagina	0	0.0			0	0.0	0	0.0	0	0.0
Cervix Uteri	25	6.0			25	6.0	19	4.9	5	20.8
Corpus and Uterus, NOS	122	23.7			122	23.7	118	26.8	4	13.2
Corpus Uteri	120	23.3			120	23.3	116	26.4	4	13.2
Uterus, NOS	2	0.4			2	0.4	2	0.4	0	0.0
Ovary	43	8.7			43	8.7	40	9.3	2	9.3
Other Female Genital Organs	4	0.8			4	0.8	4	0.9	0	0.0

Table 3: Age-adjusted Incidence Rates by Site, Gender and Race, South Dakota, 2012 (continued)

	TOTAL		MALE		FEMALE		WHITE		AMERICAN INDIAN	
	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate
Male	**517**	**109.3**	**517**	**109.3**			**486**	**102.1**	**24**	**108.5**
Penis	3	0.7	3	0.7			3	0.6	0	0.0
Prostate	490	102.4	490	102.4			460	94.2	24	108.5
Testis	24	6.1	24	6.1			23	7.2	0	0.0
Other Male Genital Organs	0	0.0	0	0.0			0	0.0	0	0.0
Urinary	**334**	**34.2**	**227**	**50.8**	**107**	**20.3**	**311**	**33.9**	**21**	**47.4**
Bladder	194	19.3	133	30.0	61	10.8	189	20.0	4	12.6
Kidney and Renal Pelvis	131	14.0	88	19.4	43	9.0	113	12.9	17	34.9
Ureter	8	0.8	5	1.2	3	0.5	8	0.8	0	0.0
Other Urinary Organs	1	0.1	1	0.2	0	0.0	1	0.1	0	0.0
Eye and Orbit	**4**	**0.5**	**3**	**0.7**	**1**	**0.2**	**3**	**0.4**	**1**	**0.8**
Brain and CNS	**65**	**7.2**	**36**	**8.1**	**29**	**6.2**	**60**	**7.4**	**2**	**1.8**
Brain	60	6.6	35	7.8	25	5.1	57	6.9	1	1.0
Meninges and CNS	5	0.6	1	0.2	4	1.0	3	0.5	1	0.8
Endocrine	**111**	**13.0**	**31**	**6.9**	**80**	**19.3**	**102**	**13.6**	**8**	**11.7**
Thyroid	103	12.1	27	5.9	76	18.4	94	12.5	8	11.7
Other Endocrine	8	0.9	4	1.0	4	0.9	8	1.1	0	0.0
Lymphomas	**210**	**22.7**	**114**	**26.5**	**96**	**19.4**	**197**	**23.0**	**9**	**19.9**
Hodgkin's Lymphoma	31	3.7	15	3.4	16	3.9	30	4.0	0	0.0
Non-Hodgkin's Lymphoma	179	19.0	99	23.0	80	15.5	167	19.0	9	19.9
Multiple Myeloma	**65**	**6.6**	**39**	**8.6**	**26**	**4.7**	**61**	**6.5**	**4**	**10.8**
Leukemia	**140**	**14.9**	**89**	**20.5**	**51**	**10.0**	**133**	**15.2**	**5**	**10.7**
Acute Lymphocytic	17	2.1	10	2.5	7	1.7	15	2.1	1	0.8
Chronic Lymphocytic	51	5.3	34	7.6	17	3.3	49	5.3	1	3.1
Other Lymphocytic	6	0.6	5	1.1	1	0.2	6	0.6	0	0.0
Acute Myeloid	43	4.4	27	6.2	16	3.0	40	4.4	3	6.8
Acute Monocytic	3	0.4	2	0.5	1	0.2	3	0.4	0	0.0
Chronic Myeloid	11	1.2	6	1.4	5	0.9	11	1.3	0	0.0
Other Myeloid/Monocytic	1	0.1	1	0.3	0	0.0	1	0.1	0	0.0
Other Acute Leukemia	3	0.3	2	0.4	1	0.2	3	0.3	0	0.0
Other Leukemia	5	0.5	2	0.5	3	0.7	5	0.6	0	0.0
Myeloproliferative and Myelodysplastic	**72**	**7.3**	**36**	**8.2**	**36**	**6.5**	**66**	**7.1**	**4**	**10.4**
Mesothelioma	**9**	**1.0**	**8**	**2.0**	**1**	**0.2**	**9**	**1.0**	**0**	**0.0**
Other Sites	**104**	**10.3**	**59**	**13.4**	**45**	**8.2**	**99**	**10.2**	**5**	**11.6**

Rates per 100,000 age-adjusted to the 2000 US standard population and 2012 SD estimated population.
Source: South Dakota Department of Health

Table 3 above shows incidence and age-adjusted incidence rates for South Dakota in 2012 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, 2012

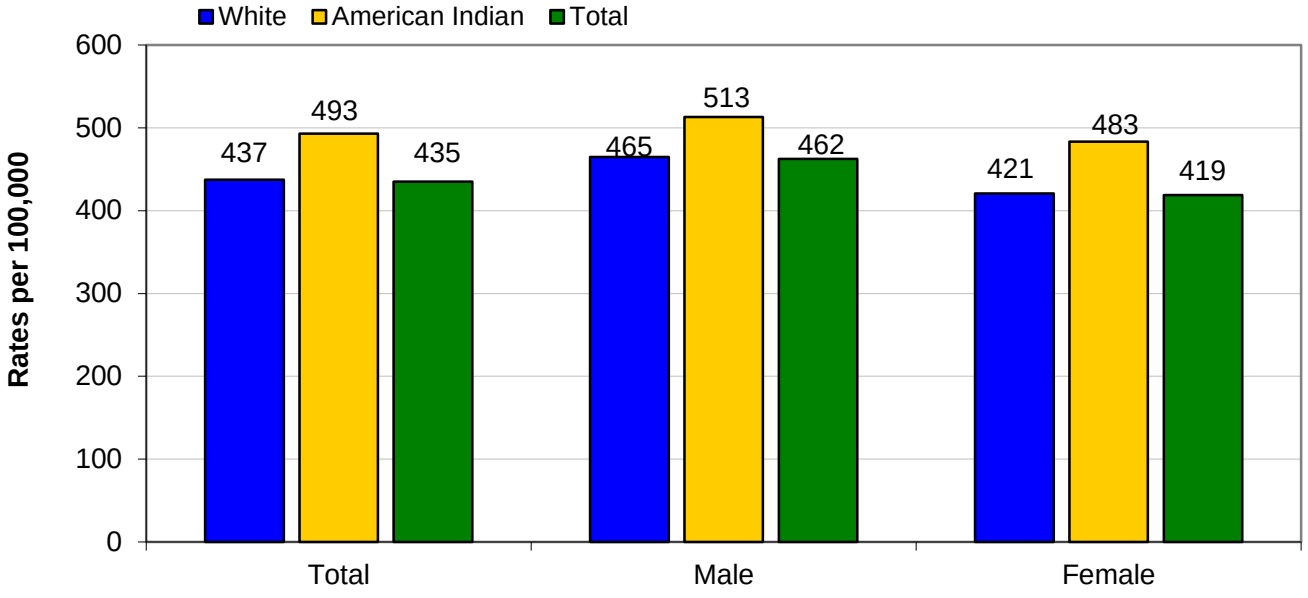
	0-19	20-34	35-49	50-64	65-74	75-84	85+
All Sites	1%	3%	9%	32%	26%	20%	10%
Bladder	0%	0%	4%	25%	24%	28%	19%
Breast, Female	0%	1%	16%	35%	25%	16%	7%
Colorectal	1%	1%	6%	27%	26%	24%	16%
Corpus and Uterus, NOS	1%	2%	7%	30%	25%	21%	14%
Hodgkin's Lymphoma	13%	26%	19%	13%	13%	13%	3%
Kidney and Renal Pelvis	2%	2%	15%	36%	27%	15%	5%
Leukemia	6%	4%	6%	21%	28%	26%	9%
Lung and Bronchus	0%	0%	3%	28%	33%	27%	9%
Melanomas of the Skin	0%	10%	18%	33%	21%	13%	5%
Non-Hodgkin's Lymphoma	1%	2%	9%	28%	28%	22%	10%
Pancreas	0%	1%	3%	30%	25%	32%	10%
Prostate	0%	0%	1%	40%	37%	17%	4%
Thyroid	1%	19%	25%	36%	11%	6%	2%

Source: South Dakota Department of Health

In 2012, 58% of all cancers were diagnosed between ages 50 to 74 (Table 4). Notable were the 16% of female breast cancers and 25% of thyroid cancers diagnosed between the ages of 35 to 49. In 2012, 39% of the Hodgkin's lymphoma cases were diagnosed in persons under 35 years old, compared to 50% in 2011.

Figure 1 below shows that incidence rates for American Indians in South Dakota were higher than those for whites in 2012. Of the 4,184 newly diagnosed cases in 2012, 228 or 5.4% were American Indians, 108 males and 120 females.

Figure 1: All Sites Cancer Incidence Rates by Race and Gender, South Dakota, 2012

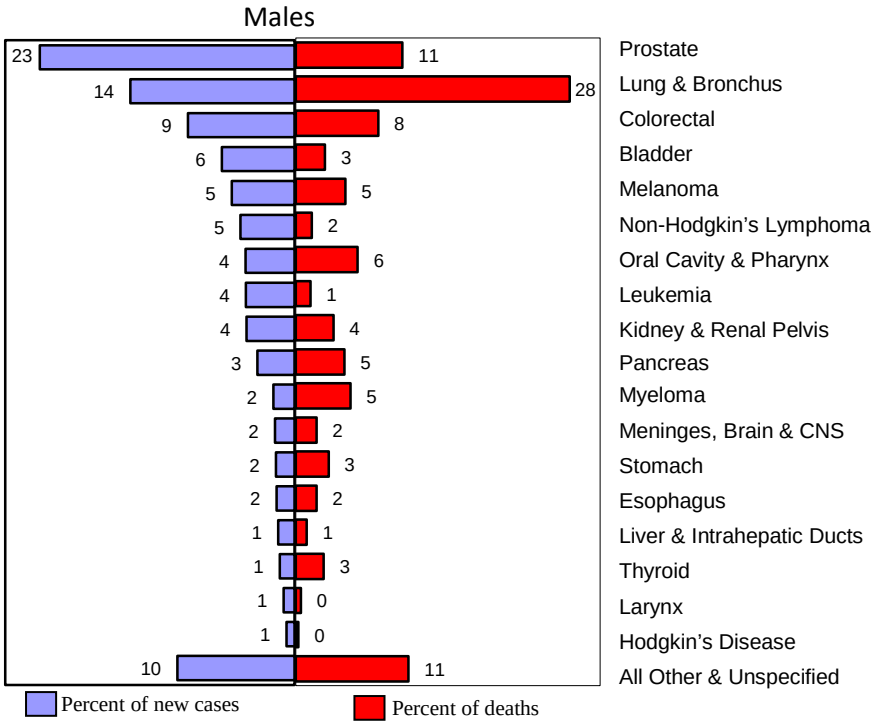


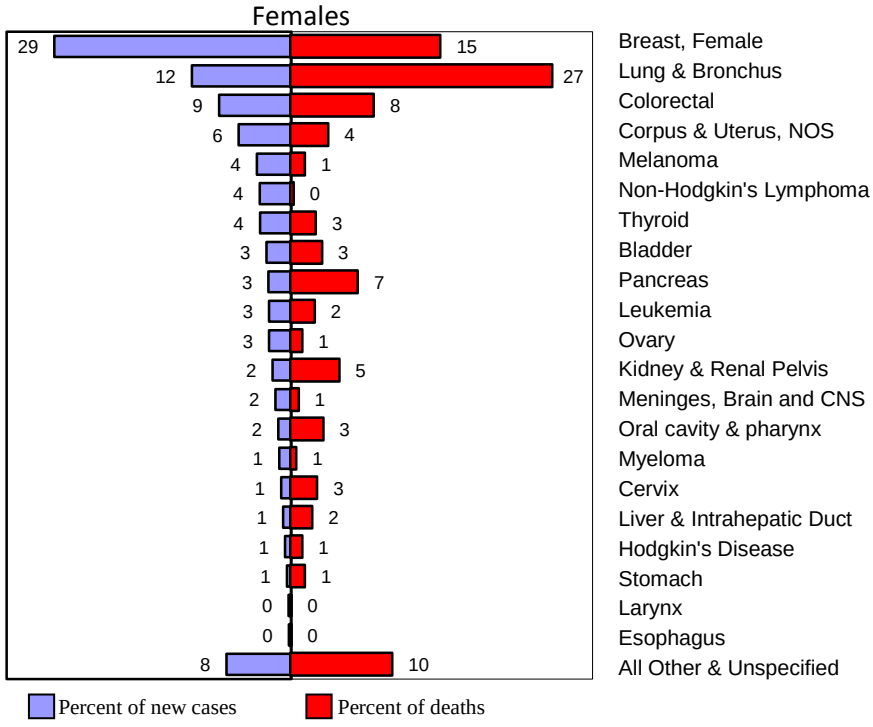
Note: Rates per 100,000 age-adjusted to the 2000 US standard population and 2012 SD estimated population.
Source: South Dakota Department of Health

V. CANCER CASES AND DEATHS BY RANK

Female breast cancer was the most common cancer diagnosed during 2012. The four most diagnosed cancers were female breast, prostate, lung and bronchus, and colorectal which accounted for 50.2% of the new cases diagnosed and 48% of cancer deaths. Figure 2 shows the percent of new cancer cases and deaths by rank and gender.

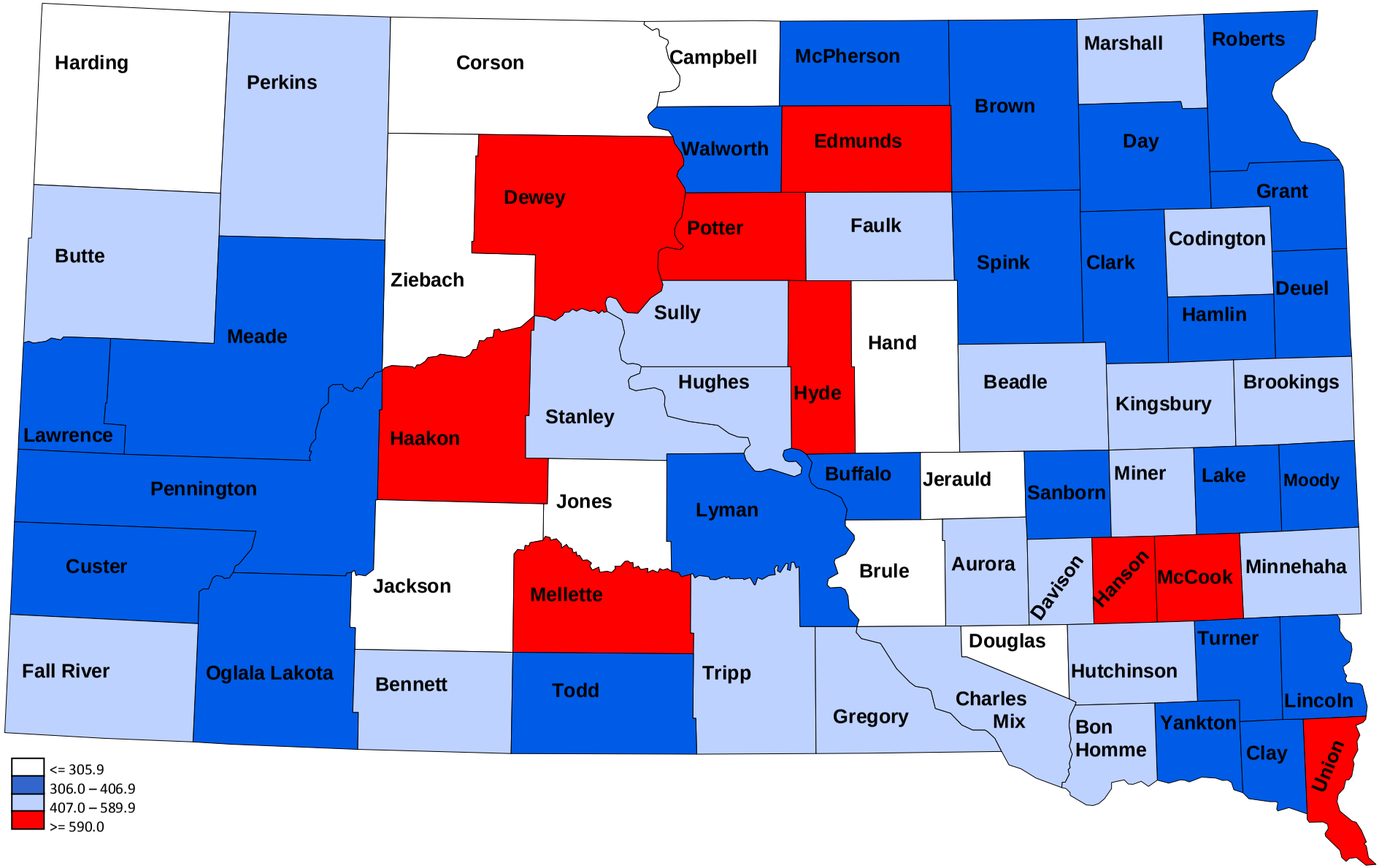
Figure 2: Percent Distribution of Cancer Cases and Deaths by Rank and Gender, South Dakota, 2012





Source: South Dakota Department of Health

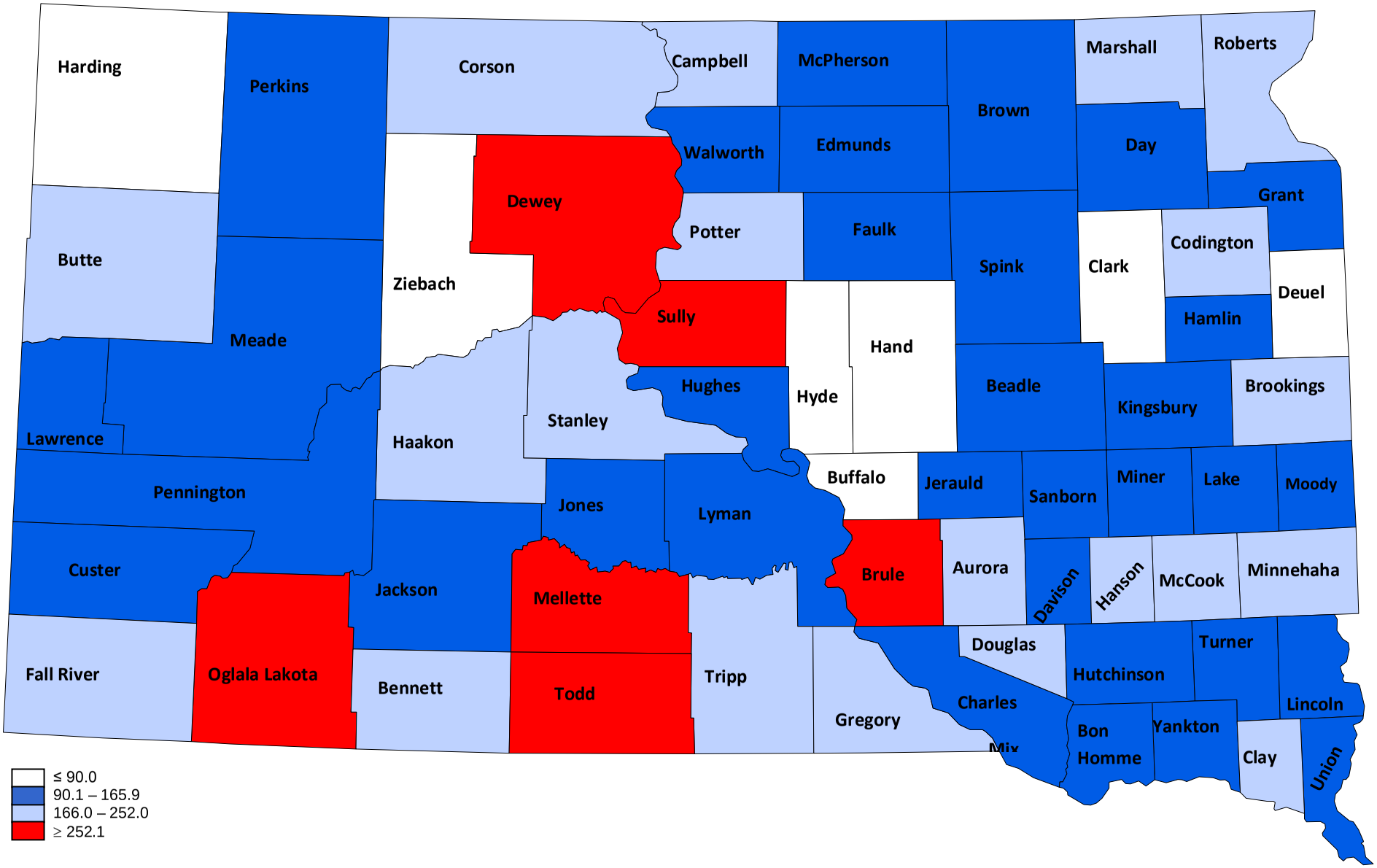
Figure 3: Cancer Incidence Rates by County, South Dakota, 2012



Note: Rates per 100,000 age-adjusted to 2000 US standard population and 2012 SD estimated population. Source: South Dakota Department of Health

South Dakota has an area of 77,121 square miles with a 2012 estimated population of 833,359 persons resulting in a population density of 10.7 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, 2012



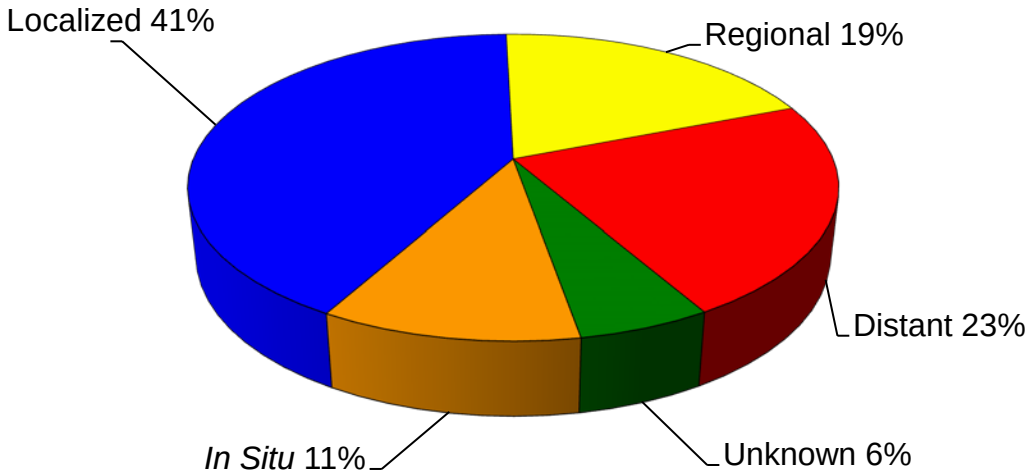
Note: Rates per 100,000 age-adjusted to 2000 US standard population and 2012 SD estimated population. Source: South Dakota Department of Health

South Dakota has an area of 77,121 square miles with a 2012 estimated population of 833,359 persons resulting in a population density of 10.7 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, 2012



Source: South Dakota Department of Health

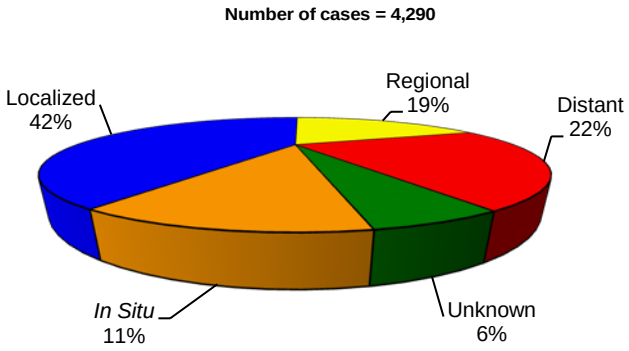
The figure above demonstrates the number of cases diagnosed at each stage of disease. For 2012, there were a total of 4,562 cases reported to the South Dakota State Cancer Registry, which includes *in situ* cases.

Table 5: South Dakota Stage at Diagnosis, All Cases, 2012

Stage	Number of Cases	Percent of Total
In Situ	498	11%
Localized	1891	41%
Regional	887	19%
Distant	1031	23%
Unknown	255	6%

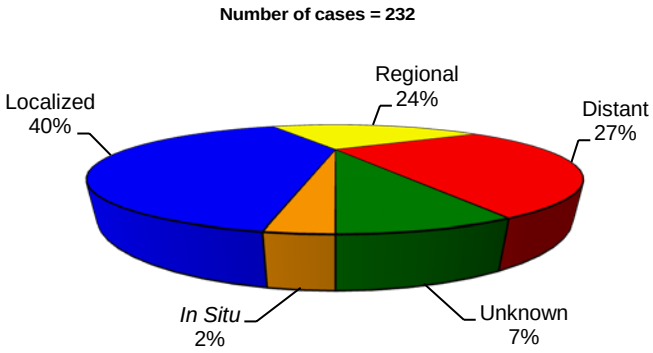
When analyzed by race, 42% of all cancer cases diagnosed for whites were diagnosed at localized stage and 40% for American Indians. American Indians had another 51% diagnosed at the regional and distant stages combined while the same stages for whites were a combined 41%. Stage at diagnosis by race was as follows:

Figure 6: Stage at Diagnosis in South Dakota, White, 2012



Source: South Dakota Department of Health

Figure 7: Stage at Diagnosis in South Dakota, American Indians, 2012



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.

Table 6: Stage at Diagnosis for Selected Sites by Race, South Dakota, 2012

	White						American Indian					
	Localized		Regional		Distant		Localized		Regional		Distant	
	Cases	%	Cases	%	Cases	%	Cases	%	Cases	%	Cases	%
Female Breast	415	23.3%	172	20.8%	39	4.1%	22	23.7%	11	20.0%	0	0.0%
Prostate	374	21.0%	65	7.9%	12	1.3%	17	18.3%	4	7.3%	3	4.8%
Lung and Bronchus	101	5.7%	121	14.7%	265	27.7%	3	3.2%	10	18.2%	19	30.6%
Colorectal	164	9.2%	135	16.4%	47	4.9%	6	6.5%	13	23.6%	8	12.9%
Melanoma of the Skin	168	9.4%	13	1.6%	15	1.6%	1	1.1%	0	0.0%	1	1.6%
Bladder	44	2.5%	16	1.9%	5	0.5%	1	1.1%	1	1.8%	0	0.0%
Non-Hodgkin's Lymphoma	46	2.6%	24	2.9%	88	9.2%	2	2.2%	1	1.8%	5	8.1%
Corpus and Uterus, NOS	78	4.4%	24	2.9%	10	1.0%	4	4.3%	0	0.0%	0	0.0%
Kidney and Renal Pelvis	69	3.9%	15	1.8%	23	2.4%	16	17.2%	0	0.0%	1	1.6%
Pancreas	17	1.0%	40	4.8%	56	5.8%	2	2.2%	0	0.0%	1	1.6%
Thyroid	58	3.3%	34	4.1%	2	0.2%	4	4.3%	3	5.5%	1	1.6%
Leukemia	3	0.2%	1	0.1%	128	13.4%	0	0.0%	0	0.0%	5	8.1%

Source: South Dakota Department of Health

VII. CANCER MORTALITY

Cancer age-adjusted death rates for 2012 ranged from a low of 68.4 in Hyde County to a high of 387.3 in Dewey County. South Dakota's age adjusted death rate was 161.2 in 2012 compared to a 5-year death rate of 163.7.

In 2012, five counties had a significantly lower rate than that of the entire state and one had a significantly higher rate. The five-year rates show nine counties having significantly lower rates and five counties with significantly higher rates. South Dakota's mortality rate for 2008-2012 was 163.7 per 100,000 persons.

The United States mortality rate for 2012 is not available. The United States mortality rate was 168.7 and the South Dakota mortality rate was 167.3 per 100,000 persons in 2011. South Dakota's mortality rate for 2012 is 161.2 per 100,000 persons.

The South Dakota 2012 mortality rates are displayed in a state map on page 15 of this report.

