South Dakota American Indian Cancer Disparities Data Report

Photo courtesy of the South Dakota Department of Tourism

SOUTH DAKOTA DEPARTMENT OF HEALTH

GREAT PLAINS TRIBAL CHAIRMEN'S HEALTH BOARD

SDCR SOUTH DAKOTA CANCER REGISTRY

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Welcome

As part of efforts to reduce the burden of cancer in South Dakota through implementation of the SD Cancer Plan 2015-2020, the SD Cancer Coalition identified numerous disparities in incidence, late-stage incidence, mortality, and preventative screening rates for breast, cervical, colorectal and lung cancer between the white and American Indian populations in South Dakota. To address these inequities, key partners including the SD Department of Health and Great Plains Tribal Chairmen's Health Board conducted further analysis of the available data.

From the Department of Health

Each year in South Dakota over 4,000 families face the reality of a cancer diagnosis and 1,600 of our friends, neighbors, and relatives lose their battle with cancer. Cancer is the leading cause of death in our state. Moreover, there are stark disparities among cancer diagnosis and death rates especially between the American Indian and white populations. The purpose of this report is to identify key data trends and provide a call to action to guide cancer prevention and control efforts to address these disparities. Collaborative efforts using evidence-based strategies are required to improve cancer prevention and early detection. The Department of Health appreciates the partnership of Great Plains Tribal Chairmen's Health Board and other partners dedicated to working together to reduce the burden of this devastating disease in South Dakota. Together, we can promote, protect and improve the health of every South Dakotan.

Kim Malsam-Rysdon | Secretary of Health

From Great Plains Tribal Chairmen's Health Board

Cancer remains one of the leading causes of death among American Indians/Alaska Natives in South Dakota. As we witness the devastation this disease causes our relatives we must remember that we are empowered by our resilience to be lifted up from this by developing strong community partnerships. With partnership and holding true to our Creator, this gives purpose that our communities can participate in the healthy ways that are so natural to the people. While breast, cervical, and colorectal cancer continue to impact a disparate number of American Indian/Alaska Native people, there is work being done to bring light to the influence of this disease for our Native communities. Organizations like Great Plain's Tribal Chairmen's Health Board and the South Dakota Department of Health are working along side survivors, researchers, nurses, doctors, and other tribal health organizations to spread awareness, record stories, educate communities, and put an end to the devastating impact of cancer in our area's tribal communities. This report represents a step towards this goal; we must as tribal and non-tribal citizens of South Dakota understand that our fellow American Indian/Alaska Native neighbors, friends, and relatives are affected by breast, cervical, and colorectal cancer at ever growing rates, while rates decline for other populations. As you read this report remember that these statistics, numbers, and figures are our relatives, mothers, fathers, aunties, uncles, cousins, sons and daughters.

Ms. Jerilyn Church | Chief Executive Officer

Preface

"*South Dakota American Indian Cancer Disparities Data Report*" is a collaborative cancer report developed by the South Dakota Department of Health (SDDOH) and the Great Plains Tribal Chairmen's Health Board (GPTCHB). The report provides a comprehensive assessment of cancer incidence and deaths, cancer-related health behaviors, and preventative screening rates for breast, cervical, colorectal, and lung cancer among American Indians and whites in South Dakota.

Acknowledgments

Funding Sources

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South Dakota Department of Health. (2019). South Dakota American Indian Cancer Disparities Data Report. Retrieved from https://getscreened.sd.gov/registry/data/

Contact Information

For more information about this report, please contact the SDDOH Cancer Registry at 605-773-3737. To order print copies of this report, visit: https://doh.sd.gov/catalog.

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Executive Summary

Purpose

The SD Department of Health and Great Plains Tribal Chairmen's Health Board partnered to develop this report highlighting the unequal burden and disparities between the white and American Indian populations in South Dakota for breast, cervical, colorectal and lung cancer. In addition to highlighting key data trends and findings, the report identifies a call to action for cancer prevention and control stakeholders within SD to eliminate these disparities.

Key Findings and Trends

Breast (Female) Cancer

- **American Indian women are diagnosed at a later stage than white women in SD; survival rates increase with early diagnosis.** *White women are significantly more likely to be diagnosed at the in situ stage than American Indian women in SD. Additionally, American Indian women were more likely to be diagnosed at the regional stage than white women (50.0 vs. 35.9). (p. 5)*

- **The American Indian incidence rate has surpassed the rate of the white population.** *From 2006-2010 to 2009-2013, the five-year age-adjusted incidence rate for breast cancer was lower among American Indian women than the rate among white women. However, in 2010-2014, the American Indian rate surpassed the white rate. This trend continued in 2011-2015, the rate for American Indians was 144.0 vs. 135.4 among whites. (p. 6)*

- **Incidence and mortality rates are higher for American Indian women in SD than American Indian women nationally.** *In 2011-2015, the five-year age-adjusted incidence rate of female breast cancer among American Indians nationally was 82.6 vs. 144.0 in SD. The five-year age-adjusted mortality rate among American Indians nationally was 14.3 vs. 19.9 in SD. (p. 6)*

- **Late-stage breast cancer is decreasing among white women; however, the rate is increasing among American Indian women.** *From 2008-2012 to 2011-2015, the five-year age-adjusted incidence rate of late-stage female breast cancer among whites decreased from 46.4 to 43.4, which represents 44 cases. However, during that same time period, this rate increased 15.6 from 41.9 to 57.5 or 23 cases among American Indian women. (p. 7)*

Cervical Cancer

- **American Indian women are diagnosed at a later stage than white women in SD; survival rates increase with early diagnosis.** *American Indian women are more likely to be diagnosed at the regional (7.2 vs. 2.1) or distant stage (3.5 vs. 1.1) than white women in SD. (p. 9)*

- **American Indian women have significantly higher incidence rates than white women in SD.** *For all time periods, the five-year age-adjusted incidence rate for cervical cancer was significantly higher among American Indian women than among white women. In 2011-2015, the rate among American Indian women was 20.9 vs. 6.0 among whites. (p. 10)*

- **Although mortality rates are falling among American Indian women, rates are still significantly higher than those among white women.** *In 2011-2015, the five-year age-adjusted mortality rate for cervical cancer among American Indian women was 6.6 vs. 1.1 among whites. (p. 10)*

- **The percentage of American Indian women diagnosed with cervical cancer receiving no treatment decreased.** *A 18.1% decrease in the percentage of American Indian women receiving no treatment from 2006-2010 to 2011-2015 was observed. The 2011-2015 no treatment received rate of 3.6% was comparable to the white rate of 2.6%. (p. 12)*