Table 7 : Cancer Deaths and Mortality Rates by County
South Dakota, 2012 and 2008-2012 Average

County	2012			2008-2012^		
	Deaths	Rate		Deaths	Rate	
South Dakota	1,623	161.2		1,599	163.7	
Aurora	10	231.5		7	151.0	
Beadle	37	146.8		41	169.2	
Bennett	8	229.7		6	175.9	
Bon Homme	15	157.0		15	142.2	
Brookings	55	192.4		43	156.0	
Brown	69	144.9		73	154.0	
Brule	18	262.8		14	190.1	
Buffalo	0	0.0		3	244.6	
Butte	25	181.9		27	210.4	▲
Campbell	6	216.3		4	127.7	
Charles Mix	19	145.8		23	181.0	
Clark	5	73.6	▼	9	131.8	
Clay	26	218.1		20	164.4	
Codington	63	187.7		58	175.5	
Corson	8	198.4		8	224.3	
Custer	24	153.6		22	172.4	
Davison	46	158.4		42	156.3	
Day	16	140.8		17	161.7	
Deuel	6	78.4	▼	8	113.4	▼
Dewey	17	387.3	▲	11	241.0	▲
Douglas	11	188.5		9	174.5	
Edmunds	11	135.1		10	147.3	
Fall River	22	172.0		25	183.3	
Faulk	6	135.1		5	105.4	▼
Grant	11	98.9		16	144.7	
Gregory	14	167.0		15	187.0	
Haakon	4	185.1		5	159.3	
Hamlin	11	145.7		12	154.1	
Hand	4	75.1	▼	7	116.4	▼
Hanson	6	186.0		6	184.7	
Harding	0	0.0		*	61.8	▼
Hughes	29	135.3		33	165.8	
Hutchinson	15	103.4		21	150.7	
Hyde	3	68.4	▼	3	133.5	
Jackson	4	152.8		4	147.7	
Jerauld	5	96.6		7	202.1	
Jones	*	107.0		*	123.7	
Kingsbury	12	136.5		14	157.1	
Lake	26	152.4		27	162.9	
Lawrence	56	162.5		53	162.3	
Lincoln	49	117.4	▼	46	138.9	▼
Lyman	8	165.1		6	144.1	
McCook	18	223.3		18	213.2	▲
McPherson	6	98.5		4	76.7	▼
Marshall	14	194.7		14	197.0	
Meade	44	158.8		43	169.0	
Mellette	6	311.5		5	242.7	
Miner	5	141.6		9	191.7	
Minnehaha	321	184.9		304	173.7	
Moody	15	164.8		13	161.9	
Oglala Lakota	18	266.8		15	217.7	▲
Pennington	184	151.4		183	160.0	
Perkins	8	163.2		10	181.1	
Potter	9	192.6		10	199.0	
Roberts	26	198.7		27	197.0	
Sanborn	5	143.0		4	105.5	▼
Spink	14	139.5		15	135.4	
Stanley	7	182.5		7	194.6	
Sully	6	279.0		3	172.0	
Todd	15	257.2		13	243.7	▲
Tripp	17	185.5		14	144.9	
Turner	18	137.6		19	144.5	
Union	31	163.3		30	176.0	
Walworth	14	137.6		14	137.6	
Yankton	39	124.1		41	139.0	▼
Ziebach	0	0.0		*	143.3	

* 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 2012 estimated population. Source: South Dakota Department of Health

Table 8: Age-adjusted Mortality Rates by County for Selected Sites, 2012

	Colorectal		Lung and Bronchus		Female Breast		Prostate		Bladder		NHL	
	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate
South Dakota	**164**	**15.9**	**433**	**43.3**	**107**	**19.1**	**75**	**17.8**	**43**	**4.0**	**63**	**6.1**
Aurora	*	34.5	4	99.6	*	110.7	*	95.2	0	0.0	0	0.0
Beadle	6	23.2	4	16.2	4	27.0	*	19.7	*	4.9	3	10.4
Bennett	*	55.5	*	59.0	0	0.0	0	0.0	0	0.0	0	0.0
Bon Homme	*	12.7	4	39.2	0	0.0	0	0.0	*	7.6	*	13.0
Brookings	3	9.9	15	53.2	*	7.7	4	34.9	*	2.9	4	15.9
Brown	7	11.7	23	50.3	7	29.8	0	0.0	0	0.0	3	7.8
Brule	*	31.9	6	93.6	0	0.0	*	31.4	*	15.3	*	23.0
Buffalo	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Butte	*	13.8	5	36.5	*	16.4	3	50.8	*	8.5	*	7.8
Campbell	*	31.0	*	38.3	*	45.6	0	0.0	0	0.0	0	0.0
Charles Mix	0	0.0	4	29.7	3	37.0	0	0.0	0	0.0	*	8.9
Clark	0	0.0	*	10.7	*	36.5	0	0.0	0	0.0	0	0.0
Clay	*	20.7	12	97.4	*	13.9	3	68.3	0	0.0	*	18.7
Codington	8	22.0	15	47.0	4	19.5	4	26.9	0	0.0	3	8.0
Corson	*	64.5	*	21.4	*	40.0	0	0.0	0	0.0	0	0.0
Custer	3	17.5	6	30.9	*	9.6	*	23.9	0	0.0	*	4.7
Davison	0	0.0	19	68.9	3	11.5	*	8.1	*	3.4	4	13.7
Day	0	0.0	3	28.4	*	28.8	5	102.0	0	0.0	*	8.6
Deuel	0	0.0	*	17.3	0	0.0	0	0.0	*	11.3	0	0.0
Dewey	*	43.8	6	150.3	*	43.5	*	62.0	0	0.0	0	0.0
Douglas	*	41.8	4	75.5	*	37.0	0	0.0	0	0.0	*	15.8
Edmunds	*	9.0	3	47.3	0	0.0	*	28.1	*	9.0	0	0.0
Fall River	3	20.2	7	54.3	*	22.7	*	16.5	*	7.3	*	8.3
Faulk	0	0.0	3	67.6	0	0.0	0	0.0	*	23.9	0	0.0
Grant	*	6.5	3	28.0	0	0.0	0	0.0	0	0.0	0	0.0
Gregory	*	14.1	6	70.3	0	0.0	0	0.0	0	0.0	*	11.4
Haakon	*	85.9	*	38.0	0	0.0	0	0.0	0	0.0	*	29.4
Hamlin	*	15.4	*	39.6	0	0.0	3	84.9	0	0.0	0	0.0
Hand	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Hanson	0	0.0	*	40.3	*	36.9	0	0.0	0	0.0	0	0.0
Harding	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Hughes	4	18.5	3	19.1	*	17.2	0	0.0	*	3.5	3	13.3
Hutchinson	3	17.1	*	12.5	0	0.0	3	36.9	0	0.0	*	10.1
Hyde	0	0.0	0	0.0	0	0.0	*	81.6	0	0.0	*	22.8
Jackson	0	0.0	*	68.5	0	0.0	0	0.0	0	0.0	0	0.0
Jerauld	*	34.1	*	23.5	0	0.0	*	55.4	0	0.0	0	0.0
Jones	*	47.0	0	0.0	*	100.0	0	0.0	0	0.0	0	0.0
Kingsbury	0	0.0	3	33.1	*	38.9	0	0.0	*	9.1	*	13.1
Lake	*	7.6	4	25.7	*	21.0	*	14.2	*	6.6	*	7.6
Lawrence	3	7.5	14	43.6	*	10.2	7	51.9	3	7.0	5	13.9
Lincoln	4	10.2	7	16.7	8	32.2	*	6.4	*	4.6	*	5.6
Lyman	3	66.9	4	77.4	0	0.0	0	0.0	0	0.0	0	0.0
McCook	*	16.9	6	76.9	0	0.0	*	25.6	0	0.0	0	0.0
McPherson	*	21.4	*	30.6	*	18.2	*	47.4	0	0.0	0	0.0
Marshall	*	27.9	5	70.3	*	22.9	*	31.0	0	0.0	0	0.0
Meade	7	25.8	15	57.5	*	6.1	*	11.4	*	8.4	*	3.0
Mellette	*	36.1	*	44.3	*	132.4	0	0.0	0	0.0	0	0.0
Miner	0	0.0	*	31.4	0	0.0	0	0.0	0	0.0	0	0.0
Minnehaha	32	18.7	89	51.3	17	17.1	11	17.0	9	4.4	10	5.1
Moody	*	15.4	5	56.4	*	14.5	*	28.2	*	9.6	0	0.0
Oglala Lakota	*	8.6	4	48.4	0	0.0	*	46.6	0	0.0	0	0.0
Pennington	15	12.0	47	37.3	13	18.9	7	14.9	5	4.2	3	2.4
Perkins	*	16.8	3	46.3	*	34.6	0	0.0	0	0.0	0	0.0
Potter	*	17.9	4	93.1	0	0.0	0	0.0	0	0.0	0	0.0
Roberts	4	26.5	3	23.0	*	20.6	0	0.0	*	6.2	*	6.2
Sanborn	*	20.3	*	58.1	0	0.0	0	0.0	0	0.0	0	0.0
Spink	*	16.7	7	65.6	*	33.4	0	0.0	*	8.8	0	0.0
Stanley	*	40.9	3	54.0	*	142.1	0	0.0	0	0.0	0	0.0
Sully	*	50.4	*	49.1	0	0.0	0	0.0	0	0.0	0	0.0
Todd	4	65.9	4	72.1	0	0.0	0	0.0	0	0.0	0	0.0
Tripp	*	23.3	4	38.1	0	0.0	0	0.0	*	12.8	0	0.0
Turner	*	7.1	*	16.6	5	49.7	*	15.1	0	0.0	0	0.0
Union	5	25.8	7	34.4	3	26.1	0	0.0	*	5.1	*	5.1
Walworth	*	11.7	3	29.0	*	12.3	*	22.2	*	6.8	*	16.5
Yankton	5	12.7	13	43.3	4	25.0	3	22.5	*	8.4	*	4.2
Ziebach	0	0.0	0	0.0	0	0.0	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 2012 SD estimated population.
Source: South Dakota Department of Health

Table 9: Age-adjusted Mortality Rates by Site, Gender, and Race, South Dakota, 2012

	TOTAL		MALE		FEMALE		WHITE		AMERICAN INDIAN	
	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate
Total	**1,623**	**161.2**	**854**	**191.1**	**769**	**140.1**	**1,501**	**156.8**	**112**	**298.4**
Oral Cavity	**29**	**3.0**	**21**	**4.6**	**8**	**1.5**	**26**	**2.9**	**3**	**6.4**
Lip	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Tongue	8	0.9	4	0.8	4	0.9	8	0.9	0	0.0
Salivary Gland	4	0.4	4	0.9	0	0.0	4	0.4	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	4	0.8	2	0.3	4	0.4	2	3.3
Nasopharynx	3	0.3	3	0.6	0	0.0	3	0.3	0	0.0
Hypopharynx	2	0.2	2	0.4	0	0.0	2	0.2	0	0.0
Tonsil	1	0.1	1	0.3	0	0.0	1	0.1	0	0.0
Oropharynx	3	0.3	2	0.4	1	0.2	3	0.3	0	0.0
Other Oral Cavity and Pharynx	2	0.2	1	0.3	1	0.2	1	0.1	1	3.1
Digestive System	**403**	**39.7**	**223**	**49.3**	**180**	**32.1**	**367**	**37.9**	**31**	**82.7**
Esophagus	43	4.1	37	7.9	6	1.2	39	3.9	3	7.5
Stomach	14	1.4	7	1.6	7	1.2	11	1.1	2	6.0
Small Intestine	4	0.4	3	0.7	1	0.2	4	0.4	0	0.0
Colorectal	164	15.9	84	18.7	80	14.1	152	15.5	9	24.2
Colon Excluding Rectum	136	13.1	66	14.7	70	12.2	126	12.7	9	24.2
Rectum and Rectosigmoid	28	2.8	18	4.0	10	1.9	26	2.8	0	0.0
Anus, Anal Canal and Anorectum	3	0.3	1	0.2	2	0.4	3	0.3	0	0.0
Liver and Intrahepatic Bile Duct	56	5.7	34	7.4	22	4.0	44	4.7	12	28.6
Gallbladder	9	0.8	2	0.5	7	1.2	8	0.7	1	3.9
Other Biliary	4	0.4	3	0.6	1	0.2	4	0.4	0	0.0
Pancreas	105	10.5	52	11.8	53	9.3	101	10.7	4	12.6
Retroperitoneum	1	0.1	0	0.0	1	0.2	1	0.1	0	0.0
Peritoneum, Omentum and Mesentery	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Respiratory	**442**	**44.2**	**259**	**57.4**	**183**	**34.4**	**405**	**42.8**	**35**	**102.7**
Nose, Nasal Cavity and Middle Ear	1	0.1	1	0.2	0	0.0	1	0.1	0	0.0
Larynx	7	0.8	6	1.5	1	0.2	5	0.6	2	5.6
Lung and Bronchus	433	43.3	251	55.4	182	34.2	398	42.1	33	97.1
Pleura	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Mediastinum and Other Resp Organs	1	0.1	1	0.2	0	0.0	1	0.1	0	0.0
Bones and Joints	**3**	**0.3**	**3**	**0.7**	**0**	**0.0**	**2**	**0.2**	**1**	**3.9**
Soft Tissue	**12**	**1.2**	**6**	**1.2**	**6**	**1.3**	**11**	**1.2**	**1**	**1.6**
Skin	**29**	**2.9**	**21**	**4.6**	**8**	**1.5**	**27**	**2.7**	**1**	**2.0**
Melanomas Skin	19	1.9	12	2.6	7	1.4	17	1.7	1	2.0
Other Nonepithelial Skin	10	1.0	9	2.0	1	0.2	10	1.0	0	0.0
Breast	**108**	**10.5**	**1**	**0.2**	**107**	**19.1**	**101**	**10.5**	**7**	**17.5**
Breast, Female	107	19.1			107	19.1	100	24.0	7	30.9
Breast, Male	1	0.2	1	0.2			1	0.2	0	0.0
Female	**76**	**14.7**			**76**	**14.7**	**68**	**16.7**	**6**	**23.4**
Vulva	4	0.7			4	0.7	4	1.0	0	0.0
Vagina	0	0.0			0	0.0	0	0.0	0	0.0
Cervix Uteri	9	1.9			9	1.9	6	1.4	3	10.4
Corpus and Uterus, NOS	25	4.9			25	4.9	24	5.9	1	3.7
Corpus Uteri	17	3.3			17	3.3	16	4.0	1	3.7
Uterus, NOS	8	1.6			8	1.6	8	1.9	0	0.0
Ovary	37	7.1			37	7.1	33	8.1	2	9.4
Other Female Genital Organs	1	0.1			1	0.1	1	0.2	0	0.0

Table 9: Age-adjusted Mortality Rates by Site, Gender, and Race, South Dakota, 2012 (continued)

	TOTAL		MALE		FEMALE		WHITE		AMERICAN INDIAN	
	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate
Male	**75**	**17.8**	**75**	**17.8**			**74**	**13.1**	**1**	**9.4**
Penis	0	0.0	0	0.0			0	0.0	0	0.0
Prostate	75	17.8	75	17.8			74	13.1	1	9.4
Testis	0	0.0	0	0.0			0	0.0	0	0.0
Other Male Genital Organs	0	0.0	0	0.0			0	0.0	0	0.0
Urinary	**96**	**9.4**	**63**	**14.0**	**33**	**6.1**	**92**	**9.5**	**4**	**13.4**
Bladder	43	4.0	31	6.9	12	2.2	42	4.1	1	4.6
Kidney and Renal Pelvis	50	5.2	32	7.1	18	3.5	47	5.1	3	8.8
Ureter	2	0.2	0	0.0	2	0.3	2	0.2	0	0.0
Other Urinary Organs	1	0.1	0	0.0	1	0.1	1	0.1	0	0.0
Eye and Orbit	**0**	**0.0**	**0**	**0.0**	**0**	**0.0**	**0**	**0.0**	**0**	**0.0**
Brain and CNS	**52**	**5.3**	**28**	**6.1**	**24**	**4.4**	**49**	**5.3**	**3**	**6.5**
Brain	50	5.1	27	5.9	23	4.3	47	5.1	3	6.5
Meninges and CNS	2	0.2	1	0.2	1	0.1	2	0.2	0	0.0
Endocrine	**1**	**0.1**	**0**	**0.0**	**1**	**0.2**	**1**	**0.1**	**0**	**0.0**
Thyroid	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Other Endocrine	1	0.1	0	0.0	1	0.2	1	0.1	0	0.0
Lymphomas	**67**	**6.5**	**38**	**8.4**	**29**	**4.9**	**65**	**6.6**	**2**	**4.9**
Hodgkin's Disease	4	0.4	2	0.4	2	0.3	4	0.4	0	0.0
Non-Hodgkin's Lymphomas	63	6.1	36	8.0	27	4.6	61	6.2	2	4.9
Multiple Myeloma	**41**	**3.9**	**17**	**3.8**	**24**	**3.8**	**39**	**3.9**	**2**	**4.7**
Leukemia	**69**	**7.4**	**38**	**9.1**	**31**	**6.1**	**65**	**7.6**	**4**	**7.9**
Acute Lymphocytic	4	0.5	1	0.2	3	0.8	4	0.6	0	0.0
Chronic Lymphocytic	13	1.2	6	1.3	7	1.0	13	1.2	0	0.0
Other Lymphocytic	1	0.1	1	0.3	0	0.0	1	0.1	0	0.0
Acute Myeloid	28	3.0	17	4.0	11	2.2	26	3.0	2	3.1
Acute Monocytic	2	0.3	1	0.3	1	0.2	2	0.3	0	0.0
Chronic Myeloid	4	0.5	3	0.8	1	0.2	4	0.5	0	0.0
Other Myeloid/Monocytic	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Other Acute Leukemia	6	0.7	3	0.7	3	0.7	6	0.7	0	0.0
Other Leukemia	11	1.2	6	1.4	5	1.0	9	1.1	2	4.7
Mesothelioma	**6**	**0.6**	**5**	**1.2**	**1**	**0.2**	**5**	**0.5**	**1**	**1.7**
Immunoproliferative Diseases	**0**	**0.0**	**0**	**0.0**	**0**	**0.0**	**0**	**0.0**	**0**	**0.0**
Ill-Defined and Unspecified Sites	**114**	**10.9**	**56**	**12.6**	**58**	**9.8**	**104**	**10.4**	**10**	**26.2**

Rates per 100,000 age-adjusted to the 2000 US standard population and 2012 SD estimated population.
Source: South Dakota Department of Health

Table 9 shows death and age-adjusted death rates by SEER recode primary sites (Appendix D), gender and race. Approximately 1,600 persons die from cancer in South Dakota each year with little or no change in counts. Overall more males than females die from cancer, but that is starting to change as recent years of data have started to show (data not shown here).

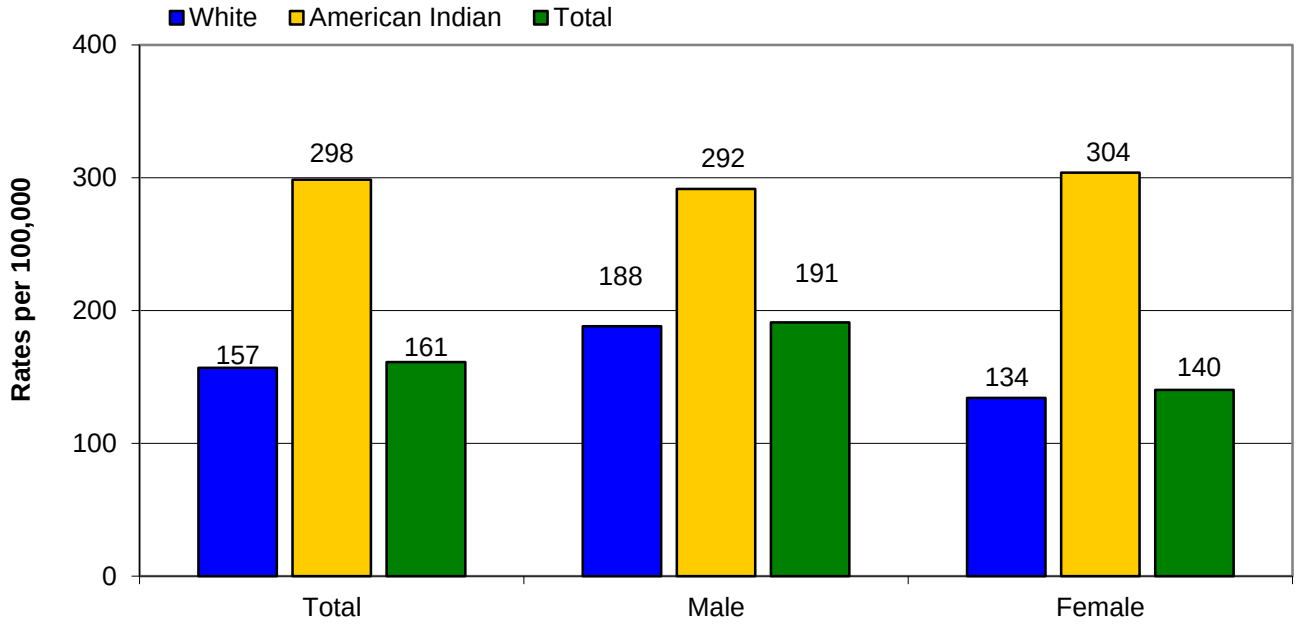
Table 10: Percentage of Cancer Deaths by Age Groups and Selected Primary Sites, South Dakota, 2012

Age Group	0-19	20-34	35-49	50-64	65-74	75-84	85+
All Sites	1%	0%	4%	22%	23%	29%	21%
Bladder	0%	0%	2%	21%	9%	28%	40%
Female Breast	0%	0%	6%	24%	18%	25%	27%
Colorectal	0%	1%	4%	19%	18%	32%	26%
Corpus and Uterus, NOS	0%	0%	8%	20%	32%	24%	16%
Meninges, Brain and CNS	4%	0%	10%	35%	13%	25%	13%
Kidney and Renal Pelvis	0%	2%	6%	24%	26%	28%	14%
Leukemia	7%	3%	9%	16%	19%	32%	14%
Lung and Bronchus	0%	0%	2%	24%	27%	33%	14%
Melanoma of the Skin	0%	0%	5%	37%	26%	16%	16%
Non-Hodgkin's Lymphoma	0%	0%	5%	16%	27%	29%	24%
Pancreas	0%	0%	2%	22%	31%	30%	14%
Prostate	0%	0%	1%	9%	16%	35%	39%

Source: South Dakota Department of Health

Overall, in 2012 more persons 75 to 84 years of age died from cancer in South Dakota than any other age group (Table 10). However, there would be cause for concern if too many people die from cancer at a young age.

Figure 8: All Sites Cancer Mortality Rates by Race, and Gender, South Dakota, 2012



Note: Rates per 100,000 age-adjusted to 2000 US standard population and 2012 SD estimated population.
Source: South Dakota Department of Health

Figure 8 illustrates that American Indian females had a higher death rate than any other group. In recent years males have had higher death rates than females, however in 2012 this was not seen. American Indian males and females had higher death rates than whites.

VIII. YEARS OF POTENTIAL LIFE LOST

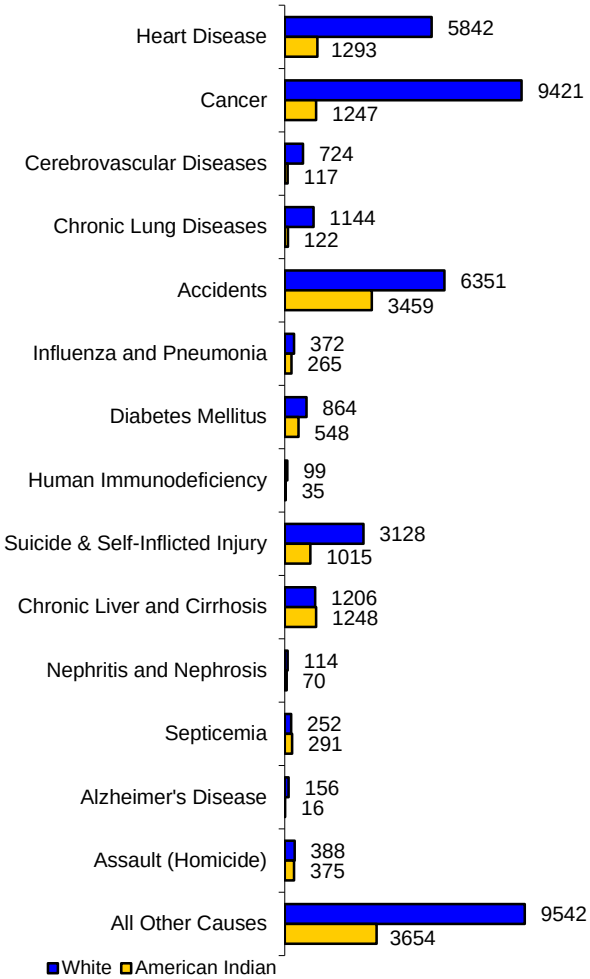
In both 2012 and the five-year period 2008 to 2012, cancer ranked number one in years of potential years lost (YPLL). The number of years lost are shown in Figures 9 and 10 by race. There were 10,816 years of potential years lost due to cancer in 2012, compared to 9,904 years in 2008.

Table 11: Leading Causes of Years of Potential Life Lost (to 75 years of age), South Dakota, 2012

Cancer	10,816
Accidents	10,111
Heart Disease	7,401
Suicide and Self-Inflicted Injury	4,268
Chronic Liver and Cirrhosis	2,472
Diabetes Mellitus	1,459
Chronic Lung Diseases	1,278
Cerebrovascular Disease	851
Homicide	837
Influenza and Pneumonia	652
Septicemia	543
All Other Causes	14,953

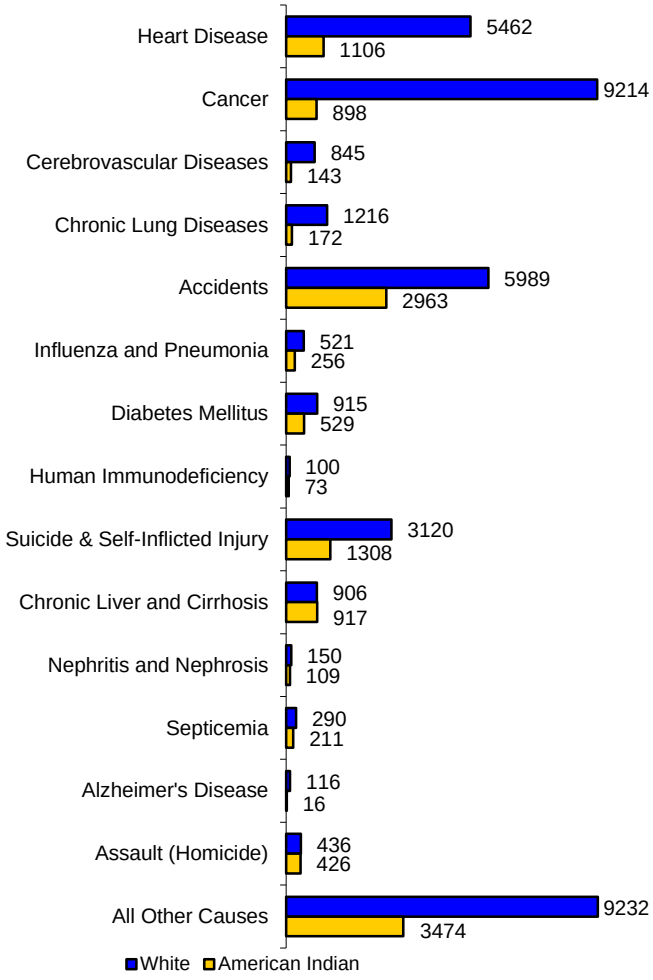
Source: South Dakota Department of Health

Figure 9: Years of Potential Life Lost (YPLL) Before Age 75 for the Leading Causes of Death by Race, South Dakota, 2012



Source: South Dakota Department of Health

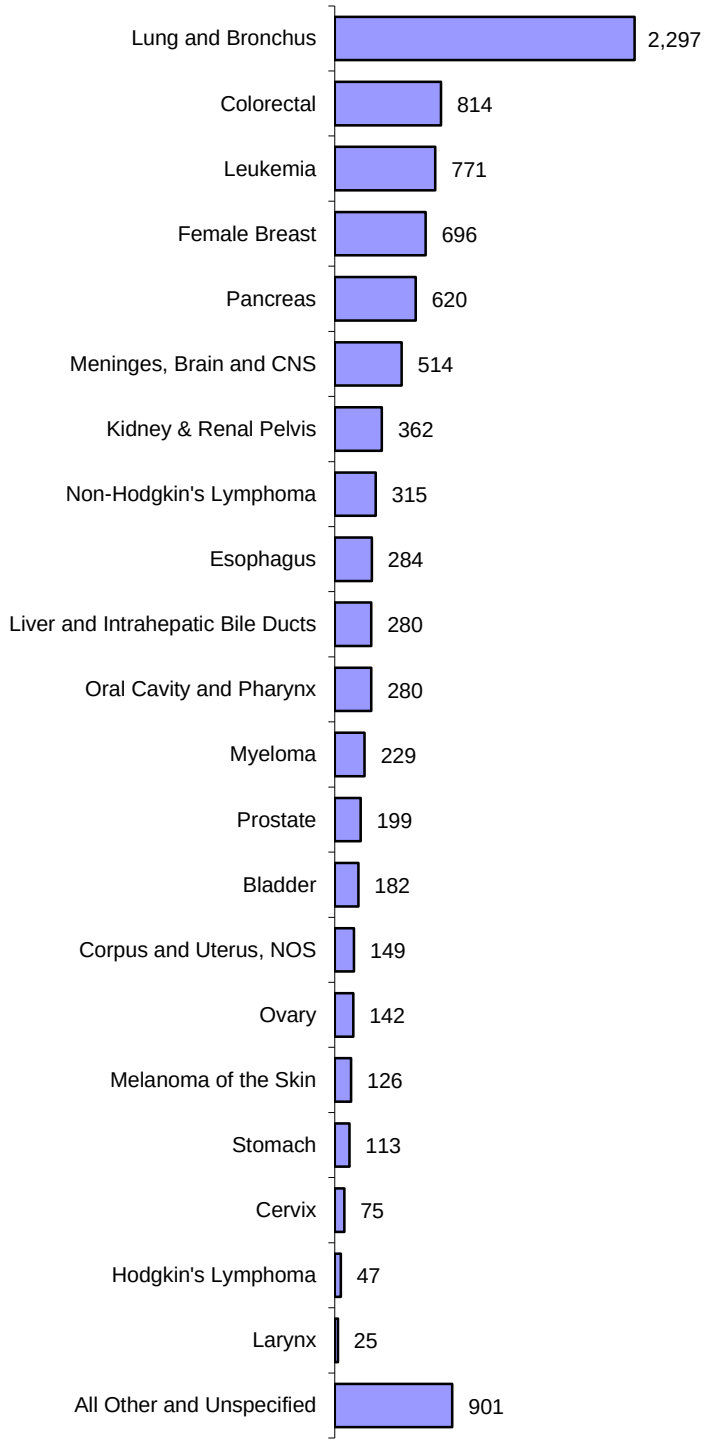
Figure 10: Years of Potential Life Lost (YPLL) Before Age 75 for the Leading Causes of Death by Race, South Dakota 2008-2012 Average*



* Number of years are averaged over the five-year period.
Source: South Dakota Department of Health

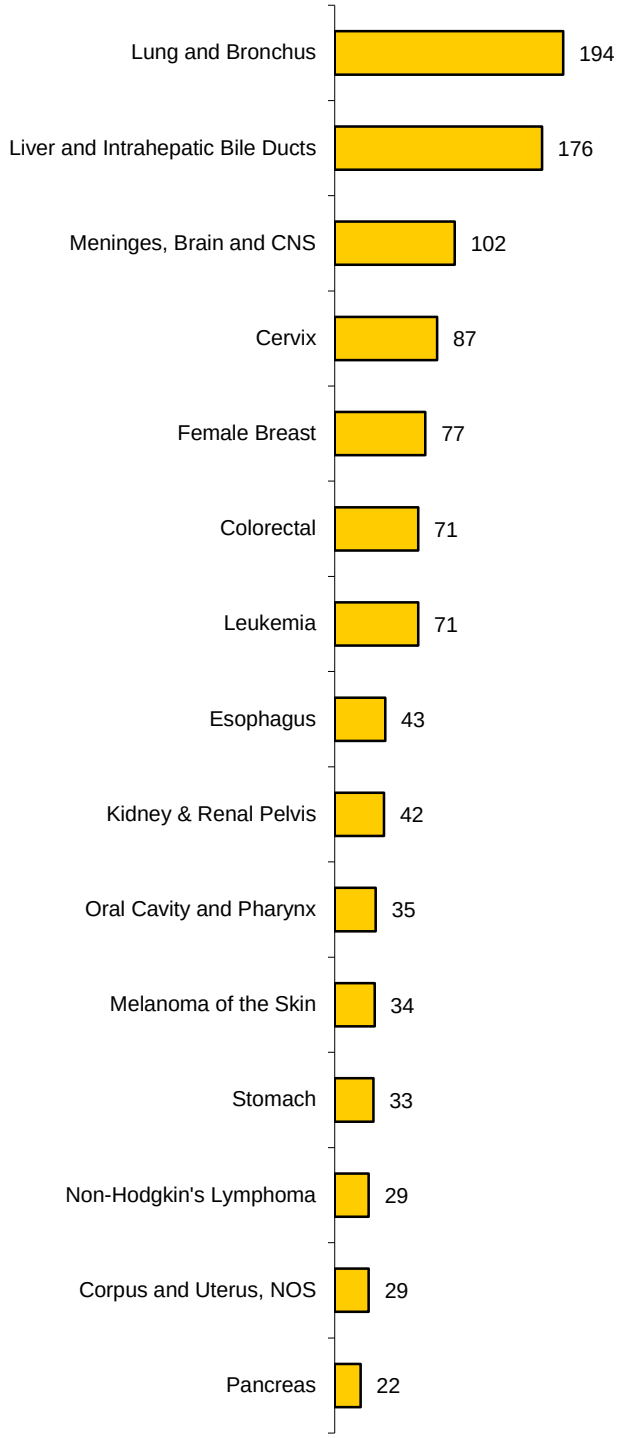
The differences in YPLL in Figures 11 and 12 reflect the number of cancer cases by primary sites by race. For example, the YPLL for lung and bronchus for whites was 2,297 for 208 deaths whereas the YPLL for American Indians was 194 years for 19 deaths which occurred during 2012. Not all cancers were present among the American Indian population during 2012, hence the differences in the cancer sites presented.