Colorectal Cancer

- **American Indians are diagnosed at a later stage than whites; survival rates increase with early diagnosis.** *American Indians are significantly less likely to be diagnosed at the in situ stage and significantly more likely to be diagnosed at the regional stage (24.5 vs. 15.2) compared to whites. Distant stage diagnosis is also more common among American Indians (13.0 vs. 7.9). (p. 13)*

- **American Indians have significantly higher incidence rates than whites in SD.** *For all time periods, the five-year age-adjusted incidence rate for colorectal cancer was significantly higher among American Indians than among whites. Similarly, the rates among whites are trending downward (49.0 to 42.0), while rates among American Indians are trending upward slightly (56.1 to 58.9). (p. 14)*

- **Among American Indians, mortality rates are increasing and significantly higher than white rates.** *In 2006-2010, the five-year age-adjusted mortality rate for colorectal cancer among American Indians was 18.6 and increased to 28.9 in 2011-2015. The 2011-2015 mortality rate among whites was 15.4. (p. 14)*

- **Colorectal cancer screening rates are 10% lower among the American Indian population.** *Up-to-date screening rates for the American Indian population were 57.8% vs. 67.5% among the white population. (p. 16)*
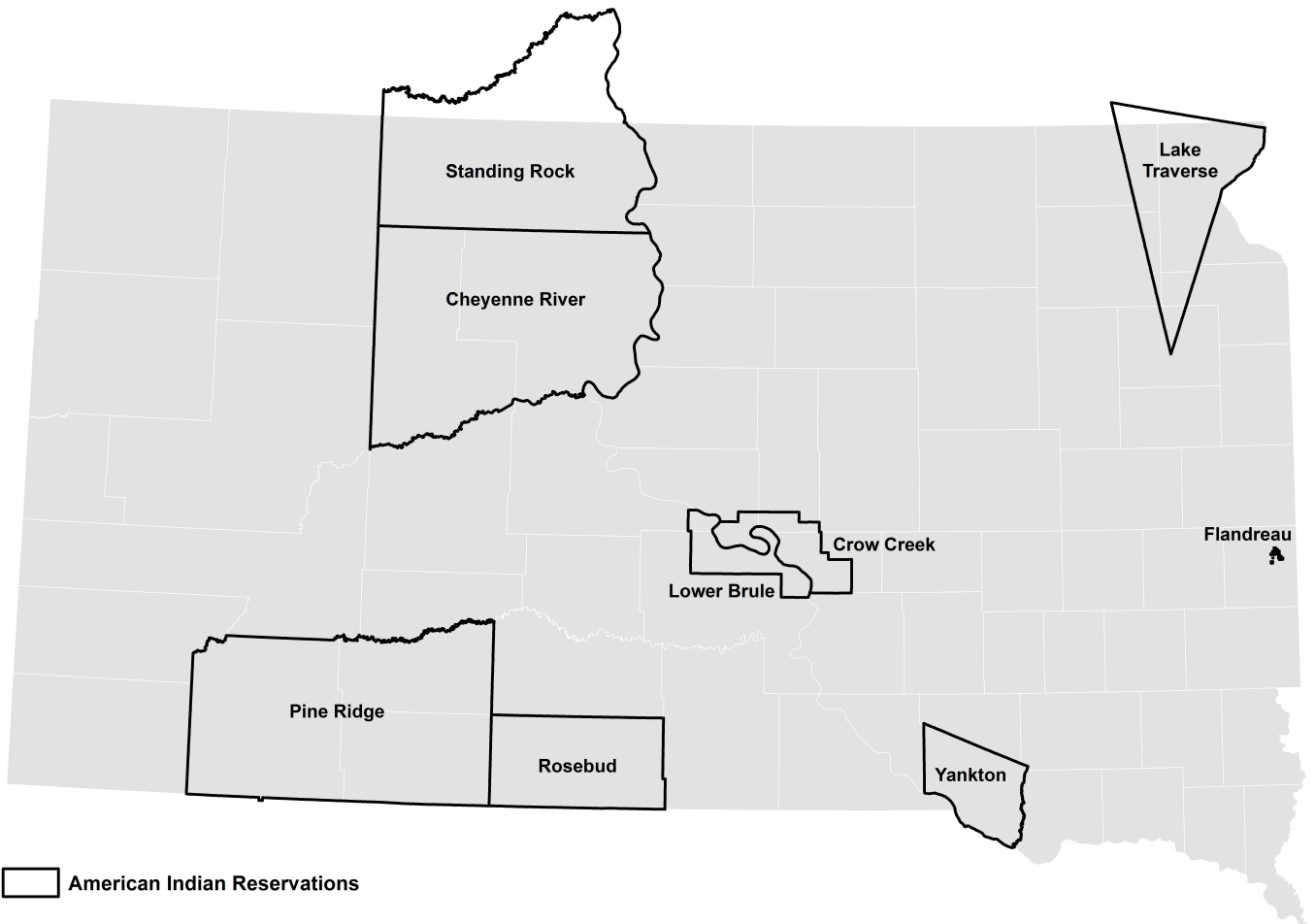
Lung Cancer

- **American Indians are significantly more likely to be diagnosed at the distant stage than whites; survival rates drastically decrease with distant stage diagnosis.** *American Indians are significantly more likely to be diagnosed at the distant stage (57.9 vs. 29.3) compared to whites. Relative five-year survival rates at the distant stage are 7.8% compared to 56.3% at the localized stage. (p. 17)*

- **Among American Indians, incidence and mortality rates are significantly higher than white rates.** *For all time periods, the five-year age-adjusted incidence and mortality rates for lung cancer was significantly higher among American Indians than among whites. In 2011-2015, the incidence rate among American Indians was 102.2 vs. 57.1 among whites; the mortality rate among American Indians was 80.8 vs. 41.8 among whites. (p. 18)*

- **Incidence and mortality rates are higher for American Indians in SD than American Indians in nationally.** *In 2011-2015, the five-year age-adjusted incidence rate of lung cancer among American Indians nationally was 37.3 vs. 102.2 in SD. The five-year age-adjusted mortality rate among American Indians nationally was 36.7 vs. 80.8 in SD. (p. 18)*

- **The percentage of American Indians diagnosed with lung cancer receiving no treatment decreased.** *A 11.6% decrease in the percentage of American Indians receiving no treatment from 2006-2010 to 2011-2015 was observed. The 2011-2015 no treatment received rate of 9.5% was comparable to the white rate of 10.5%. (p. 20)*

- **American Indians report everyday smoking at a rate higher than whites.** *In 2016, American Indians reported everyday smoking at 24.7% compared to 11.6% among whites. (p. 20)*

Call to Action

- **Promote cancer prevention for American Indians.** *Given the preventable nature of many cancers, it is imperative that evidence-based strategies are implemented to prevent cancer among the American Indian population in SD. Evidence-based cancer prevention strategy examples include: reducing tobacco use and exposure, increasing proper nutrition and physical activity, promoting HPV vaccination, and limiting alcohol intake.*

- **Promote early detection for cancer for American Indians.** *Given the drastic improvement in survival rates with early diagnosis, it is imperative that evidence-based efforts are implemented to promote early detection efforts among the American Indian population in SD. Examples of interventions proven to increase cancer screening rates include: client reminders, provider reminders, provider assessment and feedback, and reducing structural barriers for screening completion by implementing efforts such as mobile mammography, extending service hours, and eliminating transportation barriers.*

- **Promote access and referral to appropriate and timely treatment services for American Indians**. *Access to and appropriate referral for timely and high-quality cancer treatment services contributes to increased outcomes and cancer survival rates. Evidence-based treatment strategy examples include: patient navigation programs, provision of patient-centered and culturally appropriate care, accreditation for cancer treatment centers, and efforts to improve access to transportation and lodging resources.*

- **Support American Indian cancer survivors and caregivers**. *Cancer survivors often face adverse physical and psychosocial effects as well as have an increased risk for additional cancer diagnoses. Examples of evidence-based interventions demonstrated to increase quality and duration of life for cancer survivors include: provision of survivorship care plans, patient navigation and cancer survivorship programs, and educating survivors and caregivers to support informed decision making.*

Map of South Dakota American Indian Reservations

Standing Rock

Cheyenne River

Lake Traverse

Crow Creek

Lower Brule

Flandreau

Pine Ridge

Rosebud

Yankton

American Indian Reservations

Breast (Female) Cancer

For the years 2011 to 2015, the age-adjusted rate for South Dakota female breast cancer was 134.2 with a total of 3,293 newly diagnosed cases. The median age at diagnosis was 64 years of age. For whites, the age-adjusted rate was 135.4 with a median age of 64, and for American Indians, the age-adjusted 5-year rate was 144.0 with a median age of 58 years of age.

SEER Summary Stage

The pie chart represents female breast cancer stage at diagnosis, South Dakota, 2011-2015.

Localized 55%
Regional 21%
Distant 5%
Unknown 1%
In situ 18%
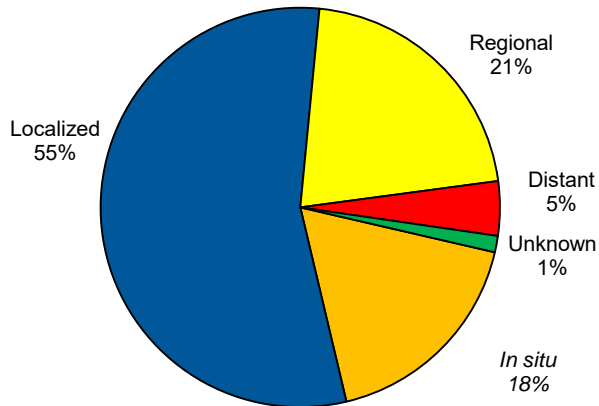
Source: South Dakota Department of Health

5-Year Relative Survival for Breast (Female) Cancer, U.S.

Stage at Diagnosis	5-Year Relative Survival, 2008-2014
Localized	98.7%
Regional	85.3%
Distant	27.0%
Unknown	54.5%

Source: SEER Program www.seer.cancer.gov

The sooner a breast cancer is diagnosed the greater the survival rate. The chart below displays the 5-year age-adjusted rate by stage and race with 95% confidence intervals (CI).

South Dakota Breast (Female) Cancer Age-Adjusted Rate by Stage and Race, 2011-2015

White   American Indian   Total   95% Lower CI Higher CI

Rate per 100,000 women

In Situ: White 30.8, American Indian ~19.3, Total 29.7
Localized: White 90.1, American Indian 83.2, Total 88.8
Regional: White 35.9, American Indian 50.0, Total 36.2
Distant: White 7.5, American Indian 7.5, Total 7.3
Unknown: White 1.8, American Indian 3.3, Total 1.9
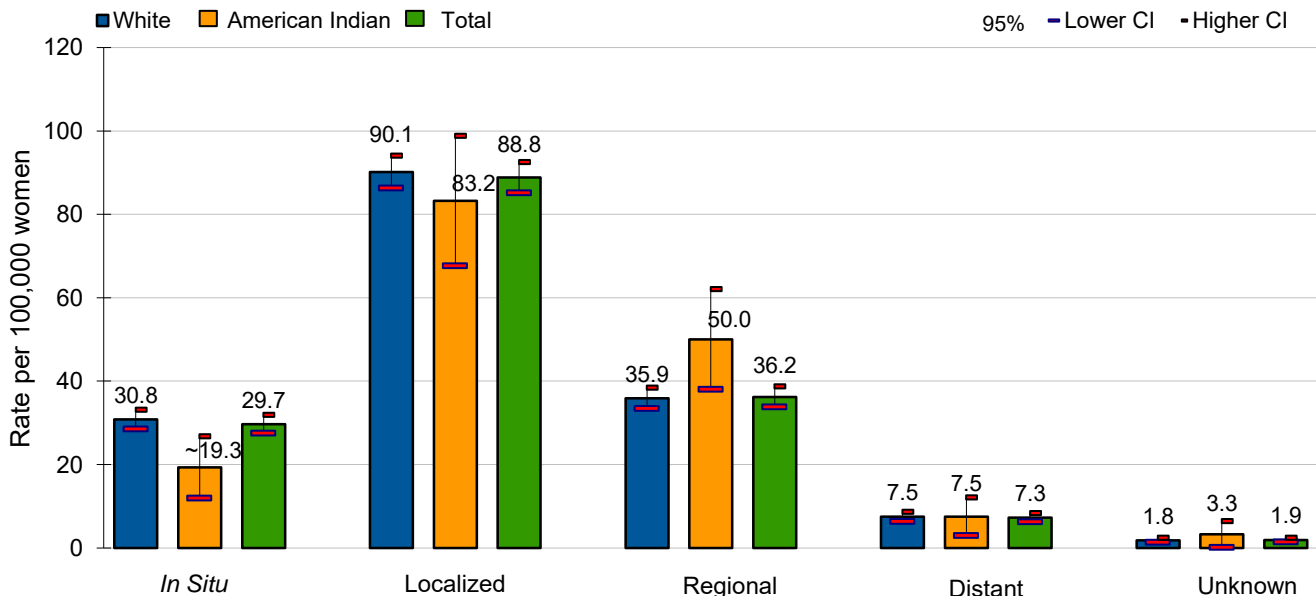
~ Rate significantly lower than the white rate.
Source: South Dakota Department of Health