Figure 11: Years of Potential Life Lost for Selected Cancers Among Whites, South Dakota, 2012



Source: South Dakota Department of Health

Figure 12: Years of Potential Life Lost for Selected Cancers Among American Indians, South Dakota, 2012

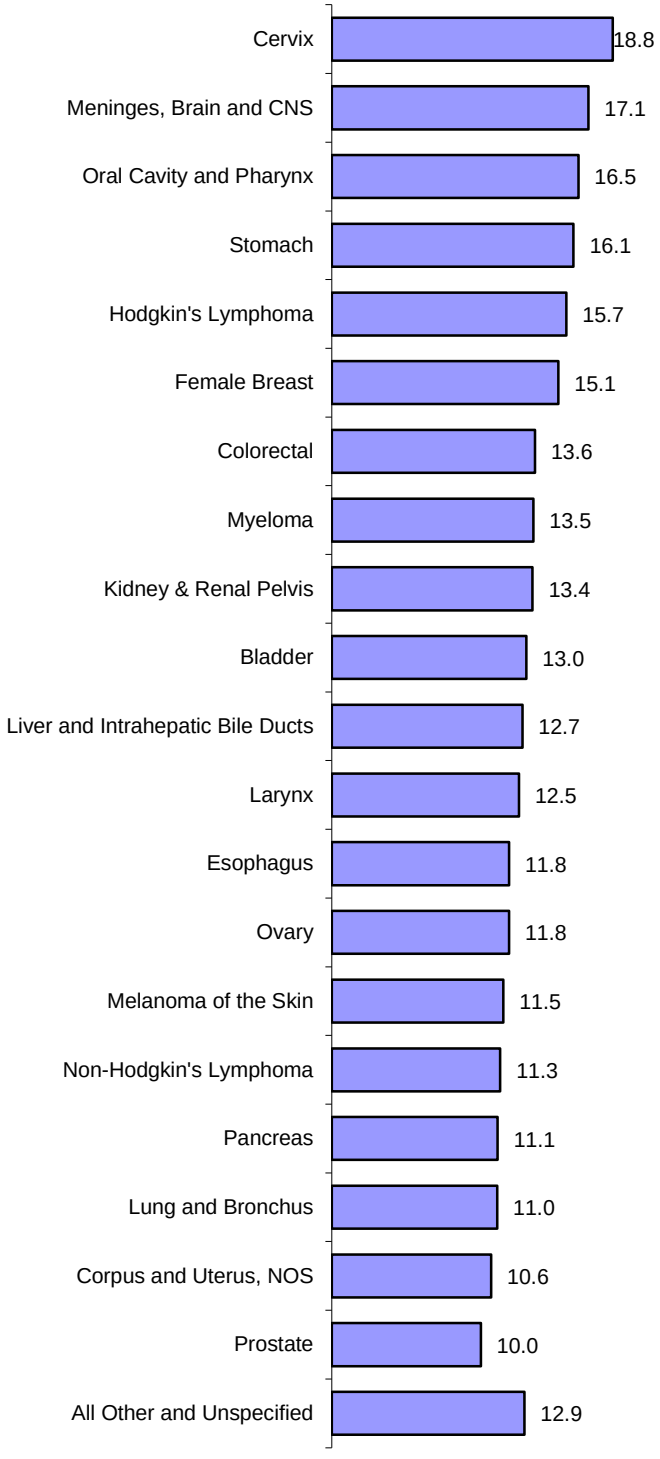


Source: South Dakota Department of Health

IX. AVERAGE YEARS OF LIFE LOST

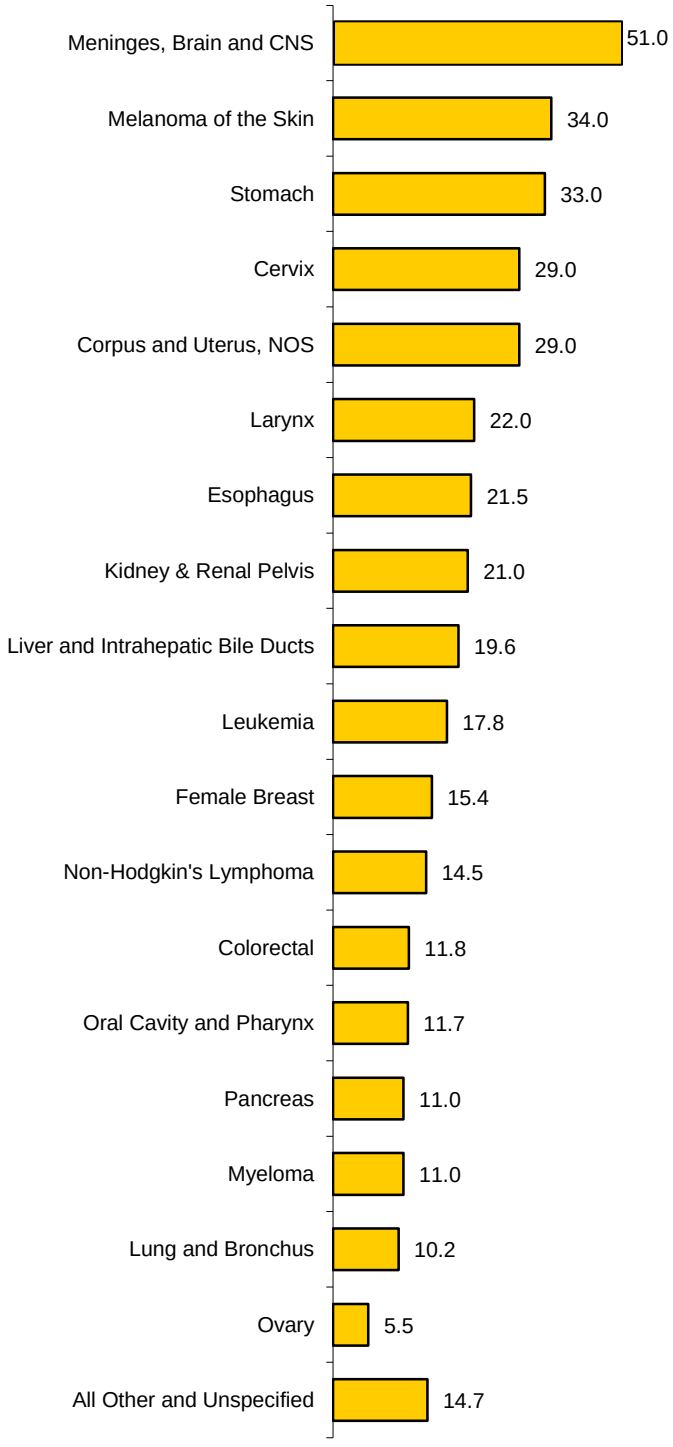
South Dakota's average years of life lost (AYLL) due to cancer in 2012 was 13.0 years, a slight decrease from 13.9 years in 2009. Female breast cancer ranked 11th among cancer sites for American Indians at 15.4 years compared to whites where it ranked 7th with an average of 15.1 years.

Figure 13: Average Years of Life Lost for Selected Cancers Among Whites, South Dakota, 2012



Source: South Dakota Department of Health

Figure 14: Average Years of Life Lost for Selected Cancers Among American Indians, South Dakota, 2012



Source: South Dakota Department of Health

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.

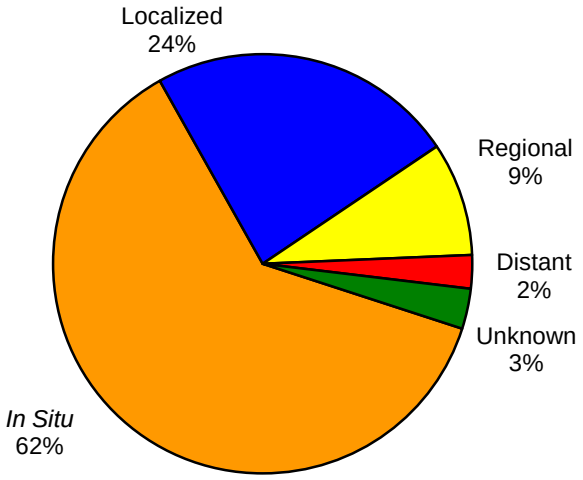
BLADDER

Table 12: Bladder Incidence and Mortality Summary, 2012

Bladder Cancer			Incidence			Mortality		
			Total	Male	Female	**Total**	Male	Female
South Dakota	**Total**	# Cases / Deaths	**194**	133	61	**43**	31	12
		Age Adjusted Rate	**19.3**	30.0	10.8	**4.0**	6.9	2.2
	White	# Cases / Deaths	**189**	131	58	**42**	30	12
		Age Adjusted Rate	**20.0**	31.1	11.0	**4.1**	6.9	2.3
	American Indian	# Cases / Deaths	**4**	2	2	**1**	1	0
		Age Adjusted Rate	**12.6**	20.3	9.4	**4.6**	16.9	0.0
United States	**Total**	Age Adjusted Rate	*** 19.7**	* 34.6	* 8.4	*** 4.4**	* 7.6	* 2.2
	White	Age Adjusted Rate	*** 21.5**	* 37.7	* 9.0	*** 4.6**	* 8.1	* 2.2
	American Indian	Age Adjusted Rate	*** 8.3**	* 17.0	* 2.6	*** 2.6**	* 4.4	* 1.5

[1]Includes *in situ* bladder; Rates per 100,000 age-adjusted to 2000 US standard population and 2012 SD estimated population.
* US Mortality rates are from 2011, the 2012 rate is not available at this time. US rates www.seer.cancer.gov
Source: South Dakota Department of Health

Figure 15: Bladder Cancer Stage at Diagnosis, South Dakota, 2012



Source: South Dakota Department of Health

Descriptive Epidemiology

Stage at Diagnosis: Cancer is categorized as noninvasive and invasive. There were 120 noninvasive bladder cancers reported in 2012. There were 74 invasive. Sixty-two percent of all bladder cancer cases were diagnosed at noninvasive, *in situ* stage. Nationally 50% of the cases of urinary bladder cancer are diagnosed at the *in situ* stage. In South Dakota, 2% of the cases were not diagnosed until the disease had spread to distant sites. In the United States, distant stage accounted for 4% of the bladder cancers reported.

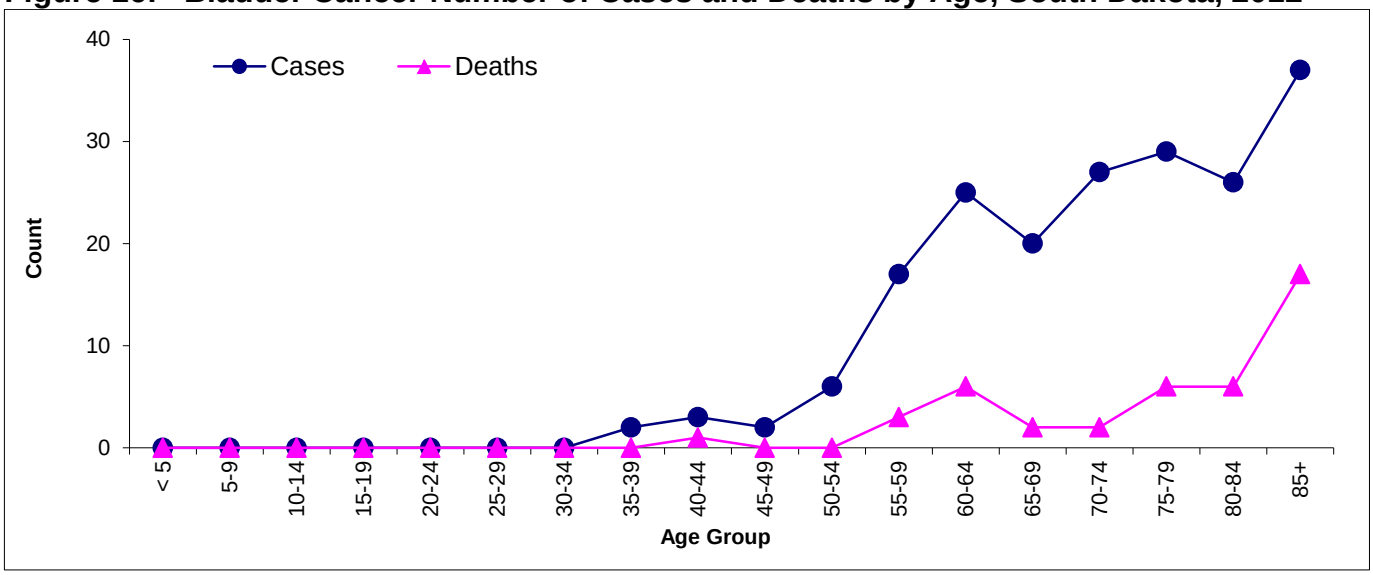
Incidence: In 2012, it was estimated that over 73,510 cases of bladder cancer would be diagnosed in the United States. There were 194 cases of bladder cancer reported in South Dakota. There were 133 men and 61 women diagnosed with bladder cancer in 2012. Statistically, men were diagnosed twice as often as women. There were only four American Indian cases diagnosed in 2012. In the United States it was the fifth most frequent cancer. In South Dakota it was the sixth most frequent cancer diagnosed.

Mortality: Over half (62%) of all bladder cancer cases reported in South Dakota were noninvasive in 2012. 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 70 and above have the highest mortality. In 2012, the South Dakota mortality rate was 4.0 compared to the US (2011) rate which was 4.4.

Risk and Associated Factors: Bladder cancer was one of the first malignancies associated with industrialization. Not surprisingly, the incidence continues to rise. Cigarette smoking increases the risk for 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 suggestions for prevention.

Figure 16: Bladder Cancer Number of Cases and Deaths by Age, South Dakota, 2012



Source: South Dakota Department of Health

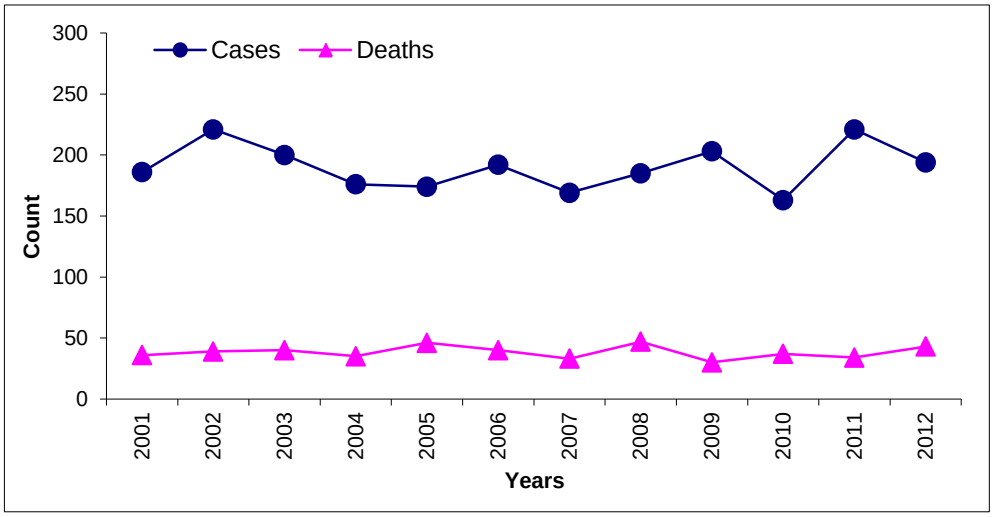


Figure 17: Bladder Cancer Cases and Deaths by Year, South Dakota, 2001 - 2012

Bladder cancer cases declined in 2012 after tying an all-time high of 221 cases in 2011 the same number as in 2002.

Source: South Dakota Department of Health

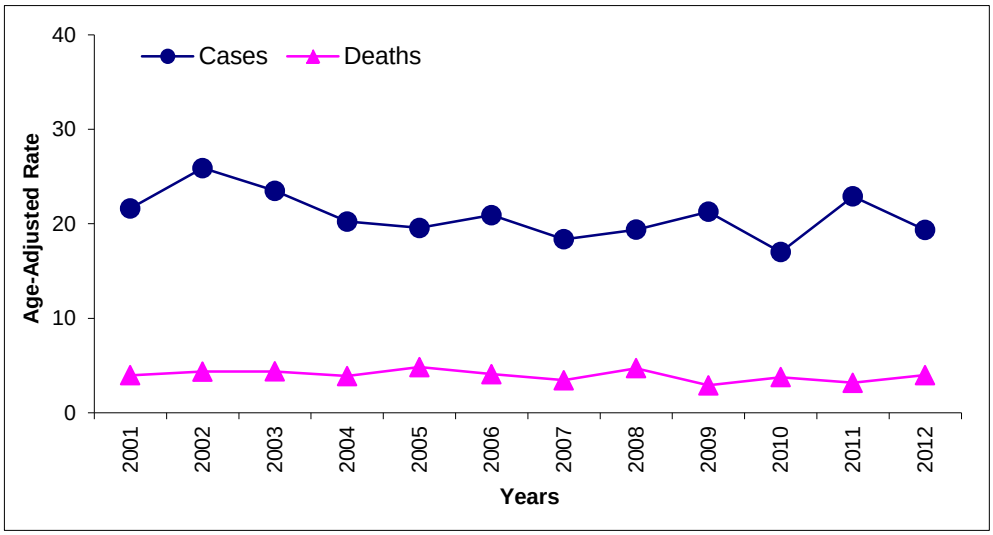


Figure 18: Bladder Cancer Age-Adjusted Rates, Cases, and Deaths by Year, South Dakota, 2001 - 2012

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

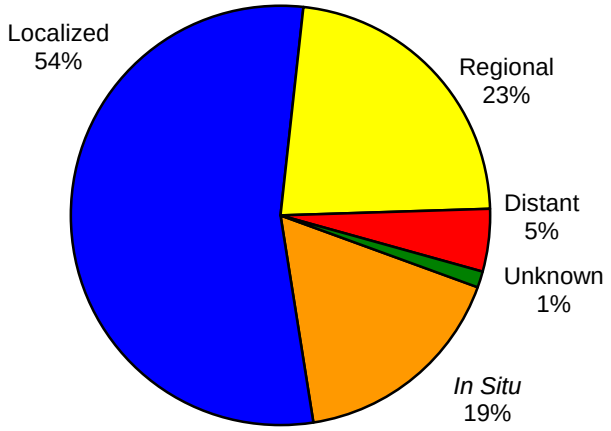
BREAST (FEMALE)

Table 13: Female Breast Incidence and Mortality Summary, 2012

Female Breast Cancer			Incidence	Mortality
South Dakota	Total	# Cases / Deaths	672	107
		Age Adjusted Rate	141.4	19.1
	White	# Cases / Deaths	633	100
		Age Adjusted Rate	144.1	19.0
	American Indian	# Cases / Deaths	35	7
		Age Adjusted Rate	123.7	30.9
United States	Total	Age Adjusted Rate	* 124.3	* 21.5
	White	Age Adjusted Rate	* 127.2	* 20.9
	American Indian	Age Adjusted Rate	* 81.3	* 14.9

Rates per 100,000 age-adjusted to 2000 US standard population and 2012 SD estimated population.
* US Mortality rates are from 2011, the 2012 rate is not available at this time.
US rates www.seer.cancer.gov Source: South Dakota Department of Health

Figure 19: Female Breast Cancer Stage at Diagnosis, South Dakota, 2012



Source: South Dakota Health Department

Descriptive Epidemiology

Stage at Diagnosis: Including *in situ* female breast cancer cases there were 809 cases diagnosed in 2012, of which 439 cases were diagnosed at localized stage. This represents 54% of all reported breast cancer cases. There were 184 cases that had progressed beyond the breast. There were 39 that were diagnosed as a distant stage and 10 that were staged as unknown. The 137 *in situ* female breast cancer cases are reported but are not used in calculating incidence rates.

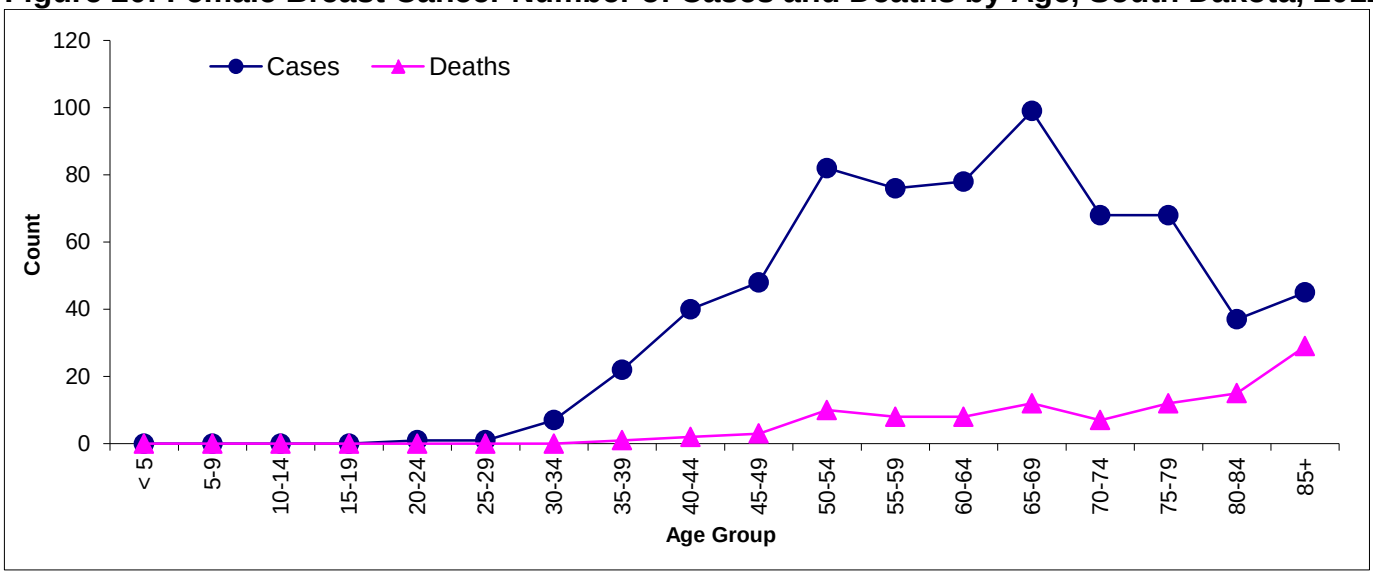
Incidence: Female breast cancer is the most common malignant tumor among women. The incidence rate increased from 1947-1990. The rates fell 3.5% per year from 2001-2005. This decrease may be in part due to the lower number of women using hormone replacement therapy. There were 672 cases of invasive female breast cancer reported in 2012. In South Dakota, 16.1% of all invasive cancer cases reported in 2012 were female breast. Nationally, 14% of all cancer cases are female breast cancer. Breast cancer represented 33% of the cancer cases diagnosed for South Dakota women in 2012.

Mortality: Breast cancer is the third 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 2012, there were 107 deaths. Of those deaths, 100 were white and seven were American Indian.

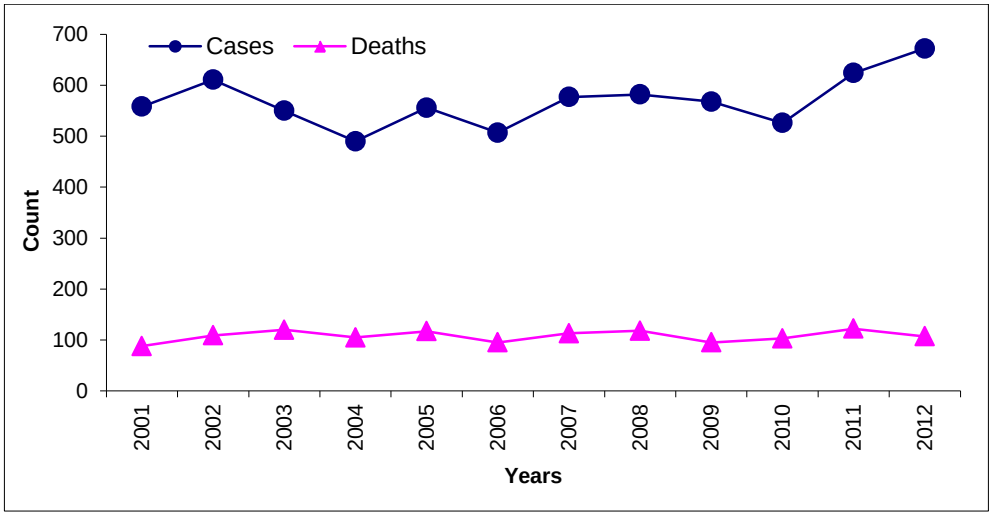
Risk and Associated Factors: Among the known risk factors for breast cancer are early onset of menarche, late onset of menopause, never having been pregnant, first full term pregnancy after age 30 and fewer number of children. These factors increase the risk because of cumulative exposure of breast tissue to estrogen. Other risk factors include high fat diets, obesity, alcohol consumption, history of fibrocystic disease, having a mother or sister with breast cancer, a personal history of ovarian or endometrial cancer and specific tumor suppressor genes such as BRCA1 and BRCA2.

Prevention and Early Detection: Prevention and early detection is the key to survival of breast cancer. Monthly self-examination and annual examination by a health professional are the mainstays of early detection. Women should talk to their doctor for individualized screening recommendations.