Breast (Female) Cancer

South Dakota Breast (Female) Cancer 5-Year Age-Adjusted Incidence Rate by Race and Number of Cases, 2006-2015

White / American Indian

Chart values (White): 119.6, 123.8, 128.3, 132.7, 132.3, 135.4
Chart values (American Indian): 116.0, 119.2, 116.6, 124.1, 143.5, 144.0
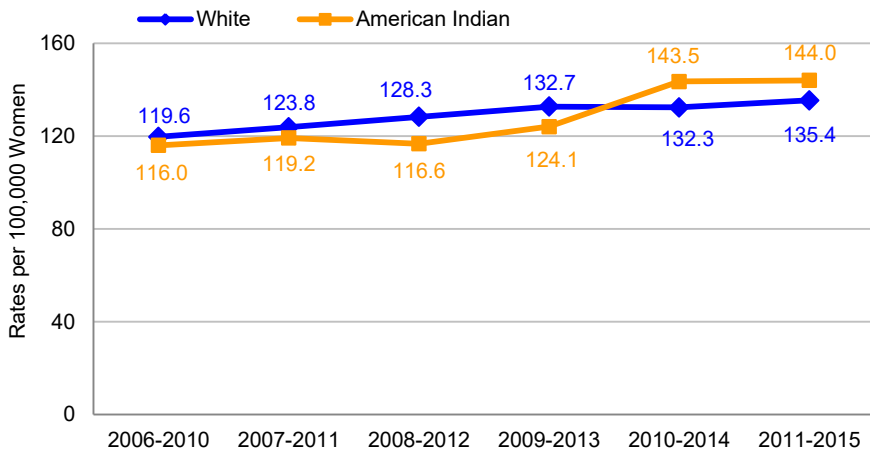
Number of Cases		
	White	American Indian
2006-2010	2,618	135
2007-2011	2,737	143
2008-2012	2,833	146
2009-2013	2,945	159
2010-2014	2,964	184
2011-2015	3,068	190

Source: South Dakota Department of Health
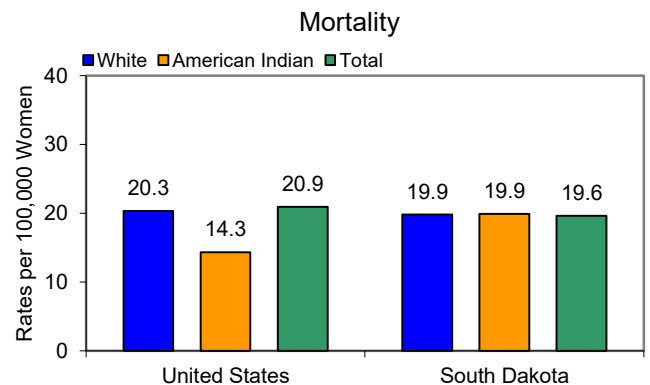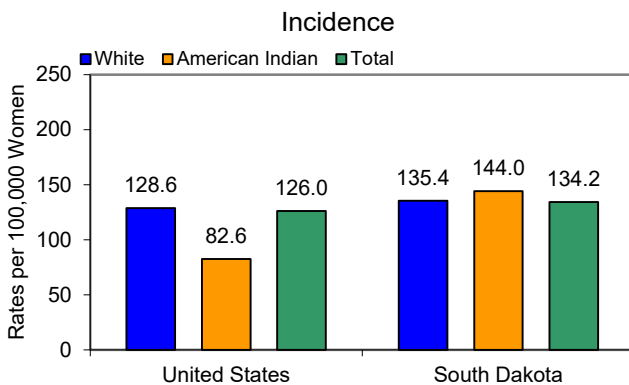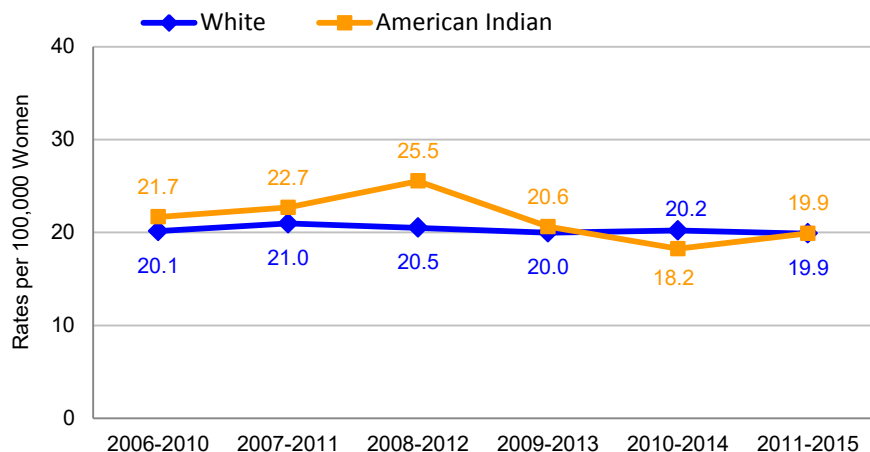
South Dakota Breast (Female) Cancer 5-Year Age-Adjusted Incidence and Mortality Rate by Race, United States and South Dakota, 2011-2015

Incidence

White / American Indian / Total

United States: 128.6, 82.6, 126.0
South Dakota: 135.4, 144.0, 134.2

Mortality

White / American Indian / Total

United States: 20.3, 14.3, 20.9
South Dakota: 19.9, 19.9, 19.6

Source: SEER Program www.seer.cancer.gov, South Dakota Department of Health

South Dakota Breast (Female) Cancer 5-Year Age-Adjusted Mortality Rate by Race and Number of Deaths, 2006-2015

White / American Indian

Chart values (White): 20.1, 21.0, 20.5, 20.0, 20.2, 19.9
Chart values (American Indian): 21.7, 22.7, 25.5, 20.6, 18.2, 19.9

Number of Deaths		
	White	American Indian
2006-2010	500	23
2007-2011	524	24
2008-2012	514	28
2009-2013	509	23
2010-2014	516	21
2011-2015	514	24

Source: South Dakota Department of Health

Breast (Female) Cancer

South Dakota Late Stage Breast (Female) Cancer 5-Year Age-Adjusted Incidence Rate by Race and Number of Cases, 2006-2015

White: 44.9, 45.2, 46.4, 45.8, 44.1, 43.4
American Indian: 45.1, 44.6, 41.9, 50.5, 57.4, 57.5

Rates per 100,000 Women

2006-2010 2007-2011 2008-2012 2009-2013 2010-2014 2011-2015
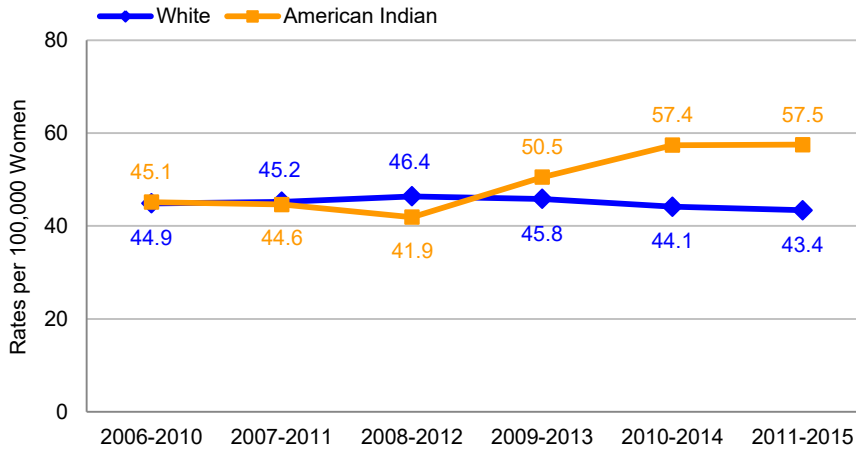
Number of Late Stage Cases		
	White	American Indian
2006-2010	954	54
2007-2011	969	55
2008-2012	986	54
2009-2013	976	67
2010-2014	949	76
2011-2015	942	77

Source: South Dakota Department of Health

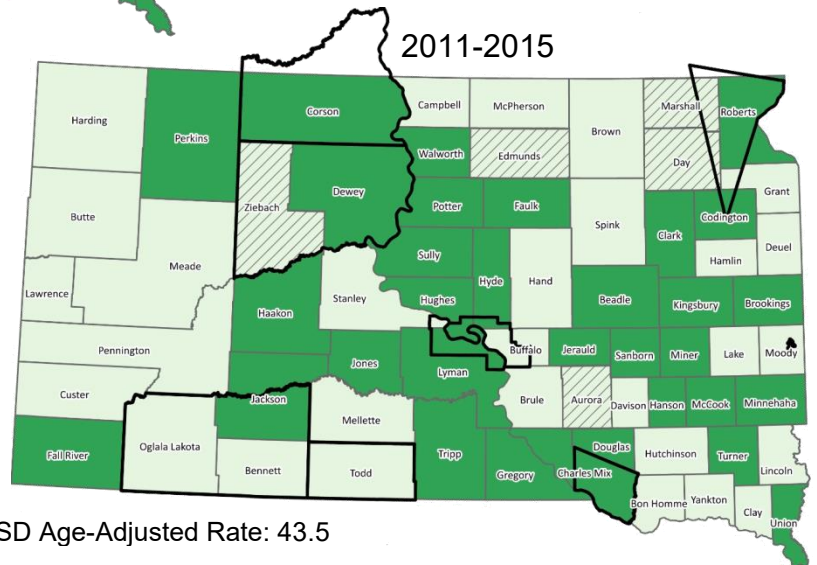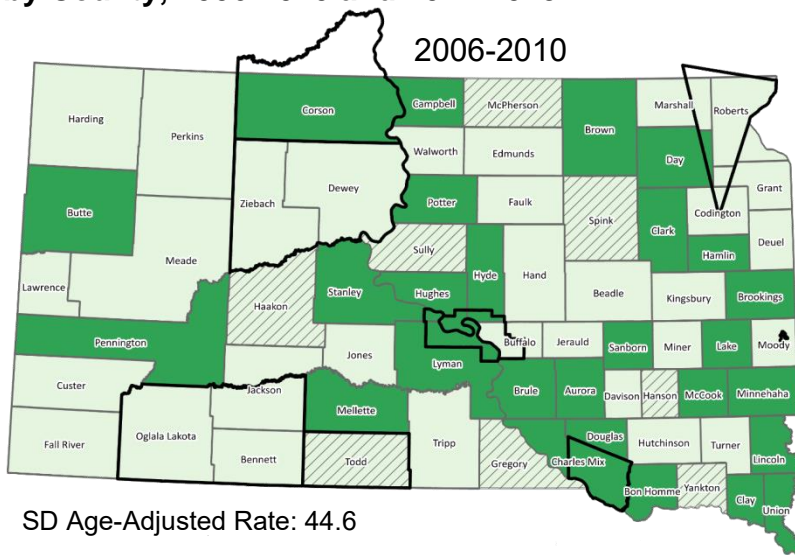## South Dakota Late Stage Breast (Female) Cancer 5-Year Age-Adjusted Incidence Rate, by County, 2006-2010 and 2011-2015


2006-2010

SD Age-Adjusted Rate: 44.6

Below the state age-adjusted rate

Above the state age-adjusted rate

Significantly lower than the state rate

American Indian reservations

NOTE: No county was significantly higher than the state rate.
Source: South Dakota Department of Health

2011-2015

SD Age-Adjusted Rate: 43.5

Breast (Female) Cancer

South Dakota Breast (Female) Cancer Time from Diagnosis to Treatment By Race, 5-Year Time Periods, 2006-2010 and 2011-2015
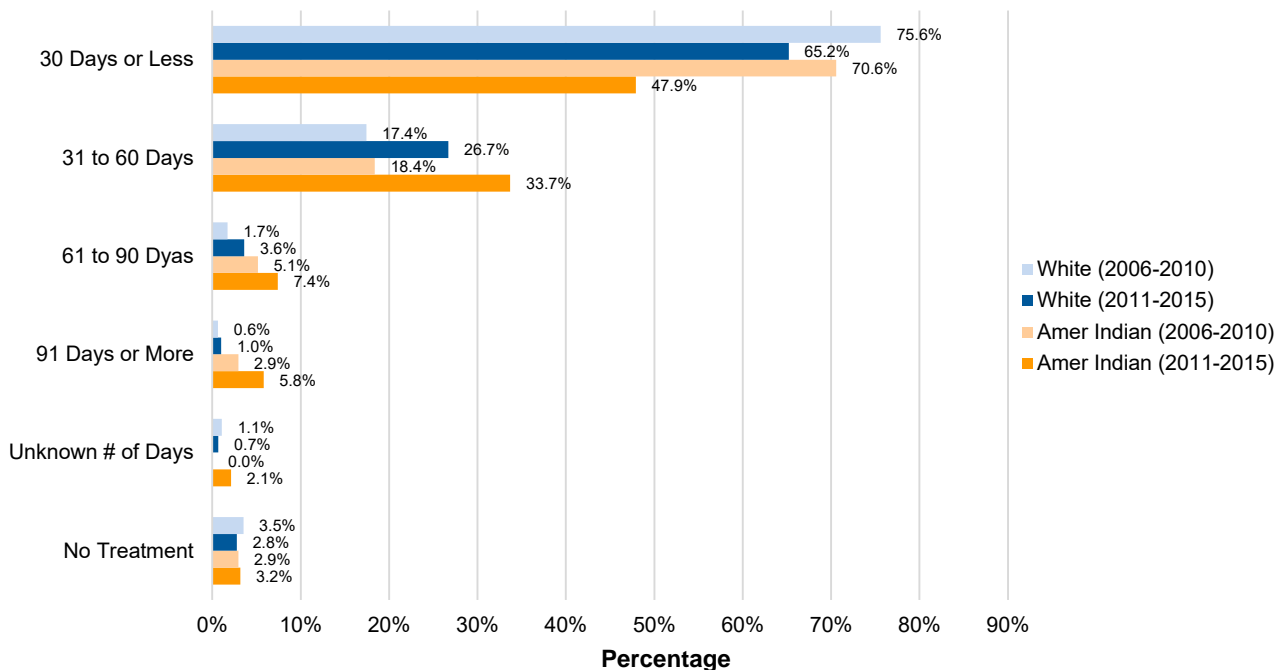
Source: South Dakota Department of Health