Figure 20: Female Breast Cancer Number of Cases and Deaths by Age, South Dakota, 2012



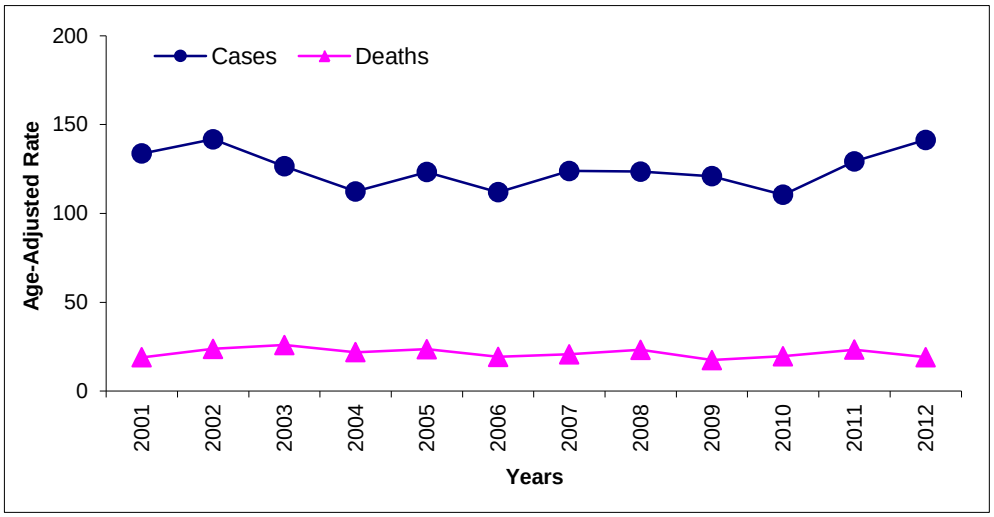
Source: South Dakota Department of Health



Source: South Dakota Department of Health

Figure 21: Female Breast Cancer Cases and Deaths by Year, South Dakota, 2001 - 2012

The incidence for female breast cancer was at an all-time high in 2012.



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

Figure 22: Female Breast Cancer Age-Adjusted Rates, Cases, and Deaths by Year, South Dakota, 2001 - 2012

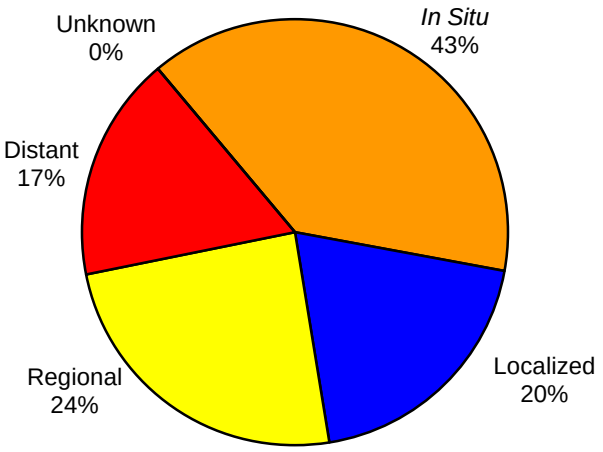
CERVIX UTERI

Table 14: Cervix Uteri Incidence and Mortality Summary, 2012

Cervix Uteri Cancer			Incidence	Mortality
South Dakota	Total	# Cases / Deaths	25	9
		Age Adjusted Rate	6.0	1.9
	White	# Cases / Deaths	19	6
		Age Adjusted Rate	4.8	1.2
	American Indian	# Cases / Deaths	5	3
		Age Adjusted Rate	20.8	10.4
United States	Total	Age Adjusted Rate	* 7.4	* 2.3
	White	Age Adjusted Rate	* 7.5	* 2.1
	American Indian	Age Adjusted Rate	* 7.4	* 2.3

Rates per 100,000 age-adjusted to 2000 US standard population and 2012 SD estimated population.
* US Mortality rates are from 2011, the 2012 rate is not available at this time.
US rates www.seer.cancer.gov Source: South Dakota Department of Health

Figure 23: Cervix Uteri Cancer Stage at Diagnosis, South Dakota, 2012



Source: South Dakota Health Department

Descriptive Epidemiology

Stage at Diagnosis: Early stage of diagnosis clearly provides the best opportunity for cure. In South Dakota, 20% of the cases reported were diagnosed at localized stage. SEER reports that 46% of the cases diagnosed nationally were at the localized stage.

Incidence: The incidence rate in South Dakota was 6.0 and in the United States it was 7.4. Both nationally and in South Dakota cervical cancer was the third most common female genital tract malignancy. Invasive cervical cancer accounted for 0.7% of all cases reported and 1.2% of all females diagnosed with cancer in South Dakota in 2012. SEER incidence reports that 0.2% of cases were younger than 20 years of age.

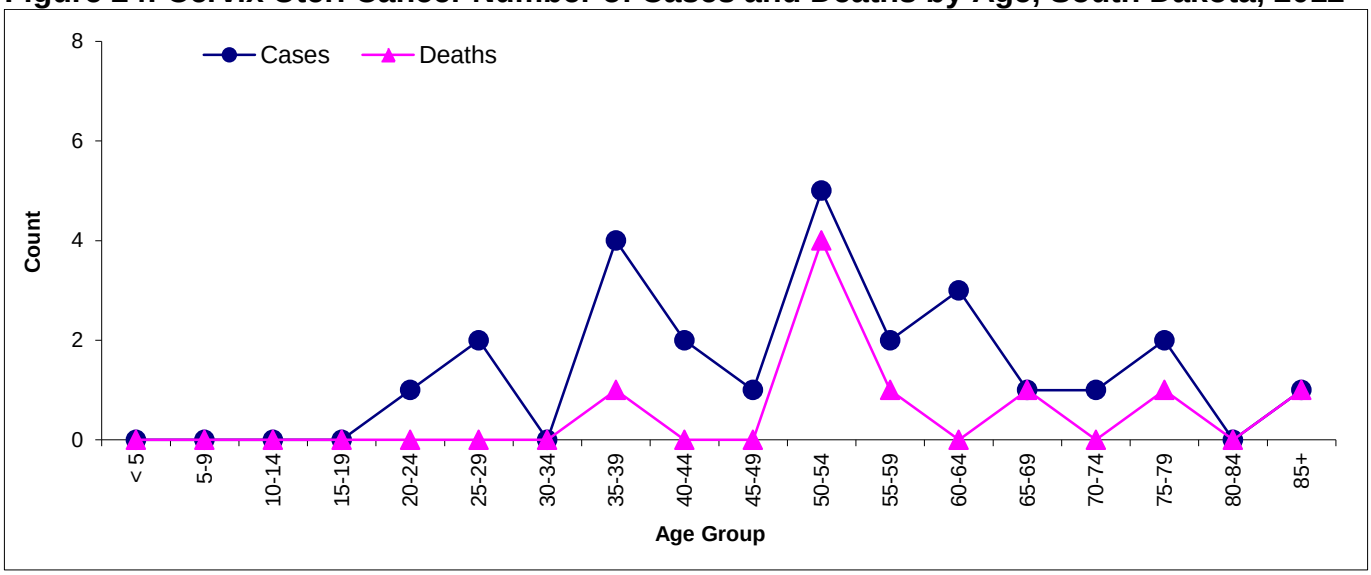
Mortality: The death rate in South Dakota was 1.9 for cancer of the cervix uteri. In the United States, the rate was 2.3 in 2011. The stage of disease at diagnosis affects the mortality rate. Cases diagnosed at a localized stage have a 92% survival rate according to the American Cancer Society. Nationally, when diagnosed at distant stage, the percentage of survival drops to 15% at five years. In South Dakota, there were seven cases in 2012 diagnosed at distant stage.

Risk and Associated Factors: Risk factors associated with cervical cancer suggest that a sexually transmitted agent is involved in the pathogenesis of the disease. Although Herpes Simplex Virus appeared to be a likely candidate in early studies, during the last decade the Human Papilloma virus (HPV) has been identified as the most likely. Other risk factors are nutritional deficiencies (Vitamin C and Vitamin B), low socioeconomic status, beginning sexual activity at a young age, high-risk male partner, tobacco use as well as the use of oral contraceptives.

Prevention and Early Detection: Cervical cancer represents the final step in a continuum that begins with cervical intraepithelial neoplasia (CIN). This is a preinvasive process, detectable by cervical cytological screening (Pap smear). The American Cancer Society recommends that all women at the age of 18 or earlier, if sexually active, should have annual Pap smears. Invasive cervical malignancies could be eradicated almost completely with regular screening programs available to all.

For more information on cervical cancer visit
http://www.cancer.gov/cancertopics/types/cervical/

Figure 24: Cervix Uteri Cancer Number of Cases and Deaths by Age, South Dakota, 2012



Source: South Dakota Department of Health

More than half of the incidence of cervical cancer occurred in women under the age of 50 .

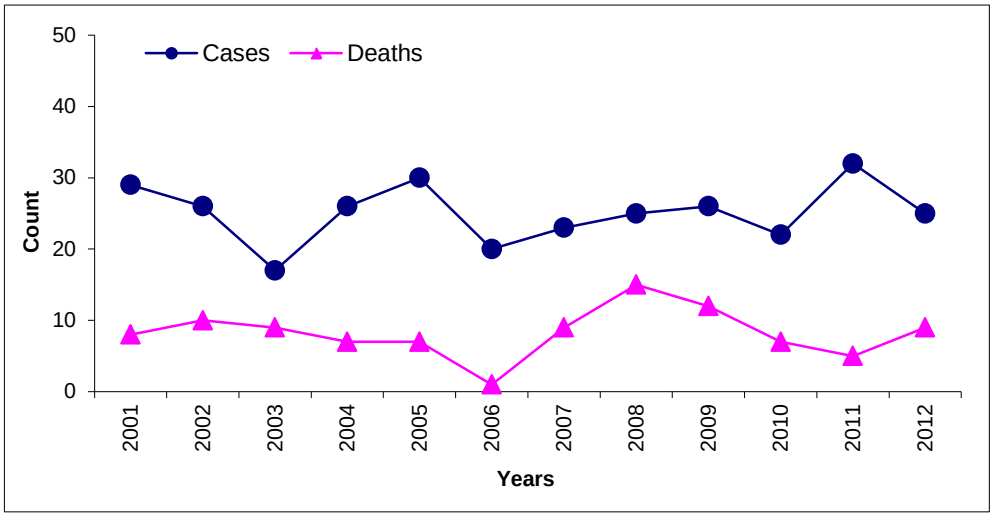


Figure 25: Cervix Uteri Cancer Cases and Deaths by Year, South Dakota, 2001 - 2012

The incidence peak for female cervix uteri cancer was in 2011.

Source: South Dakota Department of Health

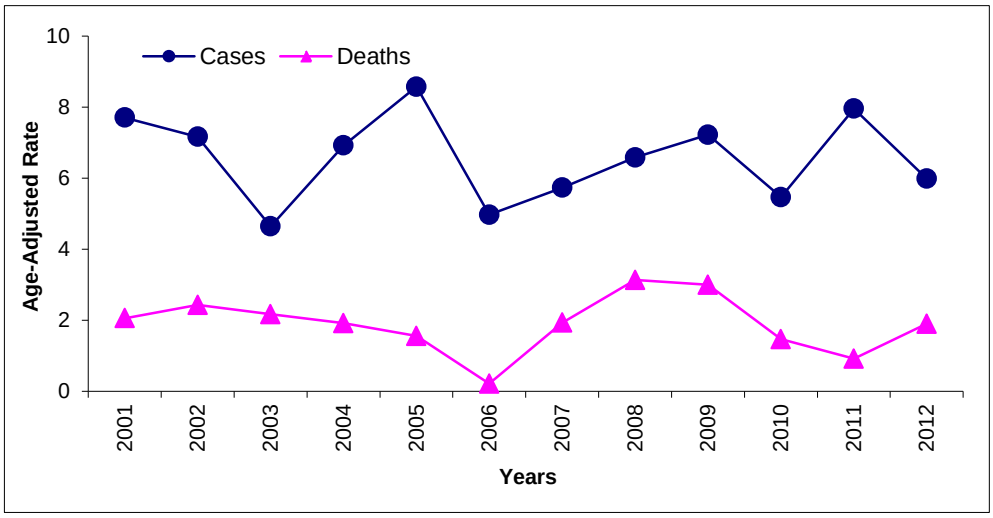


Figure 26: Cervix Uteri Cancer Age-Adjusted Rates, Cases, and Deaths by Year, South Dakota, 2001 - 2012

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

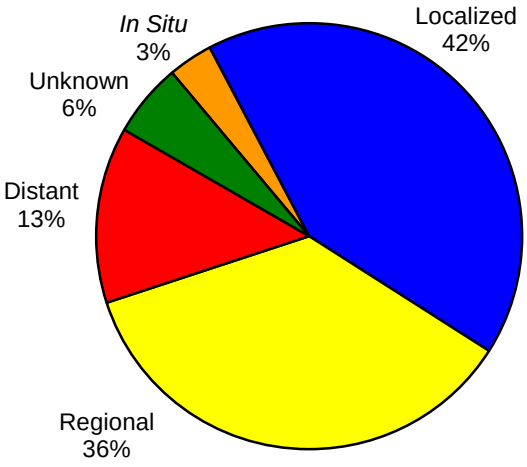
COLORECTAL

Table 15: Colorectal Incidence and Mortality Summary, 2012

Colorectal Cancer			Incidence			Mortality		
			Total	Male	Female	**Total**	Male	Female
South Dakota	**Total**	# Cases / Deaths	**398**	195	203	**164**	84	80
		Age Adjusted Rate	**40.1**	42.7	37.9	**15.9**	18.7	14.1
	White	# Cases / Deaths	**368**	177	191	**152**	78	74
		Age Adjusted Rate	**39.2**	41.3	37.5	**15.5**	18.3	13.7
	American Indian	# Cases / Deaths	**28**	16	12	**9**	4	5
		Age Adjusted Rate	**62.7**	71.6	55.3	**24.2**	16.8	29.0
United States	**Total**	Age Adjusted Rate	*** 40.3**	* 46.5	* 35.3	*** 15.1**	* 18.1	* 12.8
	White	Age Adjusted Rate	*** 39.3**	* 45.2	* 34.3	*** 14.6**	* 17.5	* 12.3
	American Indian	Age Adjusted Rate	*** 41.1**	* 47.9	* 35.1	*** 17.1**	* 20.3	* 14.3

Rates per 100,000 age-adjusted to 2000 US standard population and 2012 SD estimated population.
* US Mortality rates are from 2011, the 2012 rate is not available at this time. US rates www.seer.cancer.gov
Source: South Dakota Department of Health

Figure 27: Colorectal Cancer Stage at Diagnosis, South Dakota, 2012



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 2012, 42% (172) of the cases of colorectal cancer were diagnosed at localized stage. Localized is defined as when the disease is still confined to the colon. The remaining 203 invasive cases (49%) were diagnosed after the disease had spread beyond the colon. Of those 203 cases, 55 were diagnosed at distant stage when the disease had spread further involving other organs. The SEER National Cancer Institute website states that the 5-year survival rate for those who have distant stage at diagnosis is 12.9% for the 2004-2010 time period.

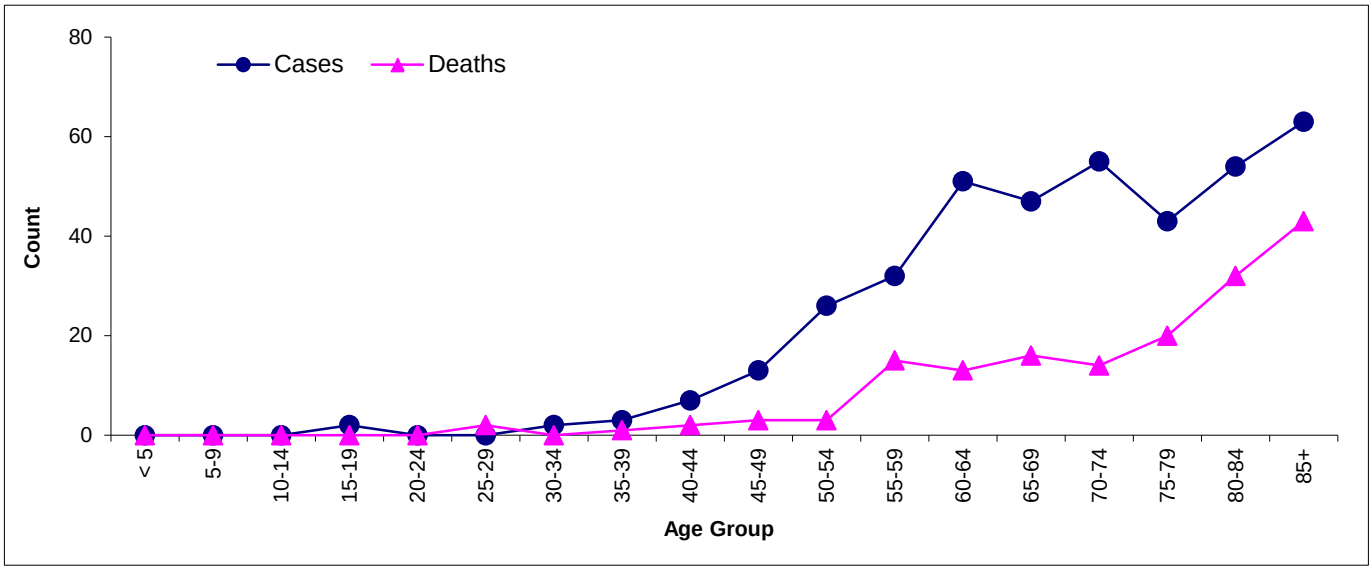
Incidence: Colorectal cancer accounted for 9.5% of all cases reported in South Dakota in 2012. The median age at diagnosis was 71. There were 195 men and 203 women diagnosed with colorectal cancer in 2012 in South Dakota. Overall, colorectal cancer was the fourth most diagnosed cancer. When reviewed by gender, it was the third most diagnosed cancer with 9.2% of the cancers reported in males and 9.8% of the cancers reported in females.

Mortality: Overall incidence and mortality rates for colorectal cancer are decreasing. The overall 5-year survival rate for 2004-2010 from SEER was 64.7% for men and women. In 2012, there were a total of 164 deaths that were attributed to colorectal cancer in South Dakota; half were men and half were women. Of that number, 152 were white and 9 were American Indian. The median age at death was 78. The SEER National Cancer Institute website states that the United States mortality rate in 2011 was 15.1.

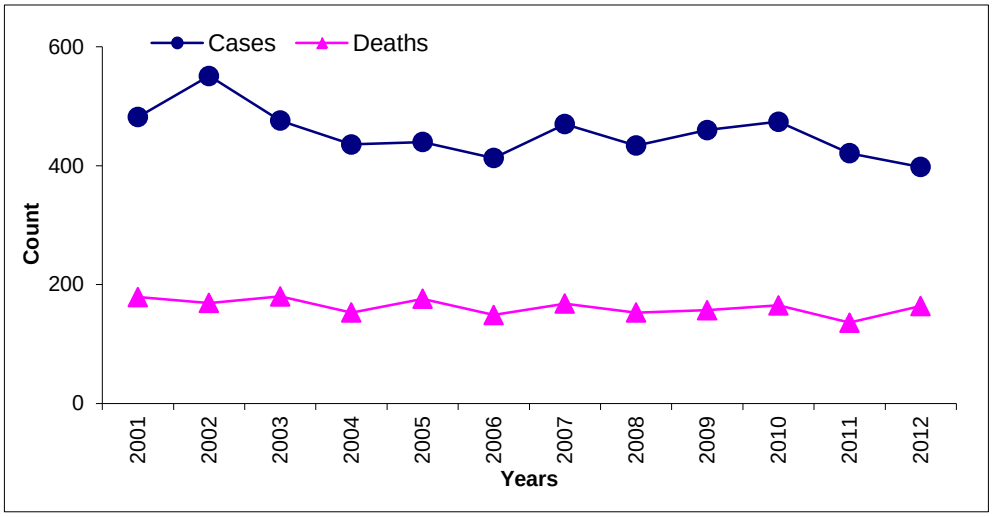
Risk and Associated Factors: Studies have shown that diets high in fat and low in fiber result in an increased risk for colon cancer. Also diets that are low in fresh fruit and vegetables increase the risk. Obesity is also listed as a risk factor.

Prevention and Early Detection: Doctors believe that most colon cancers develop in colon polyps. Therefore, removing benign colon polyps can prevent colorectal cancer. Colon polyps are initially benign but over years can become cancerous. Screening guidelines suggest having a colonoscopy every ten years beginning at the age of 50.

Figure 28: Colorectal Cancer Number of Cases and Deaths by Age, South Dakota, 2012



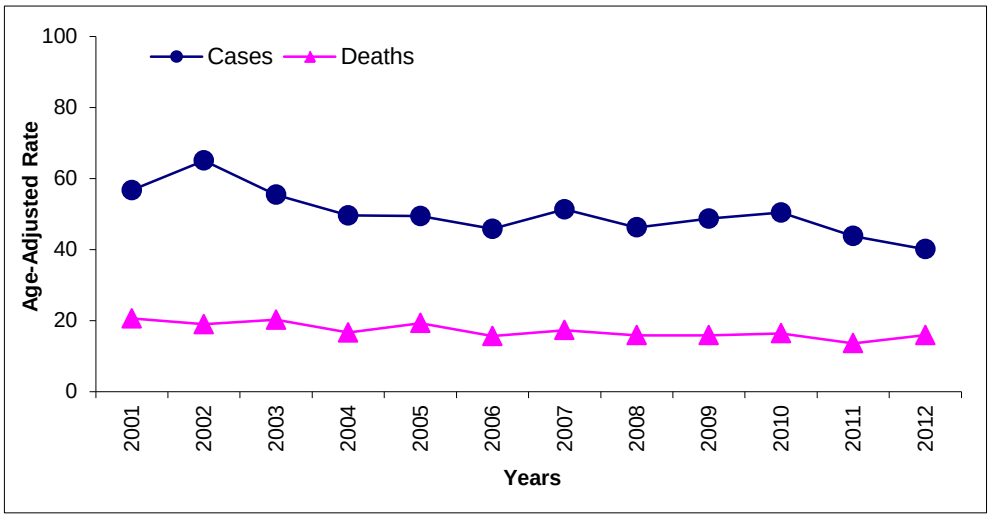
Source: South Dakota Department of Health



Source: South Dakota Department of Health

Figure 29: Colorectal Cancer Cases and Deaths by Year, South Dakota, 2001 - 2012

The incidence peak for colorectal cancer occurred in 2002. Incidences of colorectal cancer appear to escalate after age 50.



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

Figure 30: Colorectal Cancer Age-Adjusted Rates, Cases, and Deaths by Year, South Dakota, 2001 - 2012

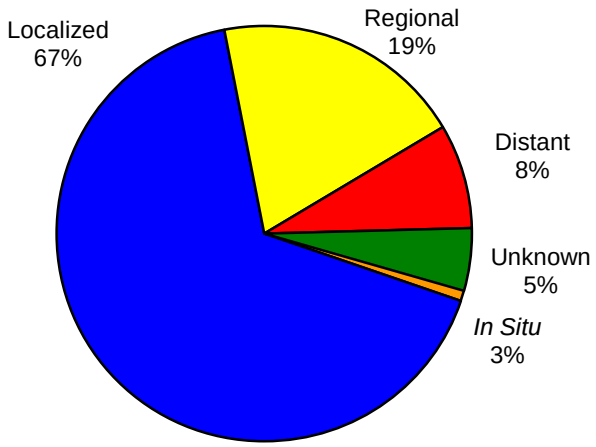
CORPUS and UTERUS, NOS

Table 16: Corpus and Uterus, NOS Incidence and Mortality Summary, 2012

Corpus & Uterus, NOS Cancer			Incidence	Mortality
South Dakota	Total	# Cases / Deaths	122	25
		Age Adjusted Rate	23.7	4.9
	White	# Cases / Deaths	118	24
		Age Adjusted Rate	24.6	4.9
	American Indian	# Cases / Deaths	4	1
		Age Adjusted Rate	13.2	3.7
United States	Total	Age Adjusted Rate	* 24.9	* 4.5
	White	Age Adjusted Rate	* 25.5	* 4.1
	American Indian	Age Adjusted Rate	* 17.4	* 4.1

Rates per 100,000 age-adjusted to 2000 US standard population and 2012 SD estimated population.
* US Mortality rates are from 2011, the 2012 rate is not available at this time.
US rates www.seer.cancer.gov Source: South Dakota Department of Health

Figure 31: Corpus and Uterus, NOS Cancer Stage at Diagnosis, South Dakota, 2012



Source: South Dakota Health Department

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 2012, 67% of corpus uteri cases were diagnosed at localized stage. Ten cases were diagnosed at distant stage, twice as many as in 2010.

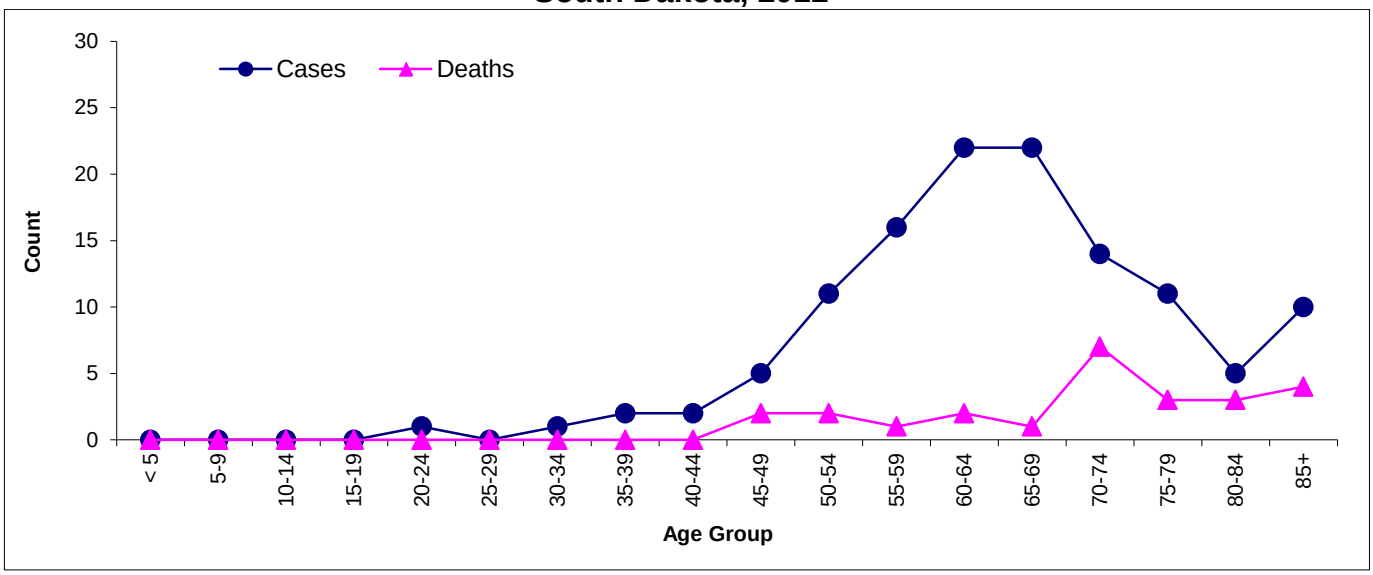
Incidence: The uterine cervix is the small cylindrical neck that leads from the uterus, or womb, into the vagina. A knob of the cervix protrudes into the vagina and can be visualized on physical examination. It is lined with epithelial and stromal cells creating a site for epithelial, stromal and mixed cell malignancies. Endometrial carcinoma is one of the female genital cancers. It is ranked fourth among females reported with cancer in South Dakota in 2012. Cancer of the corpus uteri represents 5.9% of all of the cancers diagnosed in South Dakota females in 2012. Endometrial cancer affects primarily postmenopausal women. The median age at diagnosis in the United States is 65. In South Dakota, the median age is 63 years of age.

Mortality: The death rate in South Dakota for the reporting period was 4.9 for deaths attributed to uterine cancer. In the United States, the 2011 rate was 4.5. Only 25 South Dakota female deaths were attributed to cancer of the uterus in 2012. The stage of disease at diagnosis affects the mortality rate. Overall (all stages included), the five-year relative survival rate was 83.2% 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 plays 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.

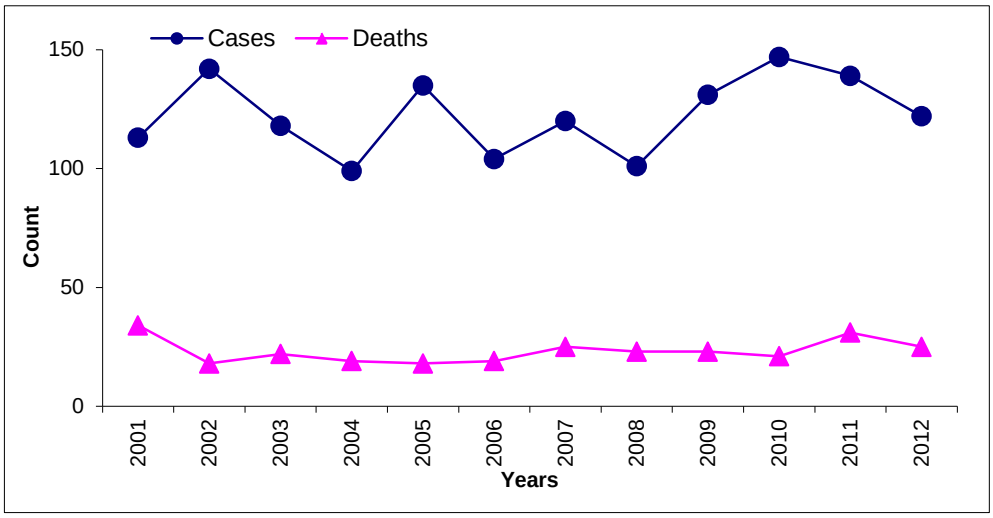
Prevention and Early Detection: Other factors associated with an increased risk of developing uterine cancer include obesity, a high-fat diet and a prolonged exposure to the female hormone, estrogen. One pregnancy appears to lower the risk of uterine cancer by 50%.