The Centers for Disease Control (CDC) National Breast and Cervical Cancer Early Detection Program Core Program Performance Indicators from the Data Quality Indicator Guide (DQIG) states that 80% or more of breast cancer patients should have treatment within 60 days of diagnosis. [1]

Women Age 40 and Older Who Have Had a Mammogram in the Past 2 Years by Race, 2014 and 2016
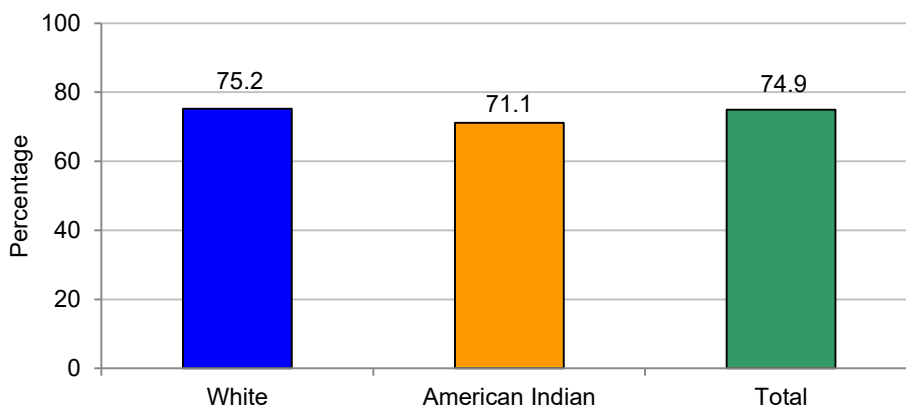
Source: South Dakota Department of Health Behavioral Risk Factor Surveillance System

Risk and Associated Factors

Studies have shown that the risk for breast cancer is due to a combination of factors. The main factors that influence breast cancer risk include being a woman and getting older. Most breast cancers are found in women who are 50 years old or older. Mammograms are the best way to find breast cancer early, when it is easier to treat. Women should talk with their doctor about ways to lower their risk and recommendations about individualized screening. [2]

[1] https://www.cdc.gov/cancer/nbccedp/data/
[2] https://www.cdc.gov/cancer/breast/basic_info/risk_factors.htm

Cervical Cancer

For the years 2011 to 2015, the age-adjusted rate for South Dakota cervical cancer was 7.1 with a total of 147 newly diagnosed cases. The median age at diagnosis was 50 years of age. For whites the age-adjusted rate was 6.0 with a median age of 52. American Indians had an age-adjusted rate of 20.9 which was significantly higher than the state rate. The median age for a diagnosed American Indian was 46.5 years of age. Nationally the age-adjusted rate was 7.4.

SEER Summary Stage

The pie chart represents female cervical cancer stage at diagnosis, South Dakota, 2011-2015.
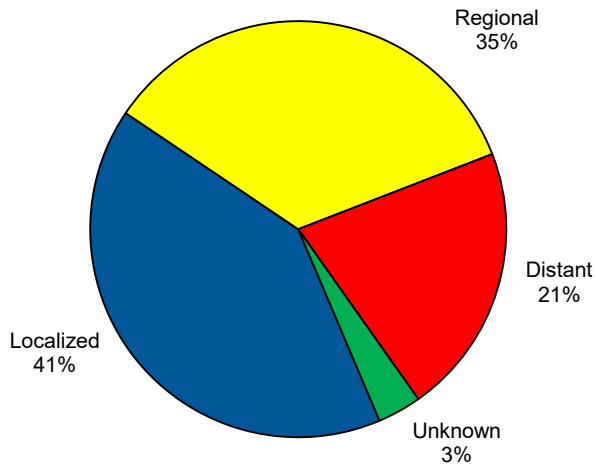
Source: South Dakota Department of Health

5-Year Relative Survival for Cervical Cancer, U.S

Stage at Diagnosis	5-Year Relative Survival, 2008-2014
Localized	91.7%
Regional	56.0%
Distant	17.2%
Unknown	50.0%

Source: SEER Program www.seer.cancer.gov

The sooner cervical cancer is diagnosed, the greater the survival rate. The chart below displays the 5-year age-adjusted rate by stage and race with 95% confidence intervals (CI).

South Dakota Cervical Cancer Age-Adjusted Rate by Stage and Race, 2011-2015
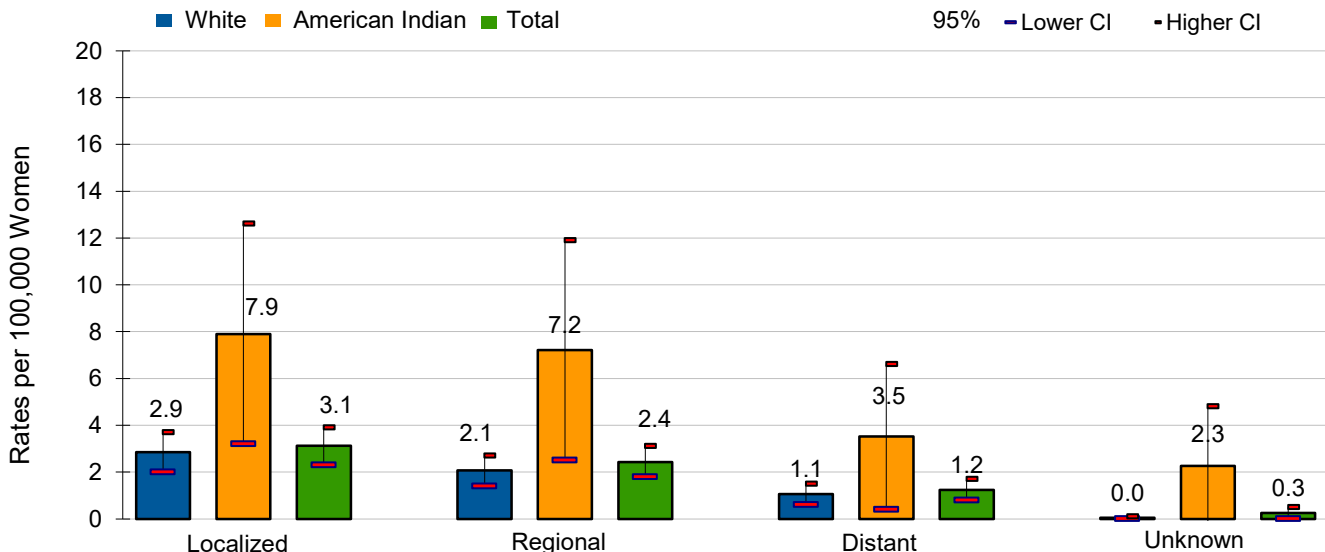
Source: South Dakota Department of Health

Cervical Cancer

South Dakota Cervical Cancer 5-Year Age-Adjusted Incidence Rate by Race and Number of Cases, 2006-2015

White: 5.2, 5.8, 5.7, 5.9, 6.1, 6.0
American Indian: *17.2, *18.4, *19.3, *18.0, *21.6, *20.9

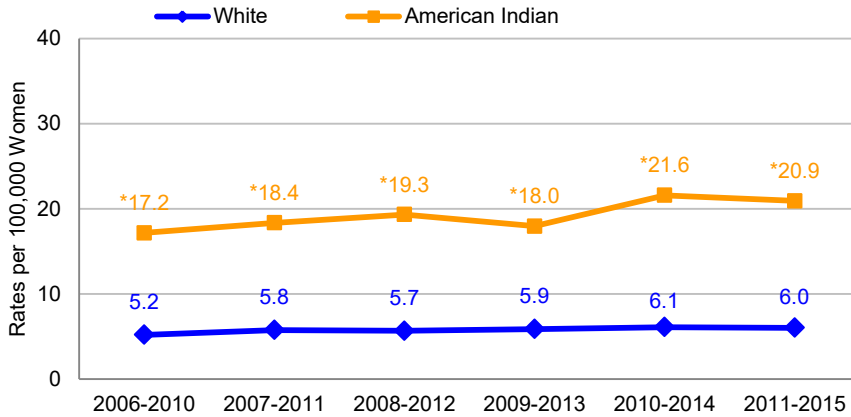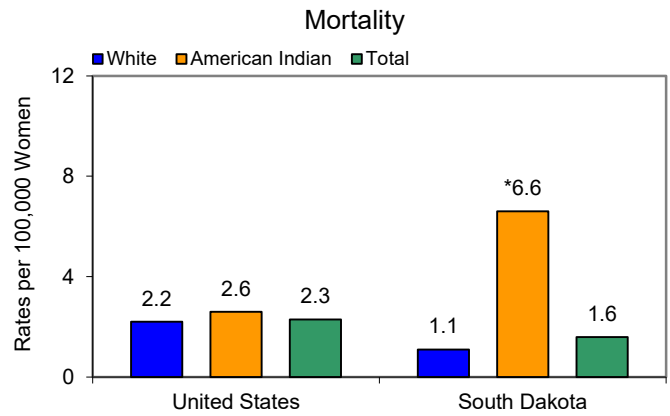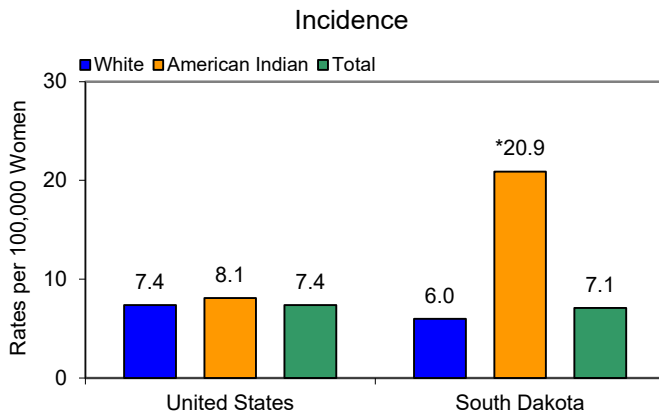| Number of Cases		
	White	American Indian
2006-2010	91	23
2007-2011	100	26
2008-2012	100	27
2009-2013	106	25
2010-2014	114	29
2011-2015	115	28

* Rate significantly higher than white rate.
Source: South Dakota Department of Health

South Dakota Cervical Cancer 5-Year Age-Adjusted Incidence and Mortality Rate by Race, United States and South Dakota, 2011-2015

Incidence

United States — White: 7.4, American Indian: 8.1, Total: 7.4
South Dakota — White: 6.0, American Indian: *20.9, Total: 7.1

Mortality

United States — White: 2.2, American Indian: 2.6, Total: 2.3
South Dakota — White: 1.1, American Indian: *6.6, Total: 1.6

* Rate significantly higher than South Dakota white rate.
Source: SEER Program www.seer.cancer.gov, South Dakota Department of Health

South Dakota Cervical Cancer 5-Year Age-Adjusted Mortality Rate by Race and Number of Deaths, 2006-2015

White: 1.4, 1.5, 1.5, 1.2, 1.2, 1.1
American Indian: *10.6, *11.9, *10.4, *9.3, *7.4, *6.6
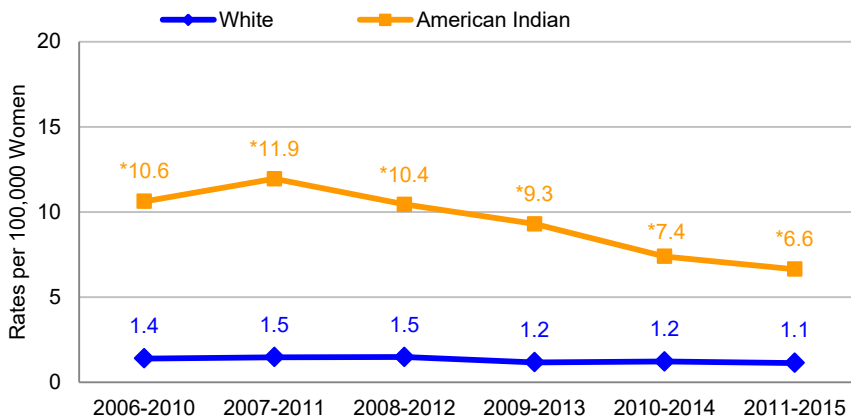
| Number of Deaths		
	White	American Indian
2006-2010	31	13
2007-2011	33	15
2008-2012	34	14
2009-2013	26	13
2010-2014	27	11
2011-2015	26	10

* Rate significantly higher than white rate.
Source: South Dakota Department of Health

American Indian age-adjusted mortality rates are significantly higher than white rates but are trending in the right direction.