Figure 32: Corpus and Uterus, NOS Cancer Number of Cases and Deaths by Age, South Dakota, 2012



Source: South Dakota Department of Health

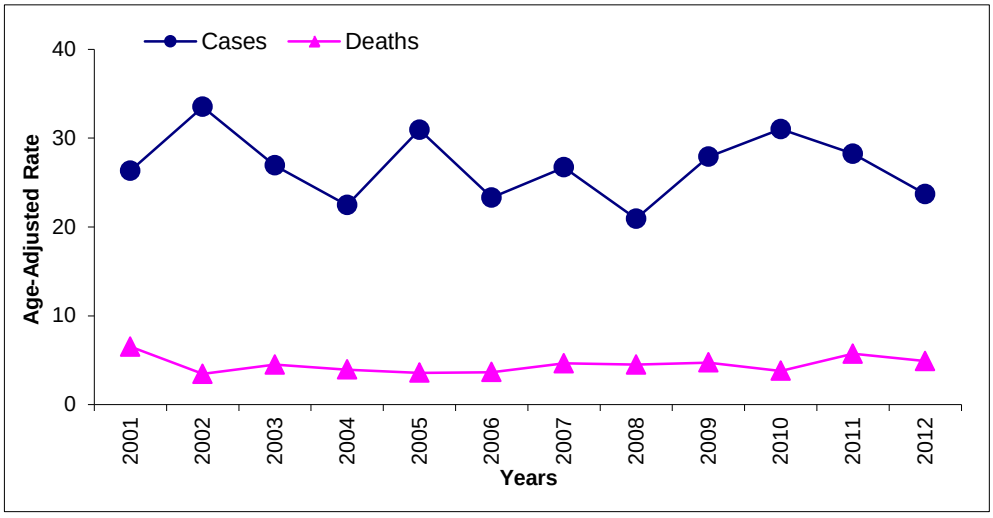
In South Dakota, in 2012 the incidence peaked in the 60-64 age group.



Source: South Dakota Department of Health

Figure 33: Corpus and Uterus, NOS Cancer Cases and Deaths by Year, South Dakota, 2001 - 2012

The incidence peak for female corpus and uterus, NOS cancer was in 2010.



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

Figure 34: Corpus and Uterus, NOS Cancer Age-Adjusted Rates, Cases, and Deaths by Year, South Dakota, 2001 - 2012

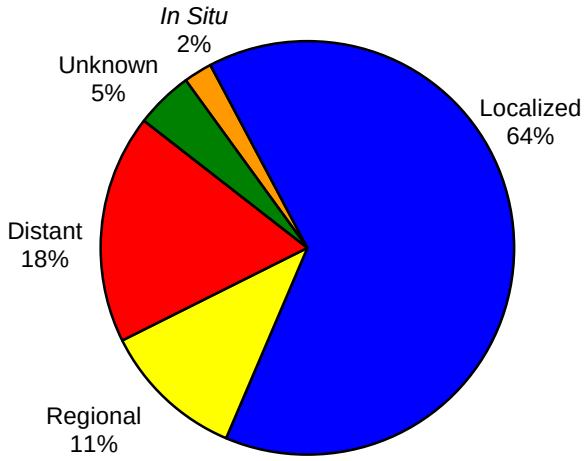
KIDNEY AND RENAL PELVIS

Table 17: Kidney and Renal Pelvis Incidence and Mortality Summary, 2012

Kidney & Renal Pelvis Cancer			Incidence			Mortality		
			Total	Male	Female	**Total**	Male	Female
South Dakota	**Total**	# Cases / Deaths	**131**	88	43	**50**	32	18
		Age Adjusted Rate	**14.0**	19.4	9.0	**5.2**	7.1	3.5
	White	# Cases / Deaths	**113**	78	35	**47**	31	16
		Age Adjusted Rate	**12.9**	18.4	7.8	**5.1**	7.2	3.4
	American Indian	# Cases / Deaths	**17**	10	7	**3**	1	2
		Age Adjusted Rate	**34.9**	41.4	28.4	**8.8**	4.3	10.2
United States	**Total**	Age Adjusted Rate	*** 15.2**	* 20.7	* 10.5	*** 3.9**	* 5.7	* 2.5
	White	Age Adjusted Rate	*** 15.6**	* 21.1	* 10.9	*** 4.0**	* 5.9	* 2.6
	American Indian	Age Adjusted Rate	*** 19.2**	* 27.3	* 12.7	*** 6.3**	* 8.7	* 4.2

Rates per 100,000 age-adjusted to 2000 US standard population and 2012 SD estimated population.
* US Mortality rates are from 2011, the 2012 rate is not available at this time. US rates www.seer.cancer.gov
Source: South Dakota Department of Health

Figure 35: Kidney and Renal Pelvis Cancer Stage at Diagnosis, South Dakota, 2012



Source: South Dakota Health Department

Descriptive Epidemiology

Stage at Diagnosis: As with all malignancies, early diagnosis is the key to better prognosis and possible cure. Sixty-four percent of the cases in 2012 were diagnosed at localized stage, with another 18% diagnosed at distant stage. Unfortunately, symptoms do not always reflect the stage of disease. Blood in the urine is one of the symptoms that frequently presents at diagnosis. As with other cancers, renal cancer can spread through the blood stream and/or lymphatic system. Survival rates associated with kidney cancer depend on how far the disease has progressed, the size of tumor, and whether or not it has metastasized. The latest five-year survival rate for localized stage kidney cancer is 91.8%. The survival rate for distant stage is 12.1%.

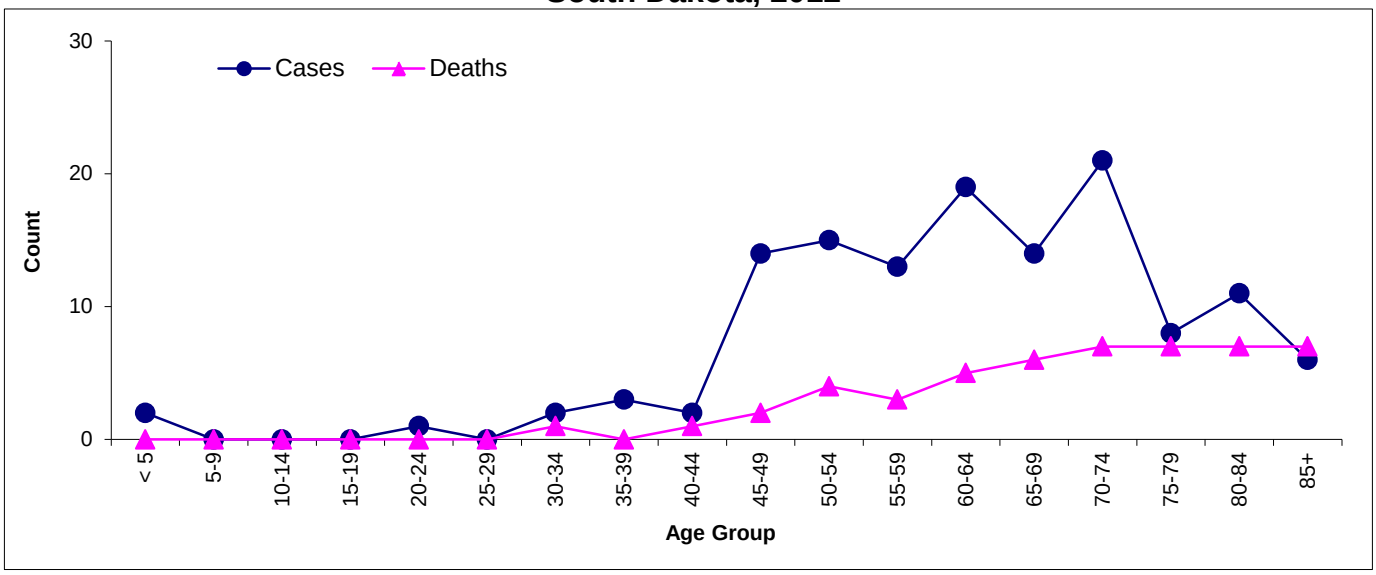
Incidence: In 2012 the American Cancer Society estimated there would be 64,770 new cases of kidney cancer in the United States. This accounts for 3.9% of all reported malignancies in the United States. In South Dakota there were 133 reported cases of kidney cancer in 2012 representing 3.1% of all cancer cases. Kidney cancer develops most often in people over 40. There is no known cause of this disease. Doctors can seldom explain why one person develops kidney cancer and another does not. The median age at diagnosis is 63 in South Dakota and 64 in the United States.

Mortality: This cancer was the eighth leading cause of cancer death for South Dakota in 2012. In the United States for 2006-2010 it was the thirteenth leading cause of death with a median age of death of 71 years. Death rates decreased by 0.9% per year from 2007 to 2011.

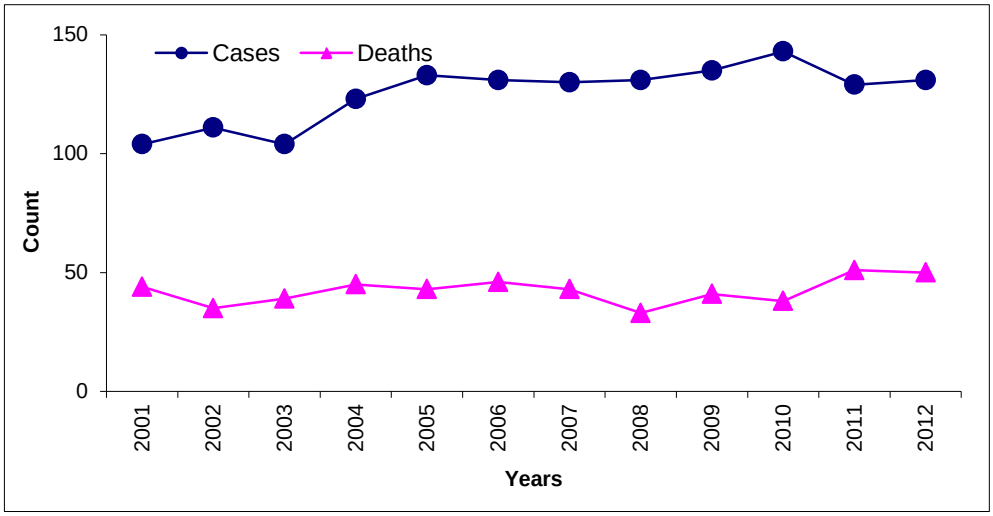
Risk and Associated Factors: Cigarette smoking increases the risk of developing kidney cancer. The risk seems to increase by the amount one smokes. Obesity is associated with risk, as are exposures to occupational substances such as aniline dyes, benzene, and naphthalene.

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 36: Kidney and Renal Pelvis Cancer Number of Cases and Deaths by Age, South Dakota, 2012



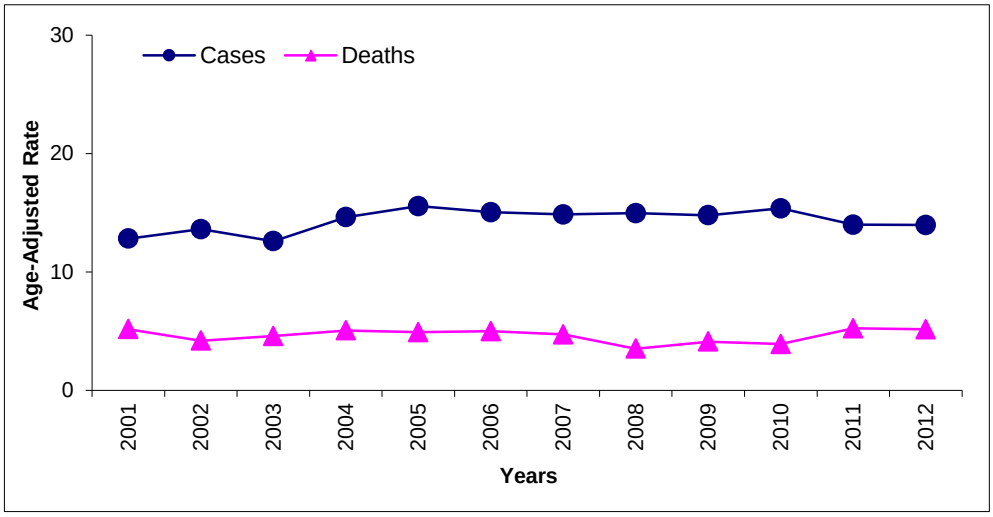
Source: South Dakota Department of Health



Source: South Dakota Department of Health

Figure 37: Kidney and Renal Pelvis Cancer Cases and Deaths by Year, South Dakota, 2001 - 2012

The incidence peak for kidney and renal pelvis cancer occurred in 2010.



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

Figure 38: Kidney and Renal Pelvis Cancer Age-Adjusted Rates, Cases, and Deaths by Year, South Dakota, 2001 - 2012

LEUKEMIA

Table 18: Leukemia Incidence and Mortality Summary, 2012

Leukemia			Incidence			Mortality		
			Total	Male	Female	**Total**	Male	Female
South Dakota	**Total**	# Cases / Deaths	**140**	89	51	**69**	38	31
		Age Adjusted Rate	**14.9**	20.5	10.0	**7.4**	9.1	6.1
	White	# Cases / Deaths	**133**	84	49	**65**	36	29
		Age Adjusted Rate	**15.2**	20.8	10.5	**7.6**	9.4	6.2
	American Indian	# Cases / Deaths	**5**	3	2	**4**	2	2
		Age Adjusted Rate	**10.7**	17.2	5.5	**7.9**	10.6	5.9
United States	**Total**	Age Adjusted Rate	*** 13.0**	* 16.5	* 10.3	*** 6.9**	* 9.3	* 5.2
	White	Age Adjusted Rate	*** 13.6**	* 17.2	* 10.7	*** 7.2**	* 9.6	* 5.4
	American Indian	Age Adjusted Rate	*** 7.1**	* 8.2	* 6.3	*** 3.9**	* 4.9	* 3.3

Rates per 100,000 age-adjusted to 2000 US standard population and 2012 SD estimated population.
* US Mortality rates are from 2011, the 2012 rate is not available at this time. US rates www.seer.cancer.gov
Source: South Dakota Department of Health

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 3.3% of the cancers reported in 2012 for South Dakota. The American Cancer Society estimated that there would be 140 new cases of leukemia in South Dakota during 2012 and 47,150 cases nationwide.

Mortality: Leukemia accounted for 4.2% of the cancer deaths in South Dakota in 2012. The subtype of acute myeloid leukemia was the most frequent cause of leukemia death. Over 65% 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 2012, there were 62 new cases of chronic leukemia.

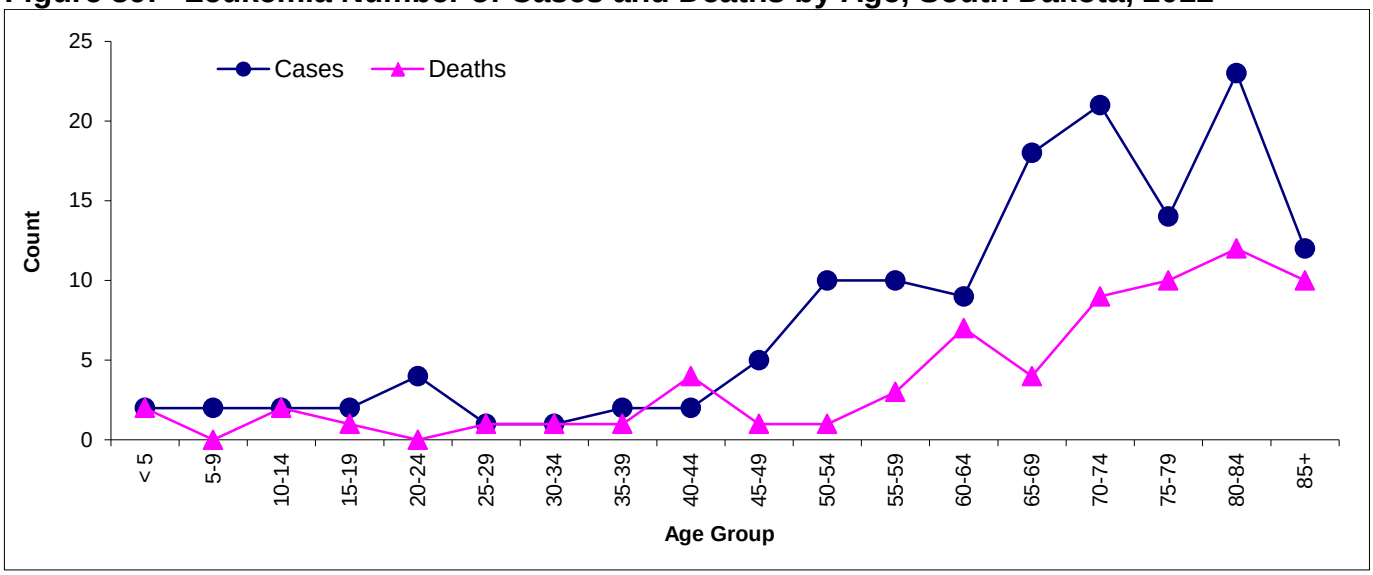
Acute Leukemia: The blood cells are very abnormal. The blood cells cannot carry out their normal processes. The number of abnormal cells increases rapidly. Acute leukemia worsens quickly as do the symptoms. There were 66 new cases of acute leukemia in South Dakota in 2012.

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 39: Leukemia Number of Cases and Deaths by Age, South Dakota, 2012



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 steadily increase after the age of 74.

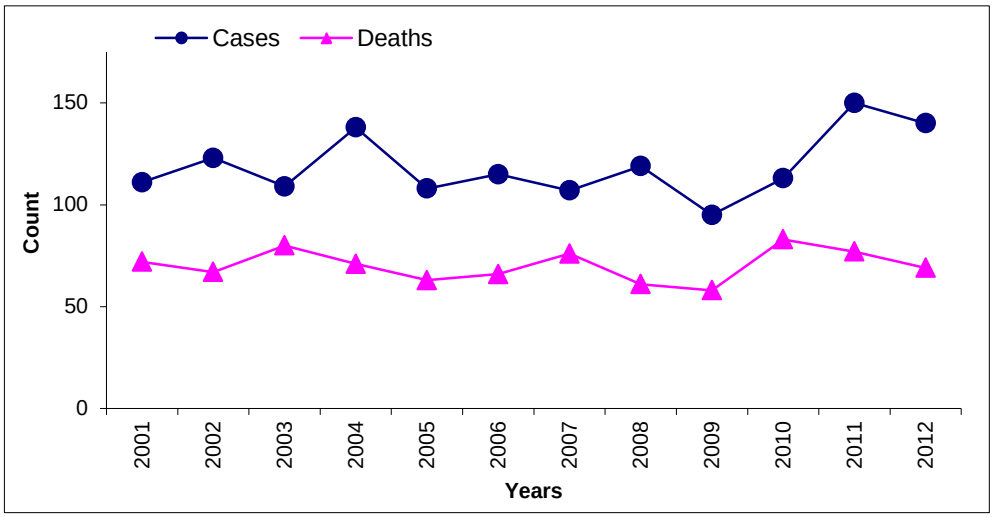


Figure 40: Leukemia Cases and Deaths by Year, South Dakota, 2001 - 2012

The incidence peak for leukemia occurred in 2011.

Source: South Dakota Department of Health

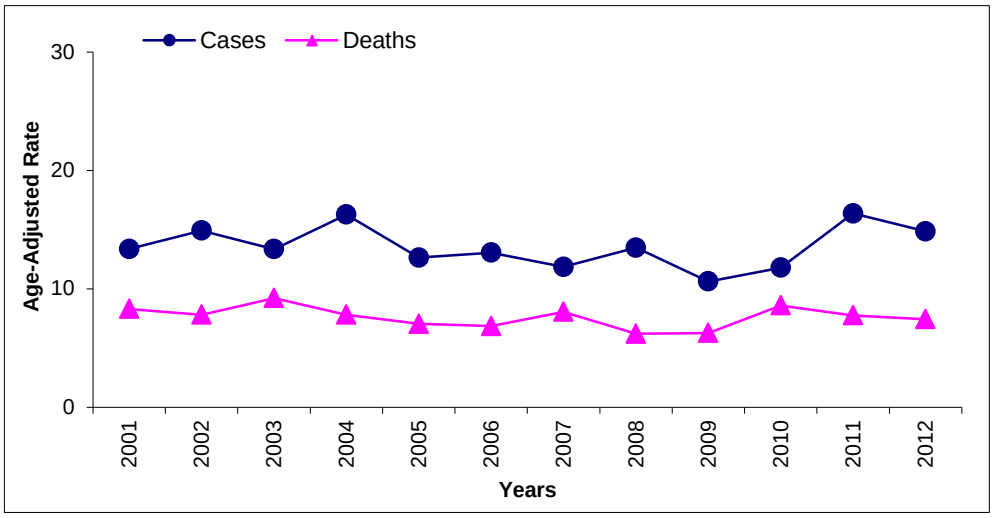


Figure 41: Leukemia Age-Adjusted Rates, Cases, and Deaths by Year, South Dakota, 2001 - 2012

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

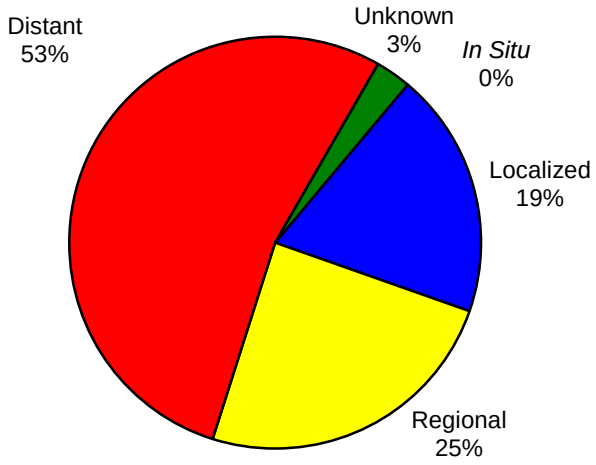
LUNG AND BRONCHUS

Table 19: Lung and Bronchus Incidence and Mortality Summary, 2012

Lung & Bronchus Cancer			Incidence			Mortality		
			Total	Male	Female	**Total**	Male	Female
South Dakota	**Total**	# Cases / Deaths	**539**	300	239	**433**	251	182
		Age Adjusted Rate	**54.6**	65.8	45.8	**43.3**	55.4	34.2
	White	# Cases / Deaths	**500**	282	218	**398**	236	162
		Age Adjusted Rate	**53.8**	65.4	44.7	**42.1**	54.9	32.5
	American Indian	# Cases / Deaths	**34**	15	19	**33**	14	19
		Age Adjusted Rate	**83.8**	70.2	89.3	**97.1**	82.3	102.3
United States	**Total**	Age Adjusted Rate	*** 55.9**	* 66.2	* 48.2	*** 46.0**	* 57.9	* 37.0
	White	Age Adjusted Rate	*** 57.5**	* 66.4	* 50.8	*** 46.7**	* 57.8	* 38.2
	American Indian	Age Adjusted Rate	*** 37.3**	* 40.4	* 34.9	*** 37.4**	* 47.4	* 30.0

Rates per 100,000 age-adjusted to 2000 US standard population and 2012 SD estimated population.
* US Mortality rates are from 2011, the 2012 rate is not available at this time. US rates www.seer.cancer.gov
Source: South Dakota Department of Health

Figure 42: Lung and Bronchus Cancer Stage at Diagnosis, South Dakota, 2012



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 2012, 25% of lung cancer patients were diagnosed at localized stage. The more advanced the stage, the poorer the prognosis is for the patient. In 2012, 288 (53%) cases were diagnosed when disease had progressed beyond the lung and metastasized to a distant location. Approximately 78% of cases in 2012 were diagnosed after the disease had progressed beyond the lung to lymph nodes, regional areas, or distant sites, such as brain or bone.

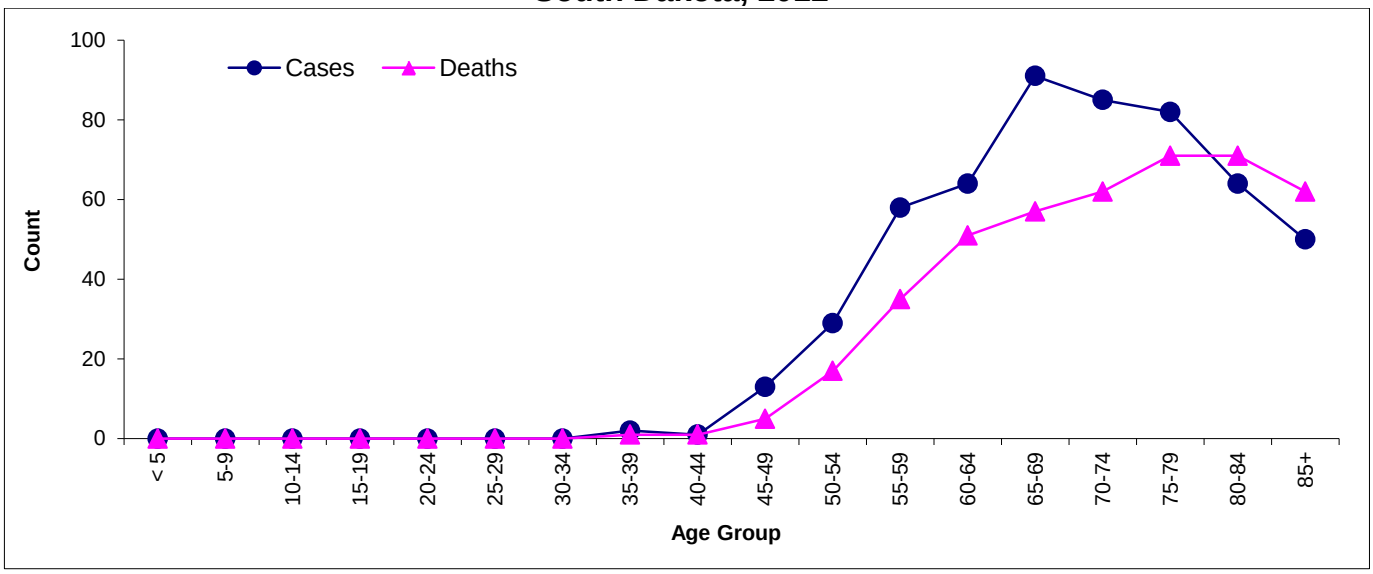
Incidence: Lung cancer is a major public health concern, with an estimated 226,160 new cases in the United States in 2012. Despite the well documented link between tobacco product use and respiratory diseases, including cancer, the outcomes of such efforts to curb the use of tobacco products have been mixed. In South Dakota, there were 539 new invasive lung cancer cases diagnosed in 2012.

Mortality: There were 433 lung cancer deaths in South Dakota in 2012. Incidence and mortality rates have significantly increased during the last century. Lung cancer accounts for approximately 27.5% of all United States deaths attributed to cancer. In South Dakota, lung cancer accounts for 26.1% of deaths from cancer. Lung cancer is the leading cause of cancer deaths in both men and women.

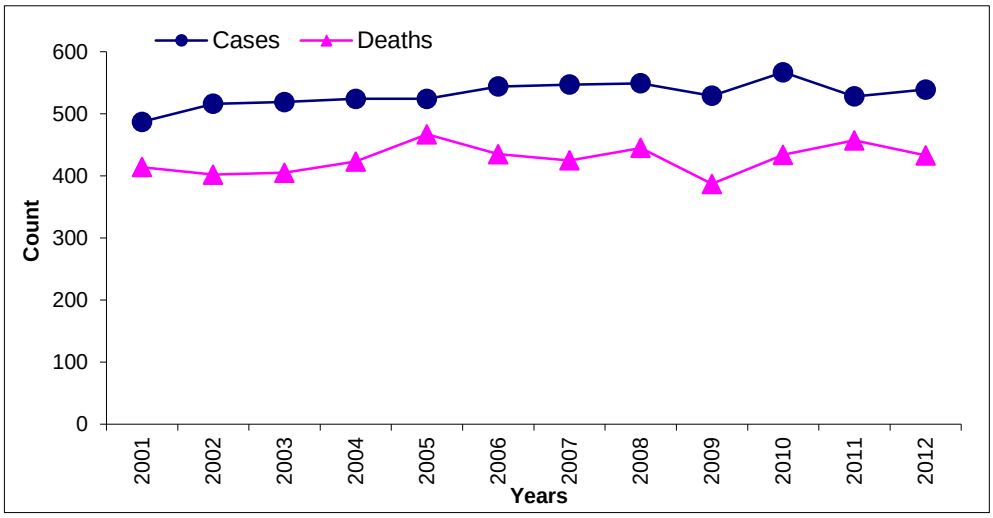
Risk and Associated Factors: Cigarette smoking is by far the most important risk factor for lung cancer. Approximately 90% of lung cancers in men and 80% in women are attributed to cigarette smoking. The lifetime risk of lung cancer in nonsmokers is estimated to be less than 1%. Other risk factors include second hand smoke and occupational or environmental exposures to substances such as arsenic, benzene, and asbestos.

Prevention and Early Detection: Efforts at early detection by screening have not been effective in reducing mortality rates significantly. Chest x-ray, analysis of cells in sputum and bronchial fiber optic examination are methods used in early diagnosis and detection. The best prevention of lung cancer is to stop smoking or never smoke.

Figure 43: Lung and Bronchus Cancer Number of Cases and Deaths by Age, South Dakota, 2012



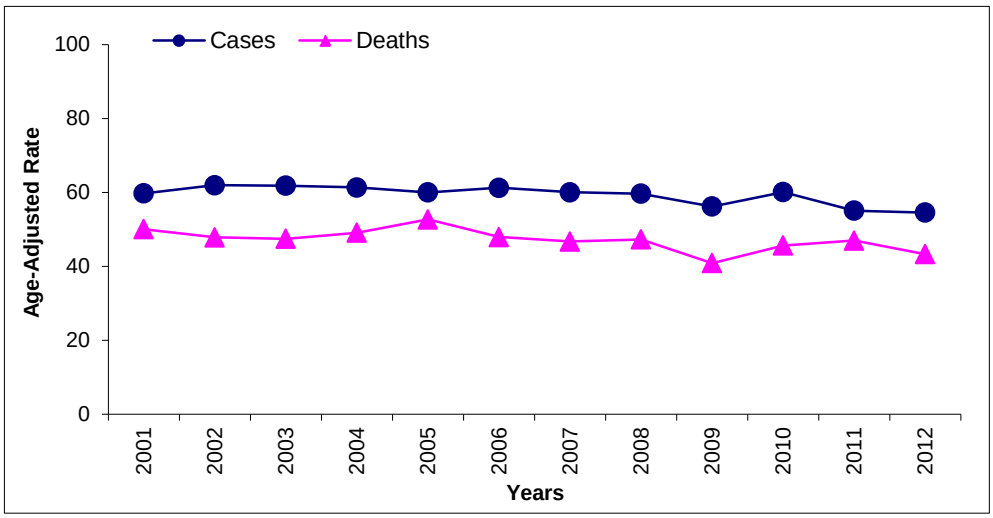
Source: South Dakota Department of Health



Source: South Dakota Department of Health

Figure 44: Lung and Bronchus Cancer Cases and Deaths by Year, South Dakota, 2001 - 2012

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



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

Figure 45: Lung and Bronchus Cancer Age-Adjusted Rates, Cases, and Deaths by Year, South Dakota, 2001 - 2012

MELANOMA OF THE SKIN

Table 20: Melanoma of the Skin Incidence and Mortality Summary, 2012

Melanoma of the Skin			Incidence			Mortality		
			Total	Male	Female	**Total**	Male	Female
South Dakota	**Total**	# Cases / Deaths	**205**	115	90	**19**	12	7
		Age Adjusted Rate	**22.6**	25.6	20.9	**1.9**	2.6	1.4
	White	# Cases / Deaths	**203**	114	89	**17**	11	6
		Age Adjusted Rate	**24.6**	27.4	23.0	**1.7**	2.5	1.1
	American Indian	# Cases / Deaths	**2**	1	1	**1**	0	1
		Age Adjusted Rate	**3.7**	3.7	3.9	**2.0**	0.0	3.9
United States	**Total**	Age Adjusted Rate	*** 21.1**	* 27.7	* 16.2	*** 2.7**	* 4.0	* 1.7
	White	Age Adjusted Rate	*** 24.8**	* 32.1	* 19.3	*** 3.1**	* 4.6	* 1.9
	American Indian	Age Adjusted Rate	*** 3.9**	* 3.2	* 4.7	*** 1.3**	* 2.2	*

Rates per 100,000 age-adjusted to 2000 US standard population and 2012 SD estimated population.
* US Mortality rates are from 2011, the 2012 rate is not available at this time. US rates www.seer.cancer.gov
Source: South Dakota Department of Health

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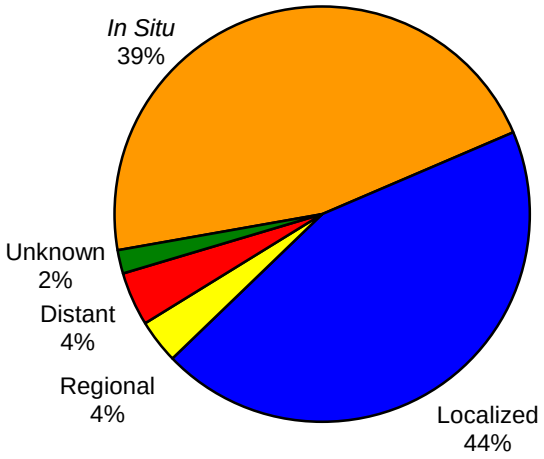
Figure 46: Melanoma of the Skin Stage at Diagnosis, South Dakota, 2012



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 2012, there were 205 cases of melanoma of the skin reported for South Dakota. Of this number, 169 were staged as localized disease. The survival rate for localized melanoma is 98.1%. For distant disease, the survival rate is 16.1% at 5 years.

Incidence: In the United States in 2012, the American Cancer Society estimated that there would be 76,250 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 South Dakota, the incidence rate is 22.6 and the United States has an incidence rate of 21.1.

***Mortality*:** There were 19 deaths attributed to melanoma of the skin in South Dakota in 2012 with a mortality rate of 1.9. The last reported mortality rate for the United States (2011) was 2.7. The median age for death in South Dakota for this cancer was 61 in 2012. Nationwide, the median age at death was 69 for melanoma of the skin.

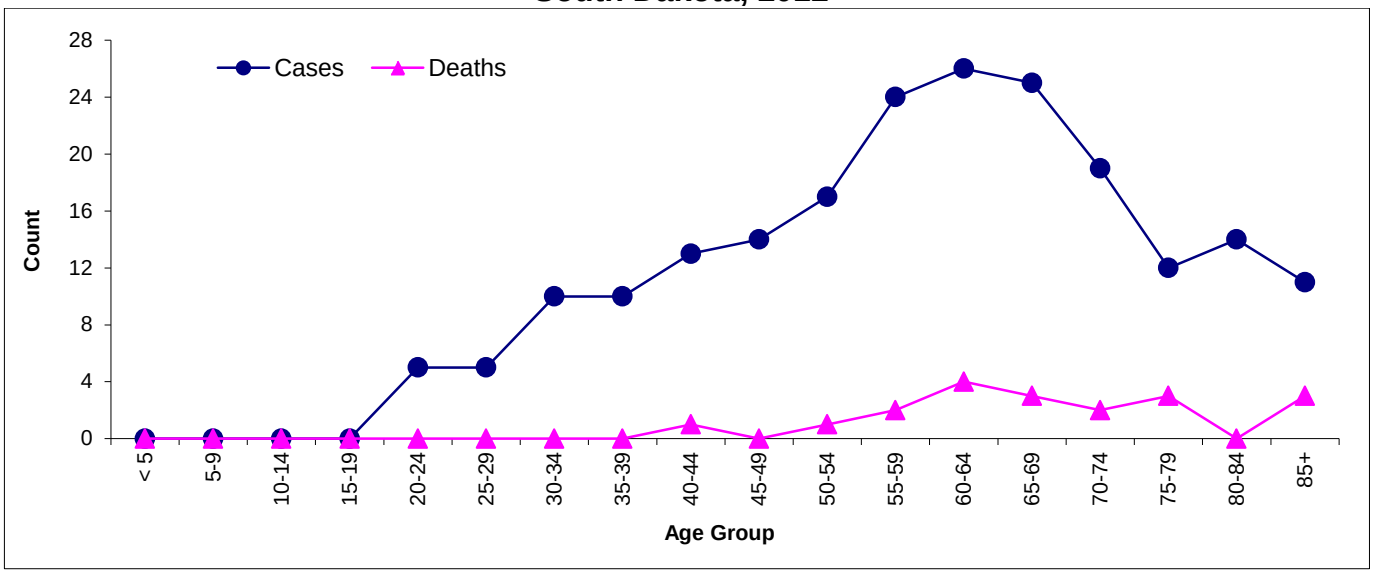
Risk and Associated Factors: Certain factors are more likely to contribute to a higher risk. These are:

- 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

Early Detection and Prevention: 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 sun glasses
- use sunscreen regularly
- stay in the shade
- cover skin
- wear a hat

Figure 47: Melanoma of the Skin Number of Cases and Deaths by Age, South Dakota, 2012



Source: South Dakota Department of Health

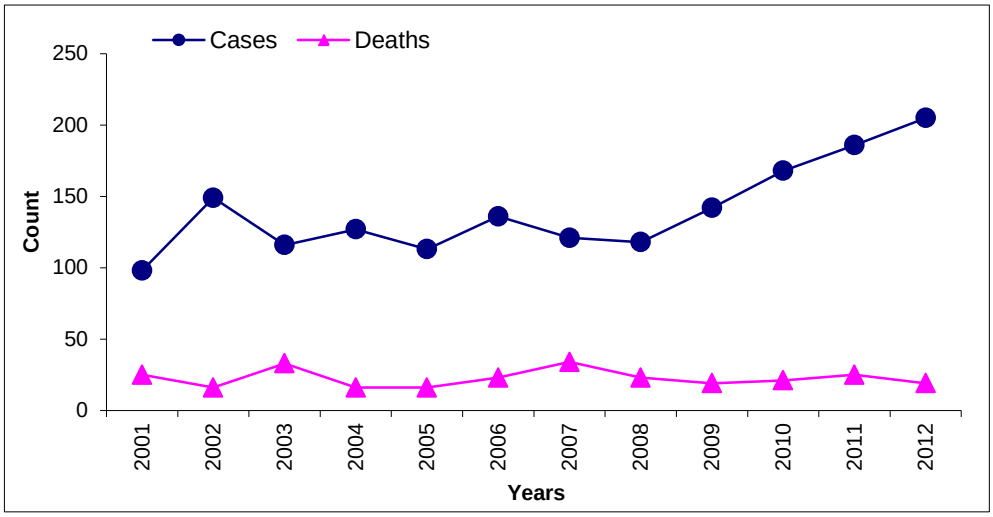


Figure 48: Melanoma of the Skin Cases and Deaths by Year, South Dakota, 2001 - 2012

Source: South Dakota Department of Health

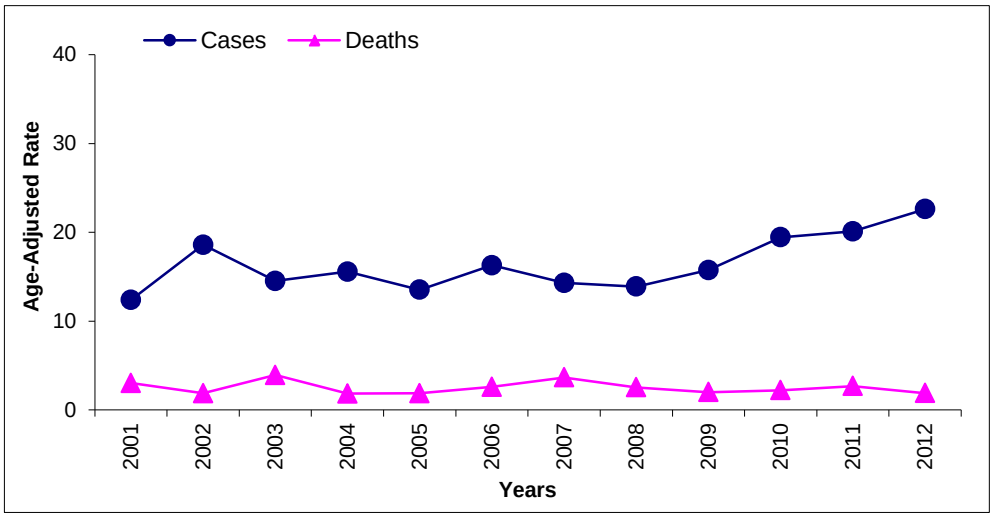


Figure 49: Melanoma of the Skin Age-Adjusted Rates, Cases, and Deaths by Year, South Dakota, 2001 - 2012

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

MYELOMA §

Table 21: Myeloma Incidence and Mortality Summary, 2012

Myeloma §			Incidence			Mortality		
			Total	Male	Female	**Total**	Male	Female
South Dakota	**Total**	# Cases / Deaths	**65**	39	26	**41**	17	24
		Age Adjusted Rate	**6.6**	8.6	4.7	**3.9**	3.8	3.8
	White	# Cases / Deaths	**61**	36	25	**39**	15	24
		Age Adjusted Rate	**6.5**	8.4	4.8	**3.9**	3.5	4.0
	American Indian	# Cases / Deaths	**4**	3	1	**2**	2	0
		Age Adjusted Rate	**10.8**	20.0	3.8	**4.7**	10.3	0.0
United States	**Total**	Age Adjusted Rate	*** 6.2**	* 7.7	* 5.0	*** 3.4**	* 4.3	* 2.7
	White	Age Adjusted Rate	*** 5.6**	* 7.2	* 4.3	*** 3.2**	* 4.1	* 2.5
	American Indian	Age Adjusted Rate	*** 4.2**	* 5.9	* 3.0	*** 2.3**	* 2.4	* 2.2

Rates per 100,000 age-adjusted to 2000 US standard population and 2012 SD estimated population.
§ can include NOS, multiple, plasma cell and solitary. * US Mortality rates are from 2011, the 2012 rate is not available at this time. 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.

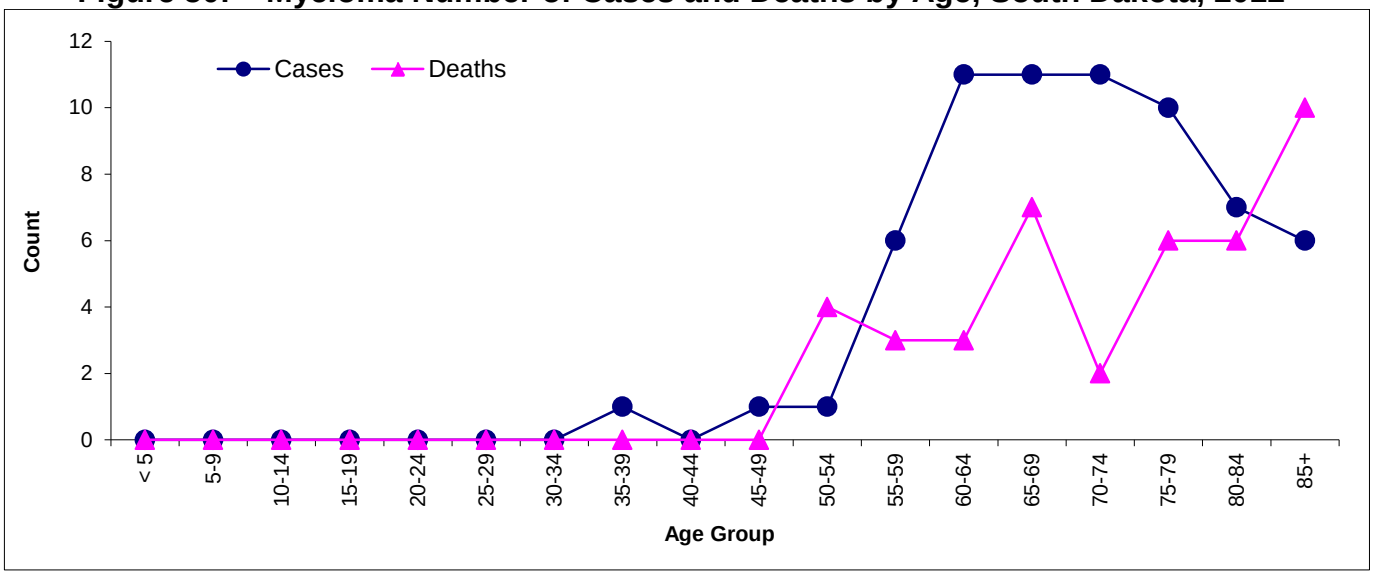
Incidence: Myeloma is a systemic malignancy of plasma cells that is highly treatable, but rarely curable. It is potentially curable when it presents as a solitary plasmacytoma of the bone or as an extramedullary plasmacytoma. In South Dakota during 2012, myeloma accounted for 1.8% of total cancer cases reported. Median age at diagnosis in South Dakota was 72 and the United States was 69. The national incidence rate is higher in men (7.7) than women (5.0). In South Dakota the incidence rate is also higher in men (8.6) than women (4.7). Myeloma is more common among the elderly. 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 survival of 24 to 30 months and a 10-year survival of 3%. During 2012, there were 41 deaths attributed to myeloma in South Dakota. Seventeen were male and 24 were female. The mortality rate for South Dakota was 3.9. For men and women the rate was 3.8. These rates compare to United States mortality rates in 2011 of 3.4 overall, 4.3 for men and 2.7 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 50: Myeloma Number of Cases and Deaths by Age, South Dakota, 2012



Source: South Dakota Department of Health

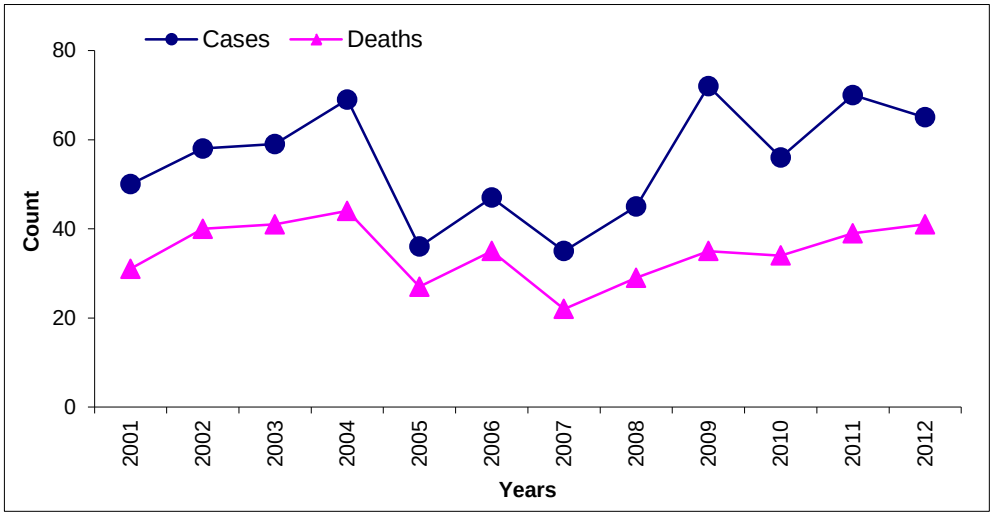


Figure 51: Myeloma Cancer Cases and Deaths by Year, South Dakota, 2001 - 2012

The incidence count for myeloma cancers took a sharp drop from 2004 to 2005, with an all-time high in 2009.

Source: South Dakota Department of Health

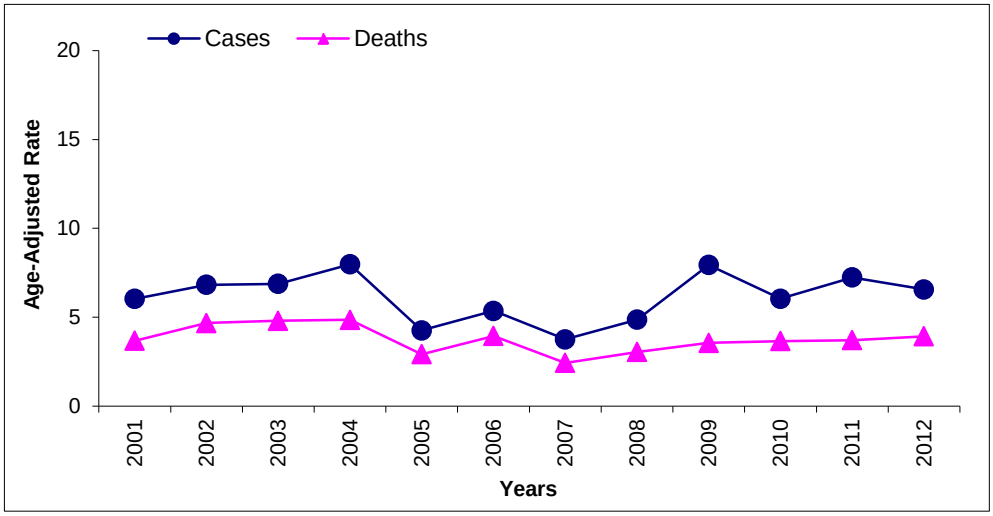


Figure 52: Myeloma Cancer Age-Adjusted Rates, Cases, and Deaths by Year, South Dakota, 2001 - 2012

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

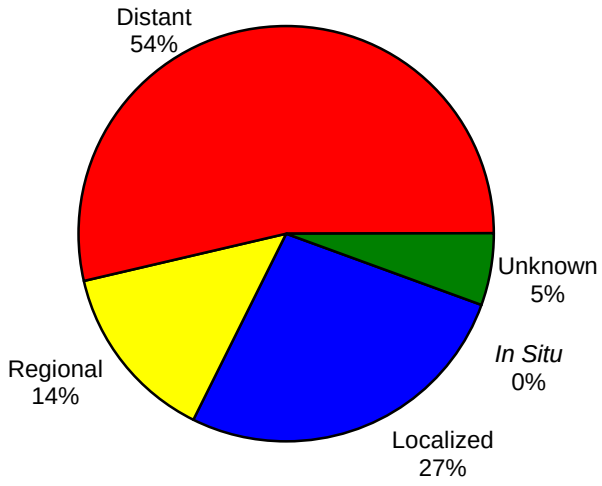
NON-HODGKIN'S LYMPHOMA

Table 22: Non-Hodgkin's Lymphoma Incidence and Mortality Summary, 2012

Non-Hodgkin's Lymphoma			Incidence			Mortality		
			Total	Male	Female	**Total**	Male	Female
South Dakota	**Total**	# Cases / Deaths	**179**	99	80	**63**	36	27
		Age Adjusted Rate	**19.0**	23.0	15.5	**6.1**	8.0	4.6
	White	# Cases / Deaths	**167**	94	73	**61**	36	25
		Age Adjusted Rate	**19.0**	23.6	14.8	**6.2**	8.4	4.3
	American Indian	# Cases / Deaths	**9**	4	5	**2**	0	2
		Age Adjusted Rate	**19.9**	14.0	23.8	**4.9**	0.0	9.3
United States	**Total**	Age Adjusted Rate	*** 19.0**	* 23.0	* 15.8	*** 6.0**	* 7.8	* 4.6
	White	Age Adjusted Rate	*** 19.8**	* 23.9	* 16.5	*** 6.3**	* 8.2	* 4.8
	American Indian	Age Adjusted Rate	*** 12.7**	* 12.9	* 12.3	*** 4.0**	* 5.3	* 2.8

Rates per 100,000 age-adjusted to 2000 US standard population and 2012 SD estimated population.
* US Mortality rates are from 2011, the 2012 rate is not available at this time. US rates www.seer.cancer.gov
Source: South Dakota Department of Health

Figure 53: Non-Hodgkin's Lymphoma Stage at Diagnosis, South Dakota, 2012



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 extralymphatic 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 2012, 54% of the cases were diagnosed at distant stage, an increase from 2011 when 47% were diagnosed at distant stage.

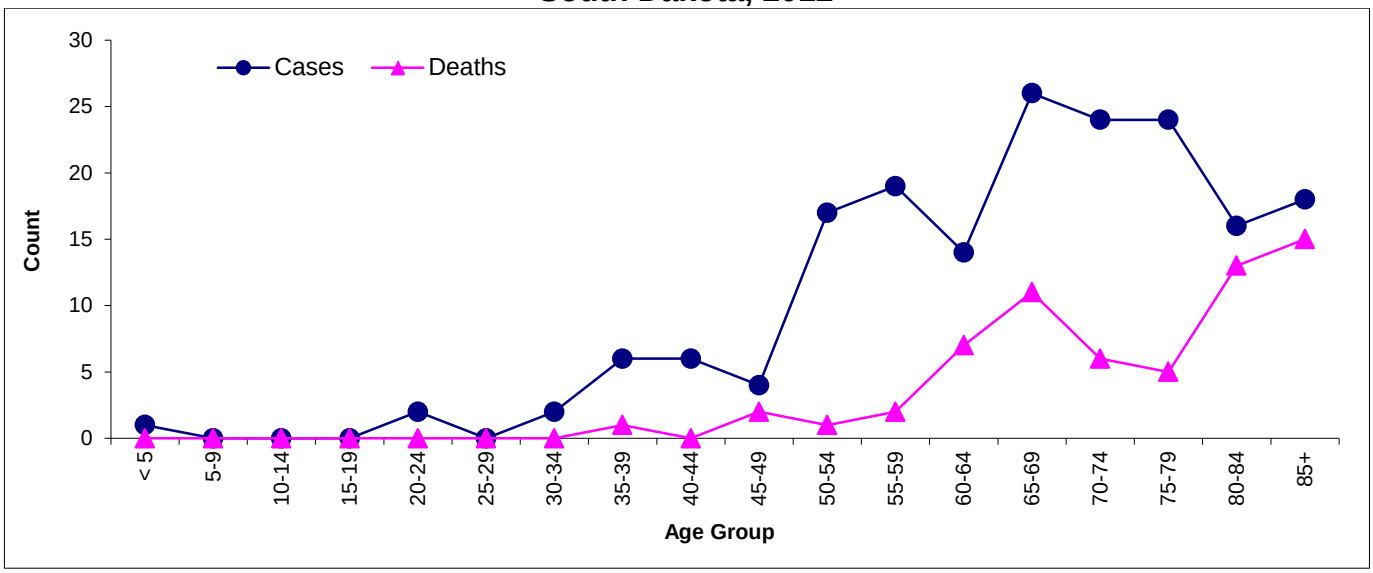
Incidence: Non-Hodgkin's lymphoma is a cancer that originates in the lymphatic system, the disease-fighting network that spreads throughout the body. It develops in lymphocytes, a type of white blood cell. Non-Hodgkin's lymphoma is more than five times as common as the other general type of lymphoma, Hodgkin's disease. The incidence rate has been increasing in the United States since the 1970s. The incidence of non-Hodgkin's disease in South Dakota was 179 cases in 2012. The median age at diagnosis in South Dakota in 2012 was 68.

Mortality: There were 63 deaths reported in South Dakota that were attributed to non-Hodgkin's lymphoma. The median age at death for those whose death was attributed to non-Hodgkin's lymphoma in South Dakota was 75 years of age. Nationally, the five-year survival rate is 69.3% for non-Hodgkin's lymphoma.

Risk and Associated Factors: Getting older 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 54: Non-Hodgkin's Lymphoma Number of Cases and Death by Age, South Dakota, 2012



Source: South Dakota Health Department

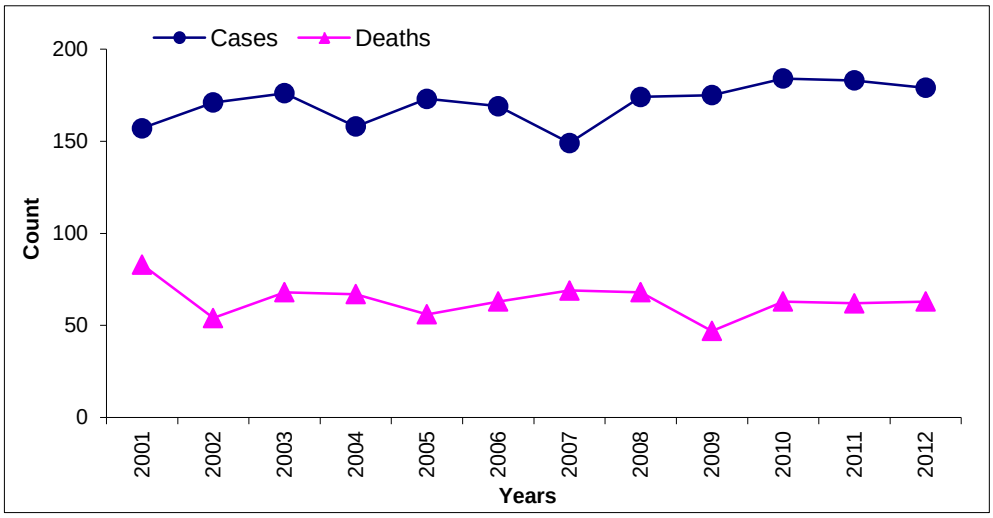


Figure 55: Non-Hodgkin's Lymphoma Cases and Deaths by Year, South Dakota, 2001 - 2012

Source: South Dakota Health Department

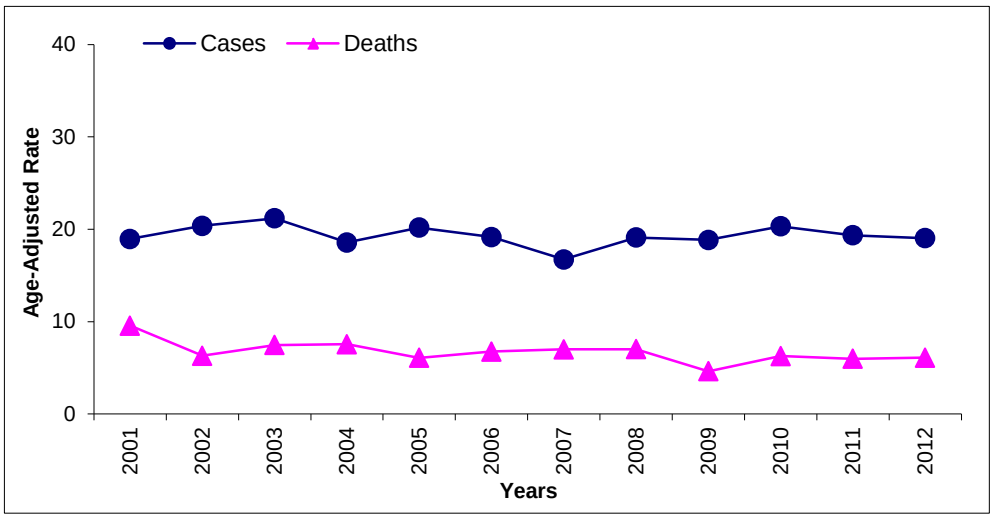


Figure 56: Non-Hodgkin's Lymphoma Age-Adjusted Rates, Cases, and Deaths by Year, South Dakota, 2001 - 2012

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

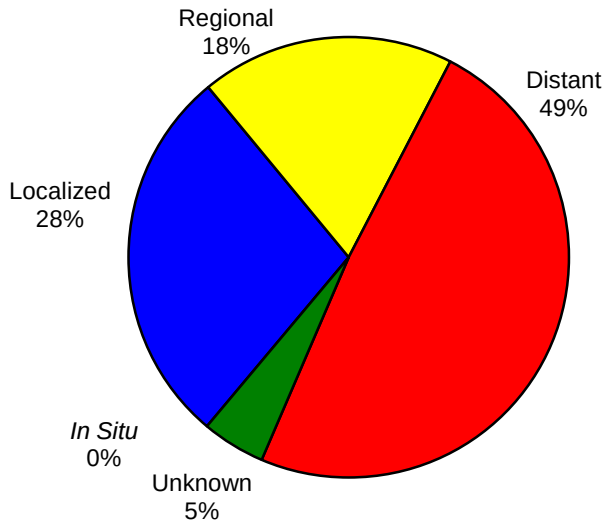
OVARY

Table 23: Ovarian Incidence and Mortality Summary, 2012

Ovarian Cancer			Incidence	Mortality
South Dakota	Total	# Cases / Deaths	43	37
		Age Adjusted Rate	8.7	7.1
	White	# Cases / Deaths	40	33
		Age Adjusted Rate	8.7	6.5
	American Indian	# Cases / Deaths	2	2
		Age Adjusted Rate	9.3	9.4
United States	Total	Age Adjusted Rate	* 11.5	* 7.5
	White	Age Adjusted Rate	* 12.1	* 7.8
	American Indian	Age Adjusted Rate	* 8.3	* 6.2

Rates per 100,000 age-adjusted to 2000 US standard population and 2012 SD estimated population.
* US Mortality rates are from 2011, the 2012 rate is not available at this time.
US rates www.seer.cancer.gov Source: South Dakota Department of Health

Figure 57: Ovarian Cancer Stage at Diagnosis, South Dakota, 2012



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 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 2012, in South Dakota 21 (49%) of the 43 cases were diagnosed at distant stage.

Incidence: The incidence of ovarian cancer varies greatly. There were 43 cases of ovarian cancer reported in 2012 in South Dakota. This accounted for 2.1% of the cancer cases diagnosed in 2012 for South Dakota women. The lifetime risk of a woman developing ovarian cancer is 1.4%. Seven cases were diagnosed at younger than 49 years of age. There were nine cases diagnosed in the 60-69 age group. The median age at diagnosis in South Dakota was 60; nationally it was 63.

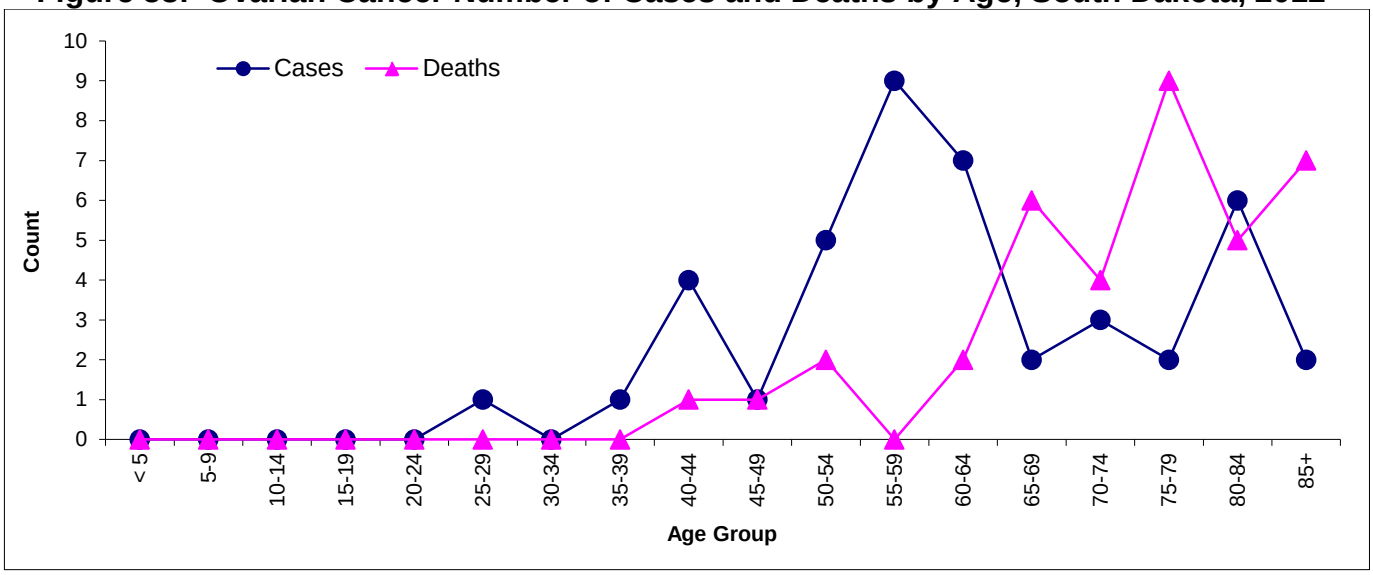
Mortality: Doctors are using dramatic new therapies to fight ovarian cancer, extending the lives of women who five or 10 years ago would have died from the disease. Survival rates for the last several decades are only about 25% for those with advanced disease. Most ovarian cancer presents at advanced disease. Only 27.4% 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 92.3% curable. In South Dakota, 37 patients died in 2012. The mortality rate was 7.1 for women in South Dakota.

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 58: Ovarian Cancer Number of Cases and Deaths by Age, South Dakota, 2012



Source: South Dakota Department of Health

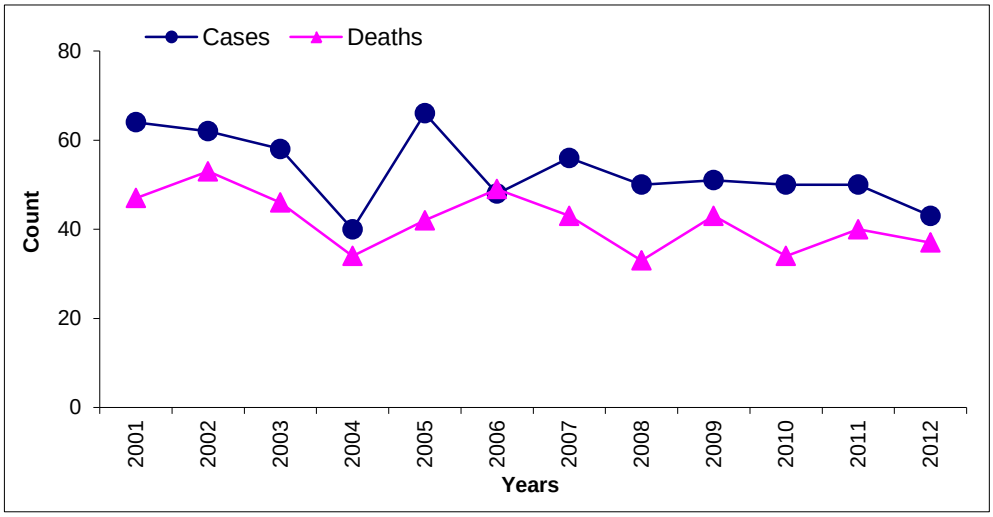


Figure 59: Ovarian Cancer Cases and Deaths by Year, South Dakota, 2001 - 2012

Source: South Dakota Department of Health

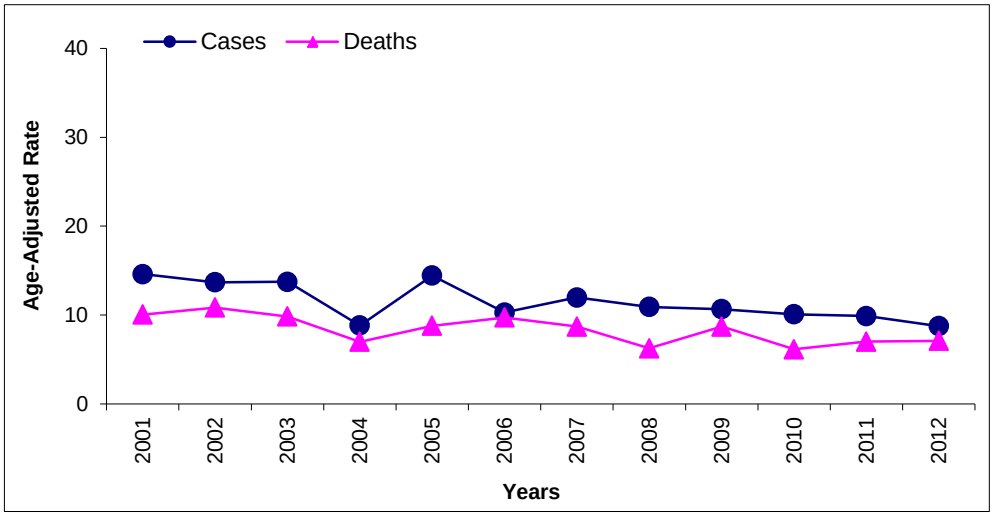


Figure 60: Ovarian Cancer Age-Adjusted Rates, Cases, and Deaths by Year, South Dakota, 2001 - 2012

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

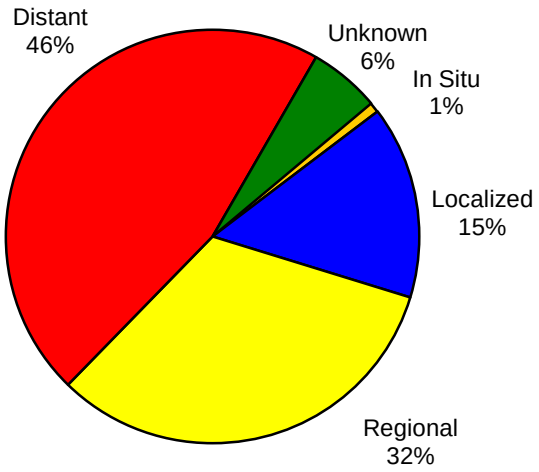
PANCREAS

Table 24: Pancreas Incidence and Mortality Summary, 2012

Pancreas Cancer			Incidence			Mortality		
			Total	Male	Female	**Total**	Male	Female
South Dakota	**Total**	# Cases / Deaths	**125**	68	57	**105**	52	53
		Age Adjusted Rate	**12.6**	14.6	10.3	**10.5**	11.8	9.3
	White	# Cases / Deaths	**120**	66	54	**101**	50	51
		Age Adjusted Rate	**12.9**	15.0	10.3	**10.7**	11.8	9.5
	American Indian	# Cases / Deaths	**3**	1	2	**4**	2	2
		Age Adjusted Rate	**7.4**	3.4	9.9	**12.6**	16.3	9.8
United States	**Total**	Age Adjusted Rate	*** 12.2**	* 14.0	* 10.7	*** 10.9**	* 12.5	* 9.5
	White	Age Adjusted Rate	*** 12.1**	* 14.1	* 10.5	*** 10.8**	* 12.5	* 9.4
	American Indian	Age Adjusted Rate	*** 9.5**	* 12.5	* 6.9	*** 8.6**	* 8.8	* 8.3

Rates per 100,000 age-adjusted to 2000 US standard population and 2012 SD estimated population.
* US Mortality rates are from 2011, the 2012 rate is not available at this time. US rates www.seer.cancer.gov
Source: South Dakota Department of Health

Figure 61: Pancreatic Cancer Stage at Diagnosis, South Dakota, 2012



Source: South Dakota Department of Health

Descriptive Epidemiology

Stage at Diagnosis: Often pancreatic cancer is 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 late stage (regional and distant) in 2012.

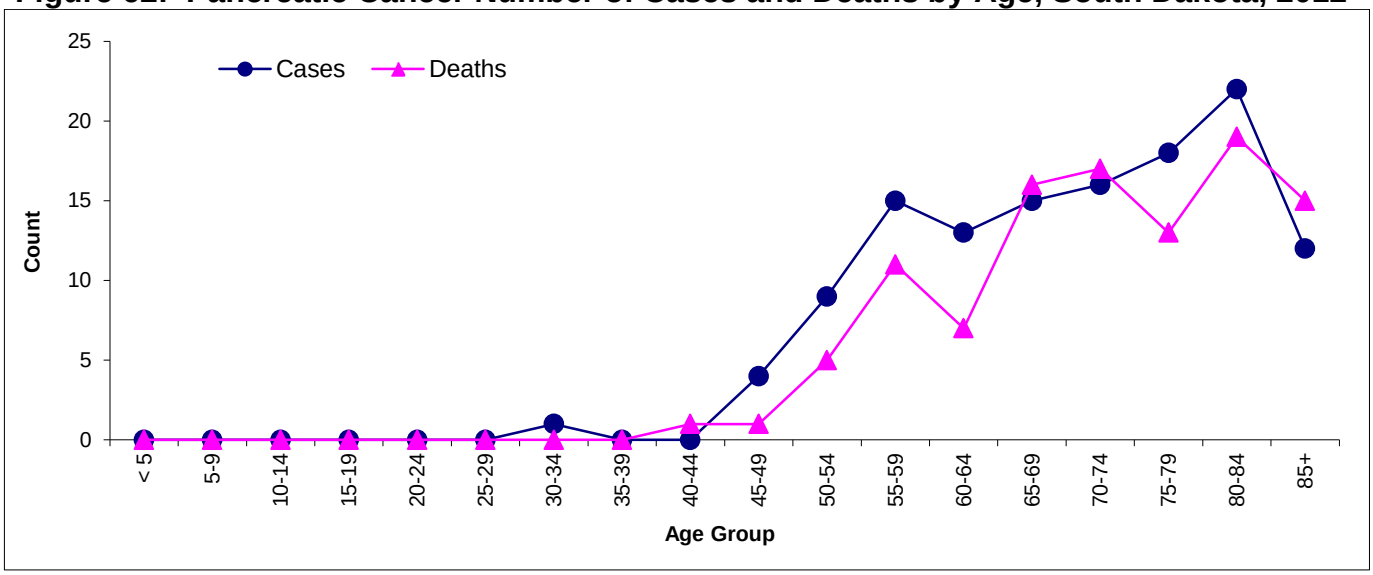
Incidence: The incidence of pancreatic cancer increases steadily with age. An estimated 43,920 new cases of pancreatic cancer were expected to be diagnosed in 2012 in the United States. The majority of the cases occured in South Dakotans 65 years old or older. Eighty-three cases (66.4%) were diagnosed in 2012 in that age group. In the United States and South Dakota this cancer occured more in females than in males. Nationally, there was a higher incidence rate in blacks of both genders. The median age at diagnosis was 71 years in South Dakota and the United States.

Mortality: The overall survival for cancer of the pancreas is poor. Studies reveal that the 5-year survival rate is approximately 6.7%. More recently, prospective studies show survival improvement with postoperative chemotherapy. In 2012, there were 105 deaths and the median age at death was 73 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 for developing pancreatic cancer. As one ages, the incidence of pancreatic cancer increases, especially after the age of 60. Cigarette smokers are two to three times more likely than nonsmokers to develop this cancer. Pancreatic cancer occurs frequently 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 62: Pancreatic Cancer Number of Cases and Deaths by Age, South Dakota, 2012



Source: South Dakota Department of Health

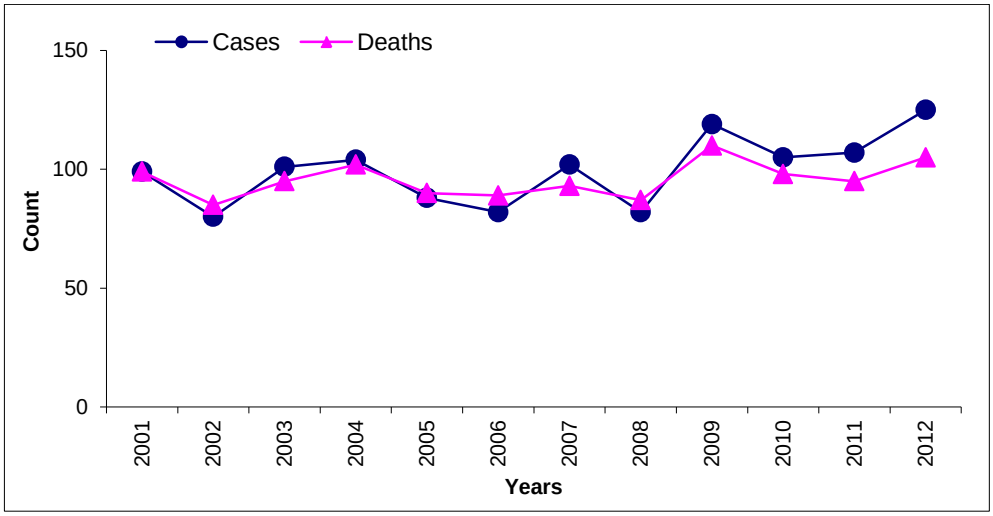


Figure 63: Pancreatic Cancer Cases and Deaths by Year, South Dakota, 2001 - 2012

Source: South Dakota Department of Health

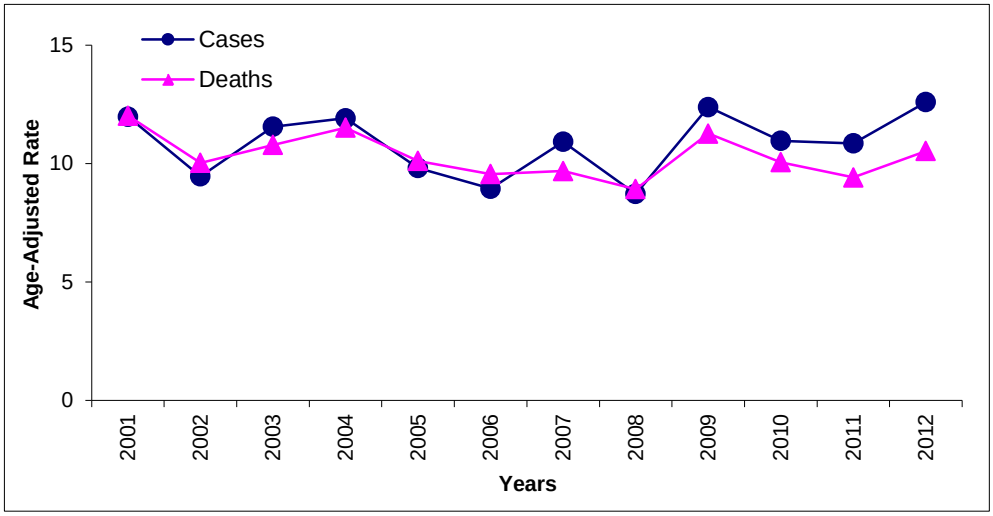


Figure 64: Pancreatic Cancer Age-Adjusted Rates, Cases, and Deaths by Year, South Dakota, 2001 - 2012

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

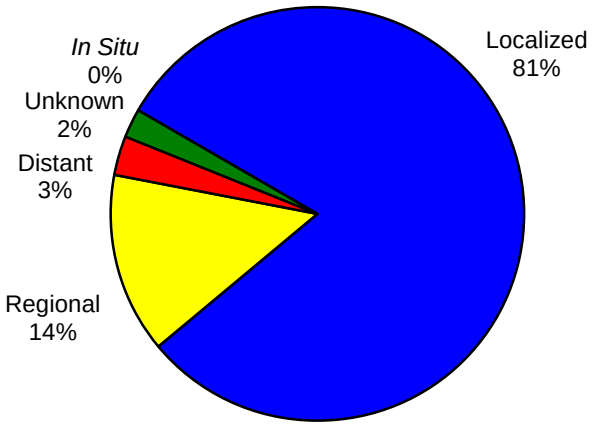
PROSTATE

Table 25: Prostate Incidence and Mortality Summary, 2012

Prostate Cancer			Incidence	Mortality
South Dakota	Total	# Cases / Deaths	490	75
		Age Adjusted Rate	102.4	17.8
	White	# Cases / Deaths	460	74
		Age Adjusted Rate	102.4	18.2
	American Indian	# Cases / Deaths	24	1
		Age Adjusted Rate	108.5	9.4
United States	Total	Age Adjusted Rate	* 135.7	* 20.8
	White	Age Adjusted Rate	* 125.9	* 19.2
	American Indian	Age Adjusted Rate	* 53.2	* 22.1

Rates per 100,000 age-adjusted to 2000 US standard population and 2012 SD estimated population.
* US Mortality rates are from 2011, the 2012 rate is not available at this time.
US rates www.seer.cancer.gov Source: South Dakota Department of Health

Figure 65: Prostate Cancer Stage at Diagnosis, South Dakota, 2012



Source: South Dakota Department of Health

Descriptive Epidemiology

Stage at Diagnosis: The greatest number of cases was diagnosed at an early stage. In 2012, 81% 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 de Vinci Robotic assisted prostatectomy, proton therapy, and brachytherapy radiation.

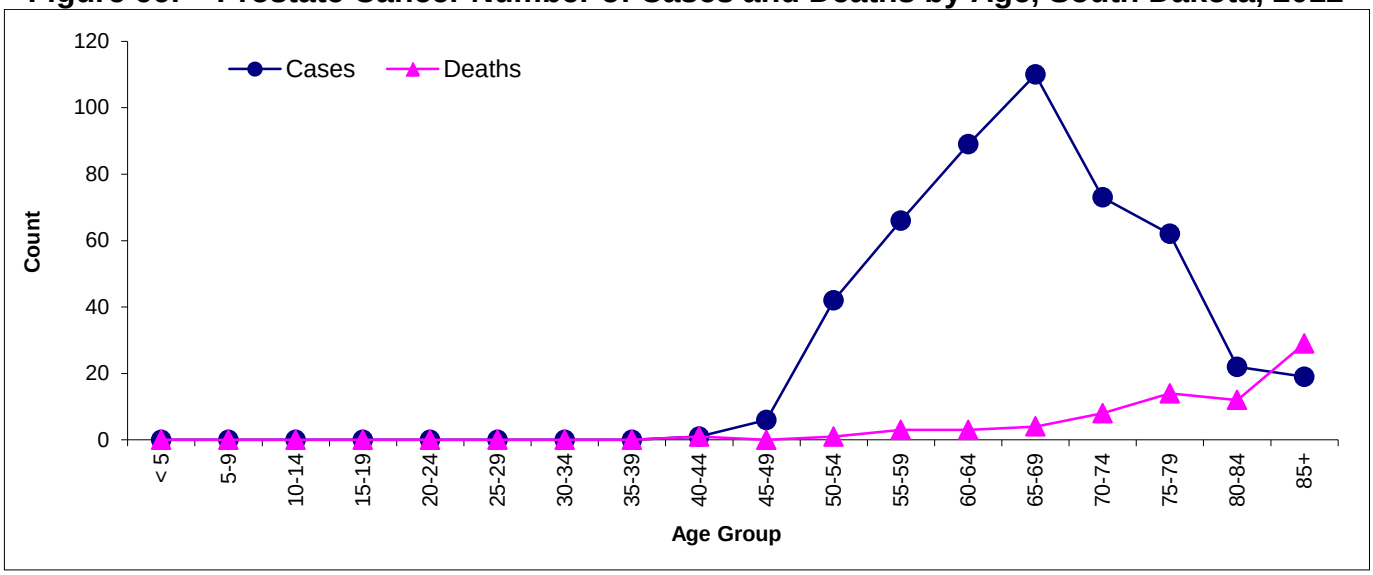
Incidence: Carcinoma of the prostate is predominately a tumor of older men. The median age at diagnosis in South Dakota is 66. Also, in South Dakota the incidence of prostate cancer begins to increase in the 60's age group. Nationwide, eight out of 10 men diagnosed with prostate cancer are over the age of 65. Prostate cancer is the second most diagnosed site of all cancers reported in the state.

Mortality: Prostate cancer was the third leading cancer death in men in South Dakota in 2012. 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 2012 was 80 years old and only one was American Indian. 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 palpable normal 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 50.

Figure 66: Prostate Cancer Number of Cases and Deaths by Age, South Dakota, 2012



Source: South Dakota Department of Health

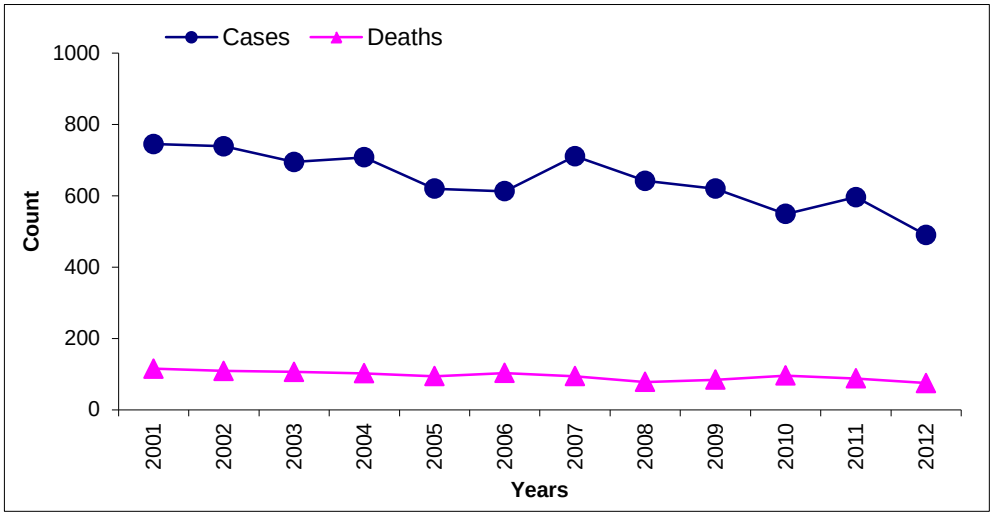


Figure 67: Prostate Cancer Cases and Deaths by Year, South Dakota, 2001 - 2012

Source: South Dakota Department of Health

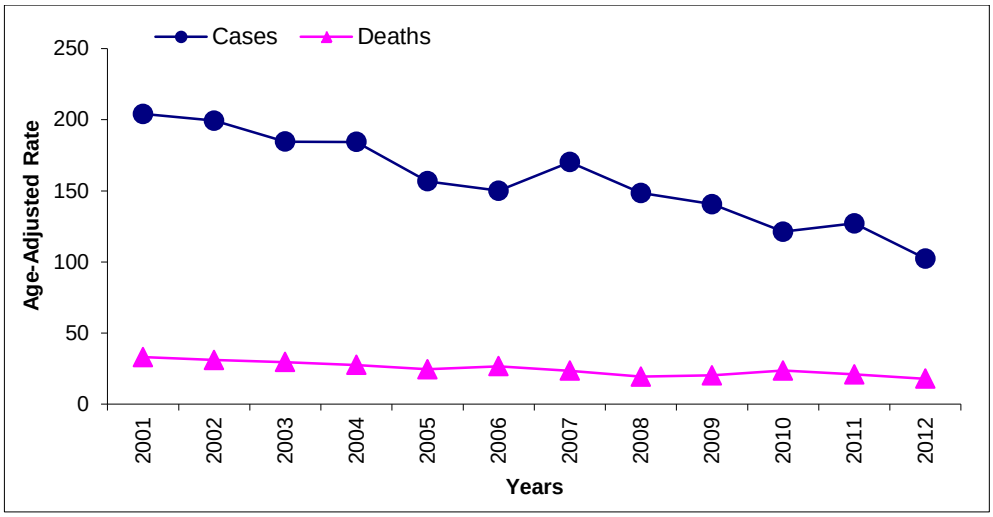


Figure 68: Prostate Cancer Age-Adjusted Rates, Cases, and Deaths by Year, South Dakota 2001 - 2012

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

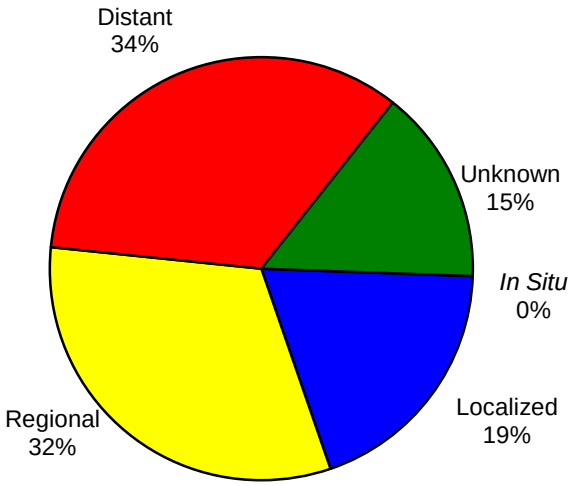
STOMACH

Table 26: Stomach Incidence and Mortality Summary, 2012

Stomach Cancer			Incidence			Mortality		
			Total	Male	Female	**Total**	Male	Female
South Dakota	**Total**	# Cases / Deaths	**47**	34	13	**14**	7	7
		Age Adjusted Rate	**4.8**	7.3	2.6	**1.4**	1.6	1.2
	White	# Cases / Deaths	**44**	31	13	**11**	6	5
		Age Adjusted Rate	**4.6**	6.8	2.7	**1.1**	1.4	0.8
	American Indian	# Cases / Deaths	**2**	2	0	**2**	1	1
		Age Adjusted Rate	**4.1**	9.0	0.0	**6.0**	4.3	6.7
United States	**Total**	Age Adjusted Rate	*** 7.2**	* 9.8	* 5.1	*** 3.3**	* 4.4	* 2.3
	White	Age Adjusted Rate	*** 6.5**	* 9.0	* 4.4	*** 2.8**	* 3.9	* 2.0
	American Indian	Age Adjusted Rate	*** 8.7**	* 13.7	* 5.2	*** 4.6**	* 6.5	* 3.2

Rates per 100,000 age-adjusted to 2000 US standard population and 2012 SD estimated population.
* US Mortality rates are from 2011, the 2012 rate is not available at this time. US rates www.seer.cancer.gov
Source: South Dakota Department of Health

Figure 69: Stomach Cancer Stage of Diagnosis, South Dakota, 2012



Source: South Dakota Department of Health

Descriptive Epidemiology

Stage at Diagnosis*:* In 2012 data demonstrates that 9 (19%) cases were diagnosed at localized stage. When a patient is diagnosed at an early stage prognosis is much better. Fifteen cases (32%) were diagnosed at regional stage. There were 16 (34%) of the cases in South Dakota diagnosed at distant stage. Prognosis for 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 continues to account for approximately 1.1% of all cancers in South Dakota. Of the 47 cases diagnosed in 2012, 34 were male and 13 were female. It is predominately a disease of men. Gastric (stomach) cancer is found more commonly in people between the ages of 50 and 70 years of age. The median age at diagnosis was 69 in the United States and 70 in South Dakota.

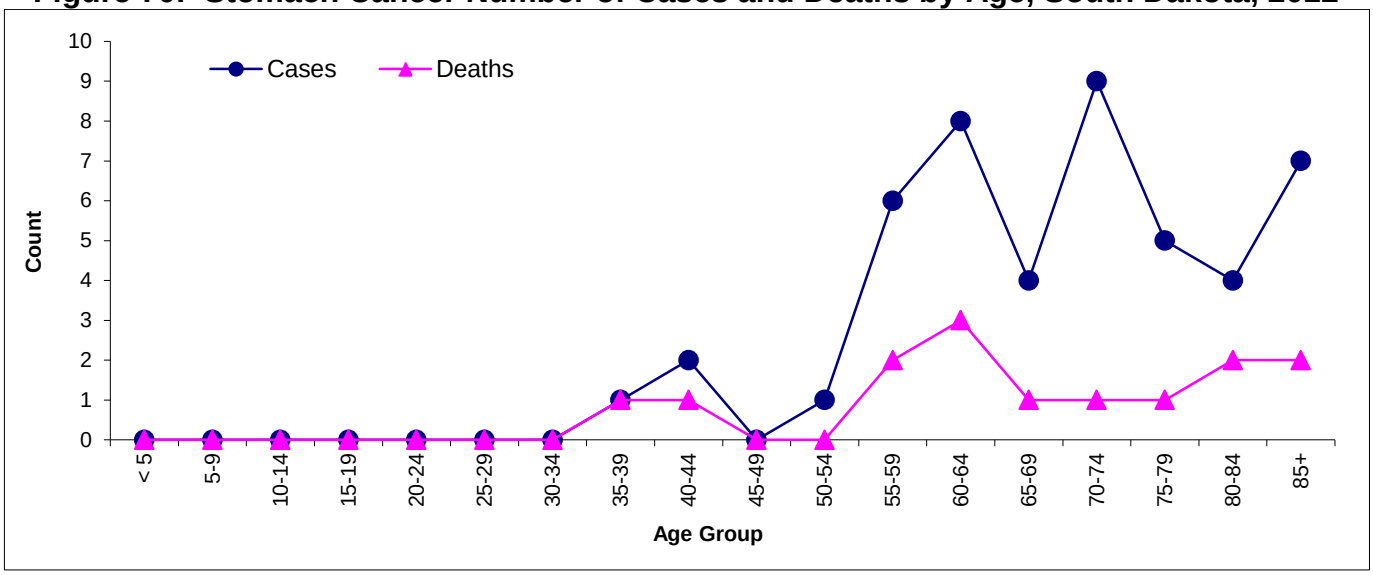
Mortality*:* Stomach cancer accounted for 0.8% of cancer deaths in South Dakota in 2012. The median age at death was 64.5 in South Dakota and 72 in the United States. The age-adjusted death rate was 1.6 for men and 1.2 in women in South Dakota. These rates are based on patients who died in 2012 in South 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.

[1]http://www.cancer.gov/Common/PopUps/popDefinition.aspx?id=45328&version=Patient&language=English
[2]http://www.cancer.gov/Common/PopUps/popDefinition.aspx?id=439435&version=Patient&language=English

Figure 70: Stomach Cancer Number of Cases and Deaths by Age, South Dakota, 2012



Source: South Dakota Department of Health

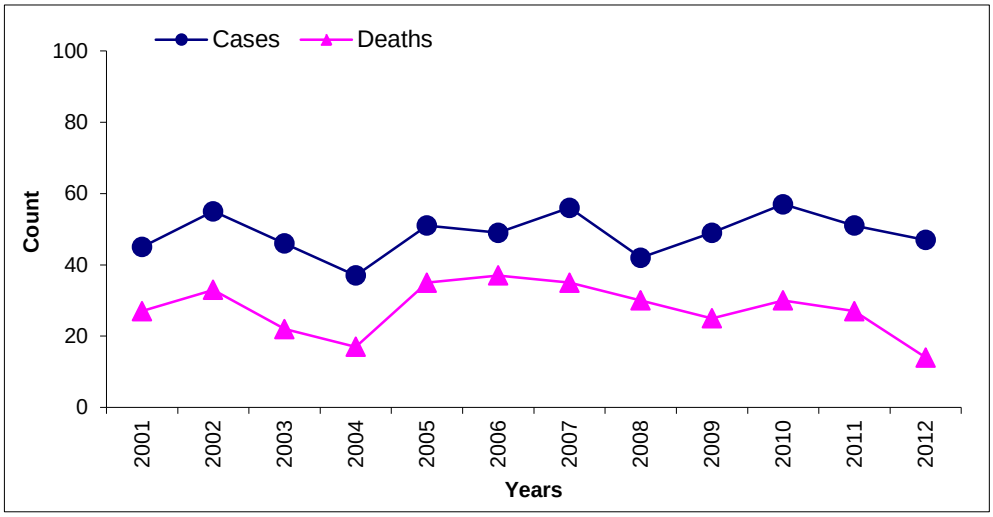


Figure 71: Stomach Cancer Cases and Deaths by Year, South Dakota, 2001 - 2012

Source: South Dakota Department of Health

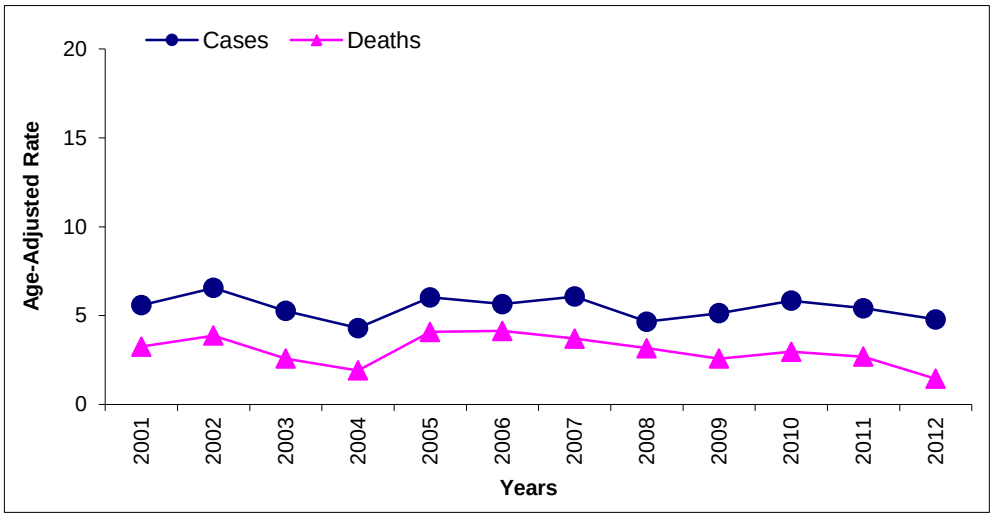


Figure 72: Stomach Cancer Age-Adjusted Rates, Cases, and Deaths by Year, South Dakota, 2001 - 2012

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

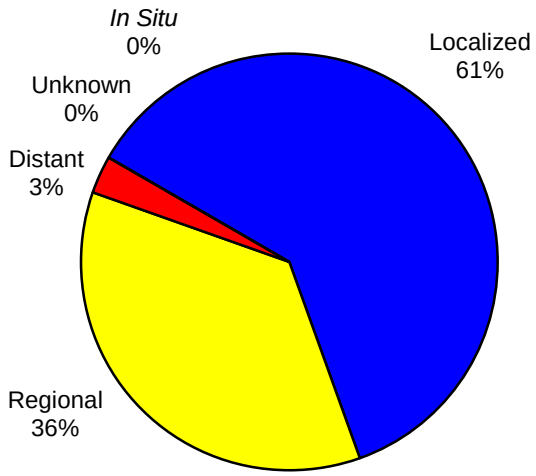
THYROID

Table 27: Thyroid Incidence and Mortality Summary, 2012

Thyroid Cancer			Incidence			Mortality		
			Total	Male	Female	**Total**	Male	Female
South Dakota	**Total**	# Cases / Deaths	**103**	27	76	**0**	0	0
		Age Adjusted Rate	**12.1**	5.9	18.4	**0.0**	0.0	0.0
	White	# Cases / Deaths	**94**	26	68	**0**	0	0
		Age Adjusted Rate	**12.5**	6.4	18.7	**0.0**	0.0	0.0
	American Indian	# Cases / Deaths	**8**	1	7	**0**	0	0
		Age Adjusted Rate	**11.7**	3.7	19.5	**0.0**	0.0	0.0
United States	**Total**	Age Adjusted Rate	*** 13.8**	* 6.9	* 20.5	*** 0.5**	* 0.5	* 0.5
	White	Age Adjusted Rate	*** 14.5**	* 7.4	* 21.7	*** 0.5**	* 0.5	* 0.5
	American Indian	Age Adjusted Rate	*** 8.0**	* 4.3	* 11.5	*****	*	*

Rates per 100,000 age-adjusted to 2000 US standard population and 2012 SD estimated population.
* US Mortality rates are from 2011, the 2012 rate is not available at this time. US rates www.seer.cancer.gov
Source: South Dakota Department of Health

Figure 73: Thyroid Cancer Stage at Diagnosis, South Dakota, 2012



Source: South Dakota Department of Health

Descriptive Epidemiology

Stage at Diagnosis: In 2012 data demonstrates that 63 (61%) of cases were diagnosed at localized stage. When a patient is diagnosed at an early stage, prognosis is much better for a cure. There were 37 (36%) cases diagnosed at regional stage. Only three cases (3%) were diagnosed at a distant stage.

Incidence: The American Cancer Society estimated 54,460 thyroid cancer cases would be diagnosed in the United States in 2012. Thyroid cancer continues to account for approximately 2.5% of all cancers in South Dakota. Of the 103 cases diagnosed in 2012, 27 were male and 76 were female. The median age at diagnosis was 51. In the United States the median age was 50. Thyroid cancer is found more commonly in people between the ages of 45 and 70 years of age, with 81% diagnosed before age 65. It is predominately a disease of females as the statistics for South Dakota confirm.

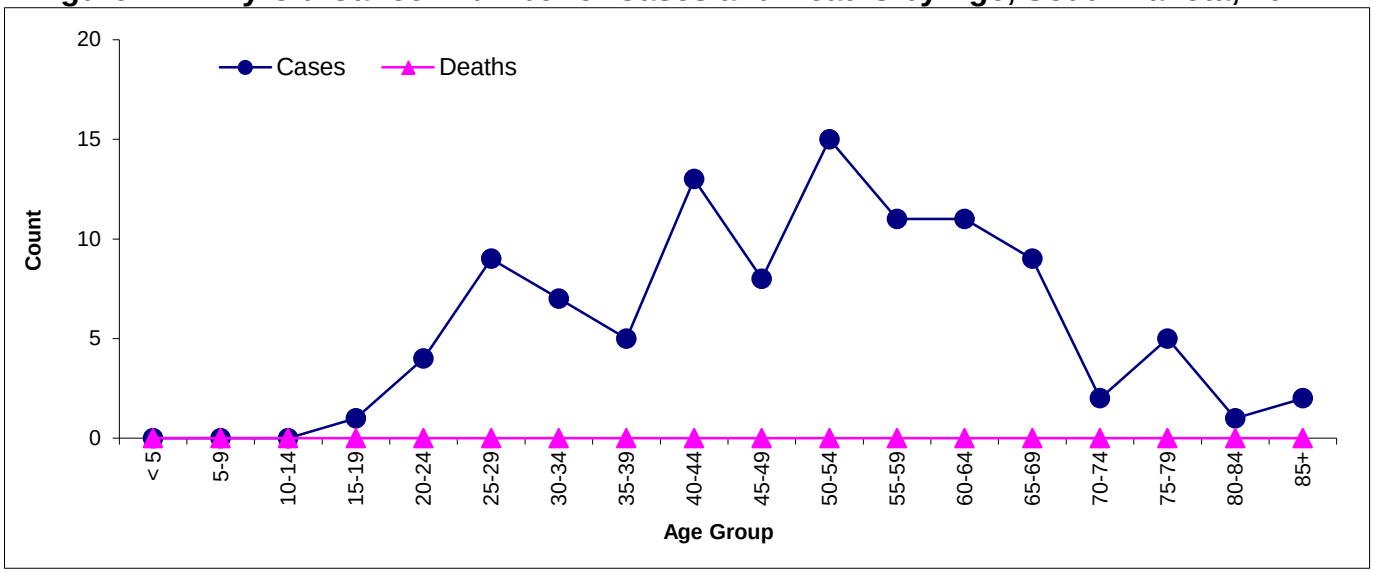
Mortality: South Dakota had no deaths attributed to thyroid cancer in 2012. Nationally, the 5-year relative survival rates were 99.9% for localized, 98.1% for regional, and 89.6% for unknown stage.

Risk and Associated Factors: Thyroid cancer accounted for only 2.5% of the cancer cases in South Dakota in 2012. 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 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
- A 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 74: Thyroid Cancer Number of Cases and Deaths by Age, South Dakota, 2012



Source: South Dakota Department of Health

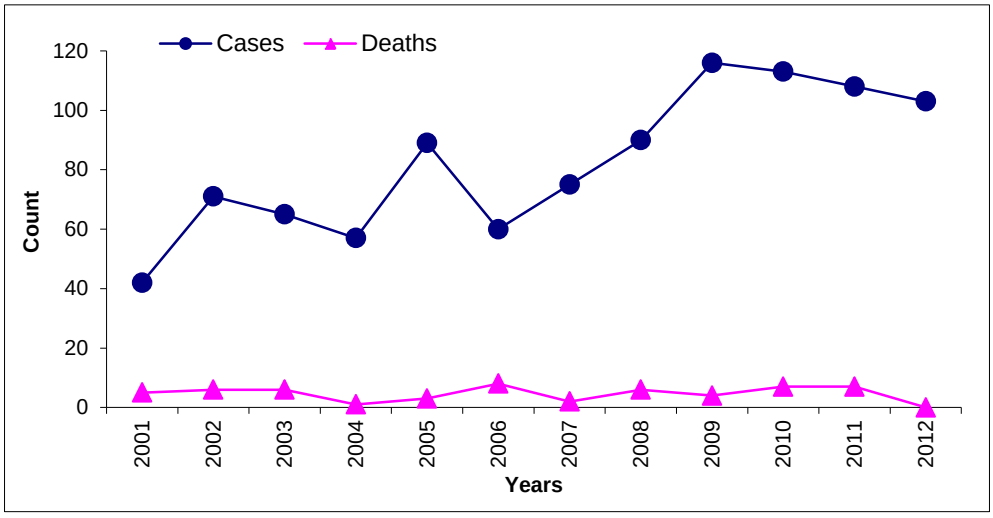


Figure 75: Thyroid Cancer Cases and Deaths by Year, South Dakota, 2001 - 2012

The incidence count for thyroid cancers peaked in 2009.

Source: South Dakota Department of Health

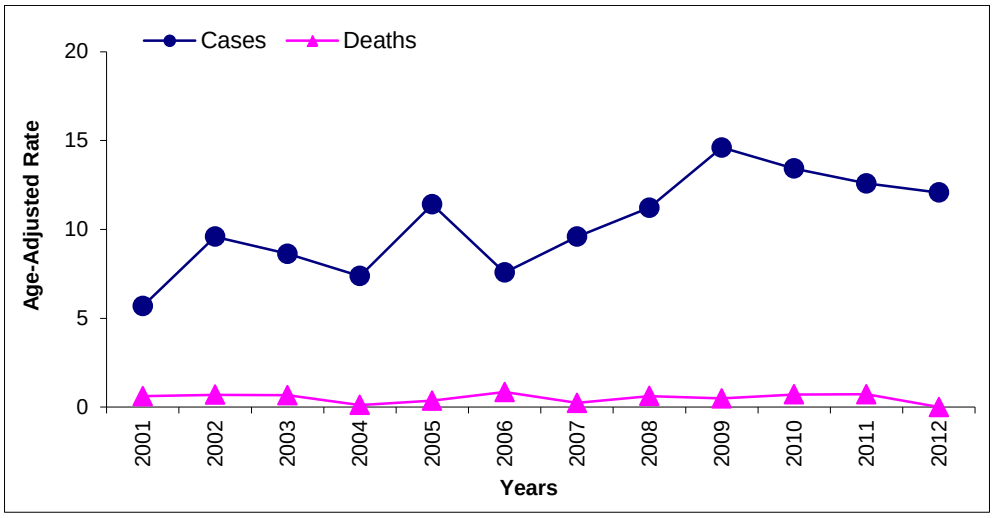


Figure 76: Thyroid Cancer Age-Adjusted Rates, Cases, and Deaths by Year, South Dakota, 2001 - 2012

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. 2003-2012 South Dakota Estimated Population

Year	2003	2004	2005	2008	2008	2008	2009	2010	2011	2012
Total	766,975	774,283	780,084	788,519	797,035	804,532	812,383	814,180	824,082	833,354
<5	51,908	53,062	54,334	55,640	57,448	58,582	59,640	59,621	59,591	59,202
5-9	51,598	51,359	51,478	51,545	51,944	52,692	53,496	55,531	56,389	58,010
10-14	57,154	56,171	54,880	54,450	53,630	52,954	52,576	53,960	54,096	53,956
15-19	62,195	61,741	60,843	60,084	59,858	59,184	58,571	57,628	57,916	57,439
20-24	59,591	61,852	62,742	63,756	62,601	62,764	62,919	57,596	58,178	59,174
25-29	44,685	45,983	47,482	48,972	51,977	53,851	56,270	55,570	56,020	56,397
30-34	45,078	44,686	44,406	43,985	44,439	45,387	46,540	49,859	52,216	53,875
35-39	48,792	47,126	46,103	46,184	46,287	46,003	45,707	45,766	45,524	46,326
40-44	58,394	57,759	56,131	54,090	51,639	49,163	47,626	47,346	47,375	47,570
45-49	57,427	57,749	58,361	58,701	58,653	58,526	57,845	57,519	54,849	52,681
50-54	50,266	52,259	53,782	55,507	56,682	57,673	57,850	59,399	59,960	60,037
55-59	39,282	41,733	44,626	47,667	49,558	51,199	52,996	54,231	56,261	57,577
60-64	31,499	33,056	34,232	35,504	38,305	40,441	42,615	43,573	47,054	48,927
65-69	26,771	27,201	27,699	28,381	29,312	30,956	32,303	31,944	33,144	35,738
70-74	25,272	24,845	24,567	24,588	24,670	24,879	25,236	25,683	25,882	26,396
75-79	22,518	22,412	22,441	22,634	22,574	22,287	21,866	21,724	21,660	21,766
80-84	17,356	17,707	17,826	18,043	18,162	18,253	18,122	18,004	18,102	18,112
85+	17,189	17,582	18,151	18,788	19,296	19,738	20,205	19,226	19,865	20,171

Appendix C: Race in South Dakota by County, 2012 Estimated Population

	Total	*White*		*Black*		*American Indian*		*Asian*		*Other*	
South Dakota	833,354	718,352	86%	13,939	2%	74,223	9%	9,005	1%	17,835	2%
Aurora	2,742	2,639	96%	16	1%	47	2%	20	1%	20	1%
Beadle	17,753	16,064	90%	268	2%	226	1%	896	5%	299	2%
Bennett	3,436	1,161	34%	10	0%	2,077	60%	19	1%	169	5%
Bon Homme	7,029	6,309	90%	86	1%	507	7%	19	0%	108	2%
Brookings	32,629	30,482	93%	405	1%	390	1%	901	3%	451	1%
Brown	37,331	34,659	93%	408	1%	1,181	3%	430	1%	653	2%
Brule	5,293	4,668	88%	26	0%	446	8%	11	0%	142	3%
Buffalo	2,020	348	17%	9	0%	1,627	81%	1	0%	35	2%
Butte	10,228	9,685	95%	56	1%	185	2%	30	0%	272	3%
Campbell	1,396	1,371	98%	5	0%	7	1%	7	1%	6	0%
Charles Mix	9,216	5,950	65%	33	0%	2,944	32%	23	0%	266	3%
Clark	3,585	3,532	99%	16	0%	5	0%	2	0%	30	1%
Clay	14,131	12,846	91%	257	2%	448	3%	283	2%	297	2%
Codington	27,606	26,308	95%	203	1%	564	2%	175	1%	356	1%
Corson	4,077	1,262	31%	9	0%	2,683	66%	11	0%	112	3%
Custer	8,339	7,806	94%	46	1%	273	3%	40	0%	174	2%
Davison	19,769	18,646	94%	172	1%	558	3%	104	1%	289	1%
Day	5,613	4,973	89%	29	1%	499	9%	16	0%	96	2%
Deuel	4,380	4,282	98%	40	1%	17	0%	7	0%	34	1%
Dewey	5,538	1,225	22%	10	0%	4,088	74%	9	0%	206	4%
Douglas	2,970	2,857	96%	12	0%	67	2%	7	0%	27	1%
Edmunds	4,026	3,949	98%	8	0%	20	0%	7	0%	42	1%
Fall River	6,971	6,188	89%	77	1%	470	7%	43	1%	193	3%
Faulk	2,377	2,343	99%	5	0%	3	0%	7	0%	19	1%
Grant	7,259	7,073	97%	27	0%	59	1%	29	0%	71	1%
Gregory	4,265	3,823	90%	12	0%	316	7%	17	0%	97	2%
Haakon	1,939	1,808	93%	15	1%	40	2%	20	1%	56	3%
Hamlin	5,918	5,810	98%	32	1%	23	0%	14	0%	39	1%
Hand	3,388	3,332	98%	3	0%	14	0%	11	0%	28	1%
Hanson	3,377	3,318	98%	8	0%	16	0%	15	0%	20	1%
Harding	1,316	1,267	96%	5	0%	22	2%	1	0%	21	2%
Hughes	17,450	14,871	85%	251	1%	1,812	10%	98	1%	418	2%
Hutchinson	7,187	6,989	97%	46	1%	75	1%	18	0%	59	1%
Hyde	1,437	1,283	89%	6	0%	115	8%	5	0%	28	2%
Jackson	3,191	1,368	43%		1%	1,647	52%	3	0%	156	5%
Jerauld	2,047	2,011	98%	4	0%	7	0%	5	0%	20	1%
Jones	1,013	945	93%	4	0%	29	3%	1	0%	34	3%
Kingsbury	5,220	5,083	97%	24	0%	32	1%	23	0%	58	1%
Lake	11,771	11,331	96%	106	1%	94	1%	86	1%	154	1%
Lawrence	24,397	22,963	94%	209	1%	548	2%	180	1%	497	2%
Lincoln	48,296	46,270	96%	479	1%	303	1%	544	1%	700	1%
Lyman	3,789	2,187	58%	12	0%	1,480	39%	10	0%	100	3%
Marshall	5,610	5,498	98%	21	0%	35	1%	14	0%	42	1%
McCook	2,439	2,399	98%	5	0%	2	0%	11	0%	22	1%
McPherson	4,671	4,114	88%	41	1%	430	9%	15	0%	71	2%
Meade	26,052	23,885	92%	468	2%	740	3%	208	1%	751	3%
Mellette	2,101	871	41%	3	0%	1,101	52%	7	0%	119	6%
Miner	2,326	2,282	98%	8	0%	5	0%	9	0%	22	1%
Minnehaha	175,037	155,918	89%	7,411	4%	4,838	3%	2,770	2%	4,100	2%
Moody	6,446	5,288	82%	54	1%	854	13%	81	1%	169	3%
Pennington	104,347	87,714	84%	1,590	2%	10,172	10%	1,187	1%	3,684	4%
Perkins	3,037	2,939	97%	10	0%	48	2%	8	0%	32	1%
Potter	2,359	2,293	97%	9	0%	26	1%	8	0%	23	1%
Roberts	10,303	6,228	60%	24	0%	3,697	36%	35	0%	319	3%
Sanborn	2,324	2,267	98%	2	0%	12	1%	6	0%	37	2%
Shannon	14,059	752	5%	46	0%	12,971	92%	71	1%	219	2%
Spink	6,611	6,428	97%	32	0%	85	1%	7	0%	59	1%
Stanley	2,969	2,641	89%	18	1%	224	8%	8	0%	78	3%
Sully	1,427	1,364	96%	10	1%	22	2%	0	0%	31	2%
Todd	9,942	1,049	11%	26	0%	8,630	87%	31	0%	206	2%
Tripp	5,485	4,577	83%	19	0%	751	14%	16	0%	122	2%
Turner	8,308	8,102	98%	39	0%	78	1%	14	0%	75	1%
Union	14,855	14,211	96%	158	1%	89	1%	179	1%	218	1%
Walworth	5,459	4,510	83%	20	0%	740	14%	19	0%	170	3%
Yankton	22,603	21,040	93%	449	2%	648	3%	143	1%	323	1%
Ziebach	2,869	697	24%	10	0%	2,061	72%	10	0%	91	3%

U.S. 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

Appendix D: SEER Incidence Site Analysis Categories (continued)

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

Appendix D: SEER Incidence Site Analysis Categories (continued)

Lymphoma			
Hodgkin Lymphoma			
Hodgkin - Nodal	C024,C098-C099,C111, C142,C379,C422,C770-C779	9650-9667	33011
Hodgkin - Extranodal	All other sites		33012
Non-Hodgkin 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**

Source: *http://seer.cancer.gov/siterecode*

+ The Site Recode variable can be created with or without Mesothelioma (9050-9055) and Kaposi Sarcoma (9140) as separate groupings. The table above documents both possibilities.

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

Appendix E: SEER Cancer Cause of Death Analysis Categories (Continued)

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, Subleukemic 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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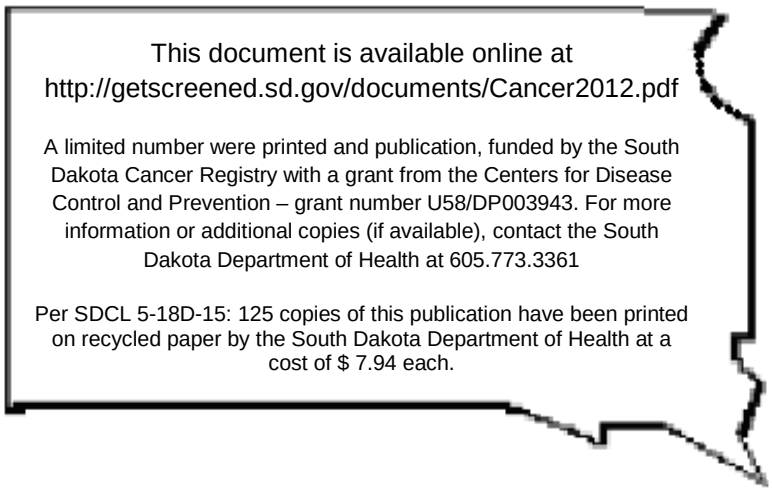

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