Comparison of New Cases Per 100,000 Women for Cervical Cancer, by State, 1995-1999, 2000-2004, and 2005-2009

1995-1999

New Cases Per
100,000 Women
☐ 5.2 – 7.6
☐ 7.7 – 8.6
☐ 8.7 – 9.6
☐ 9.7 – 11.0
☐ 11.1 +

2000-2004

2005-2009
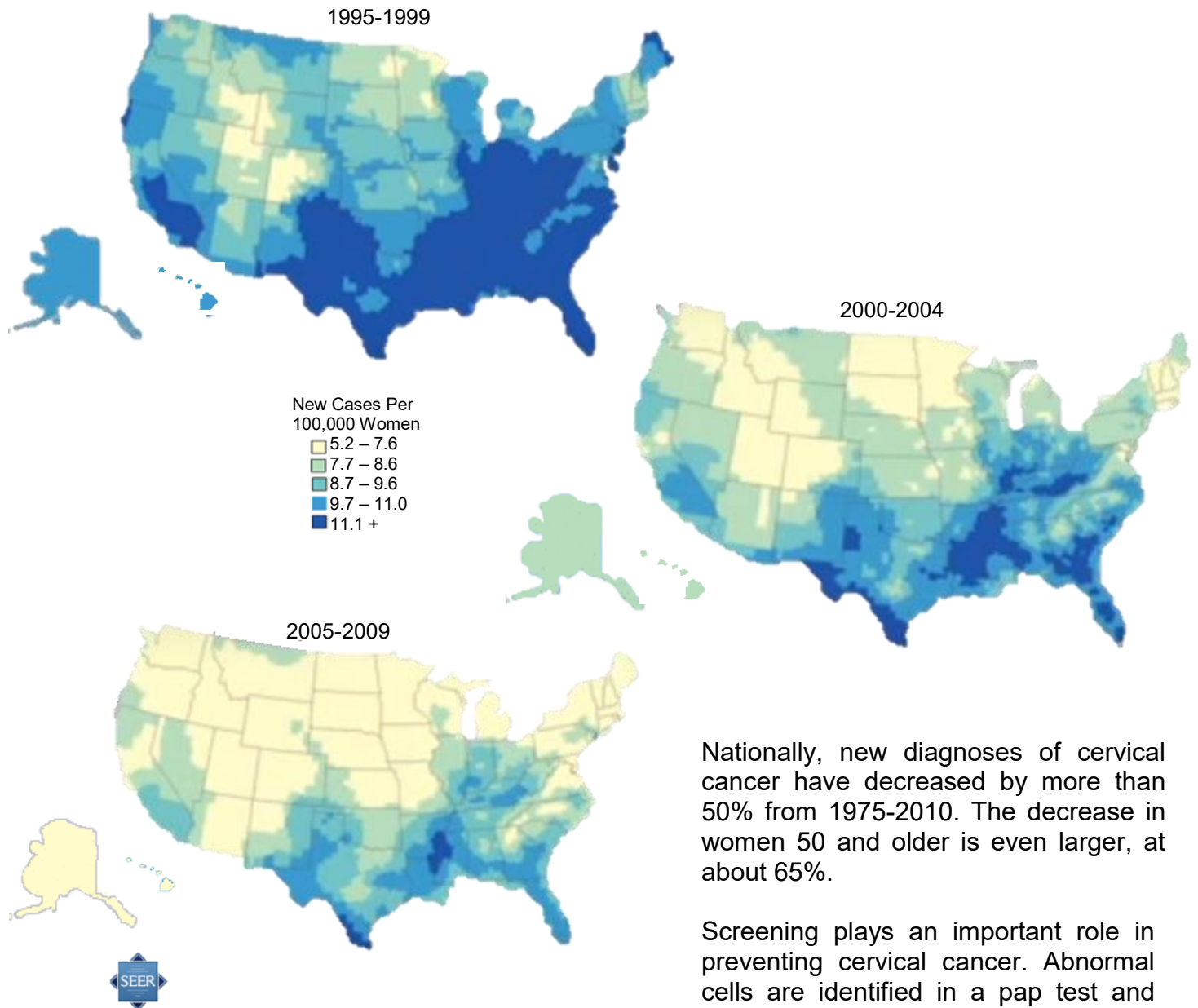
Source: SEER Program www.seer.cancer.gov

Nationally, new diagnoses of cervical cancer have decreased by more than 50% from 1975-2010. The decrease in women 50 and older is even larger, at about 65%.

Screening plays an important role in preventing cervical cancer. Abnormal cells are identified in a pap test and can be removed before they become cancer.

Major improvements have been seen in all areas of the United States, as presented in the maps on this page. There are still groups such as black women in the south, Hispanic women on the US-Mexican border, and specific groups of American Indians, to name a few, who still have high cervical cancer rates. Higher rates in these groups are due in part to lack of access in screening.

The human papillomavirus (HPV) is the number one cause of cervical cancer. Vaccination against HPV can prevent more cancers in the future along with increased cervical cancer screening.

Source: www.cancer.gov/cervical

Cervical Cancer

South Dakota Cervical Cancer Time from Diagnosis to Treatment By Race, 5-Year Time Periods, 2006-2010 and 2011-2015

30 Days or Less: 80.2%, 74.8%, 69.6%, 82.1%
31 to 60 Days: 11.0%, 16.5%, 4.3%, 10.7%
61 to 90 Dyas: 2.2%, 3.5%, 0.0%, 0.0%
91 Days or More: 0.0%, 0.9%, 4.3%, 0.0%
**Unknown # of Days**: 1.1%, 1.7%, 0.0%, 3.6%
No Treatment: 5.5%, 2.6%, 21.7%, 3.6%

Legend: White (2006-2010), White (2011-2015), Amer Indian (2006-2010), Amer Indian (2011-2015)
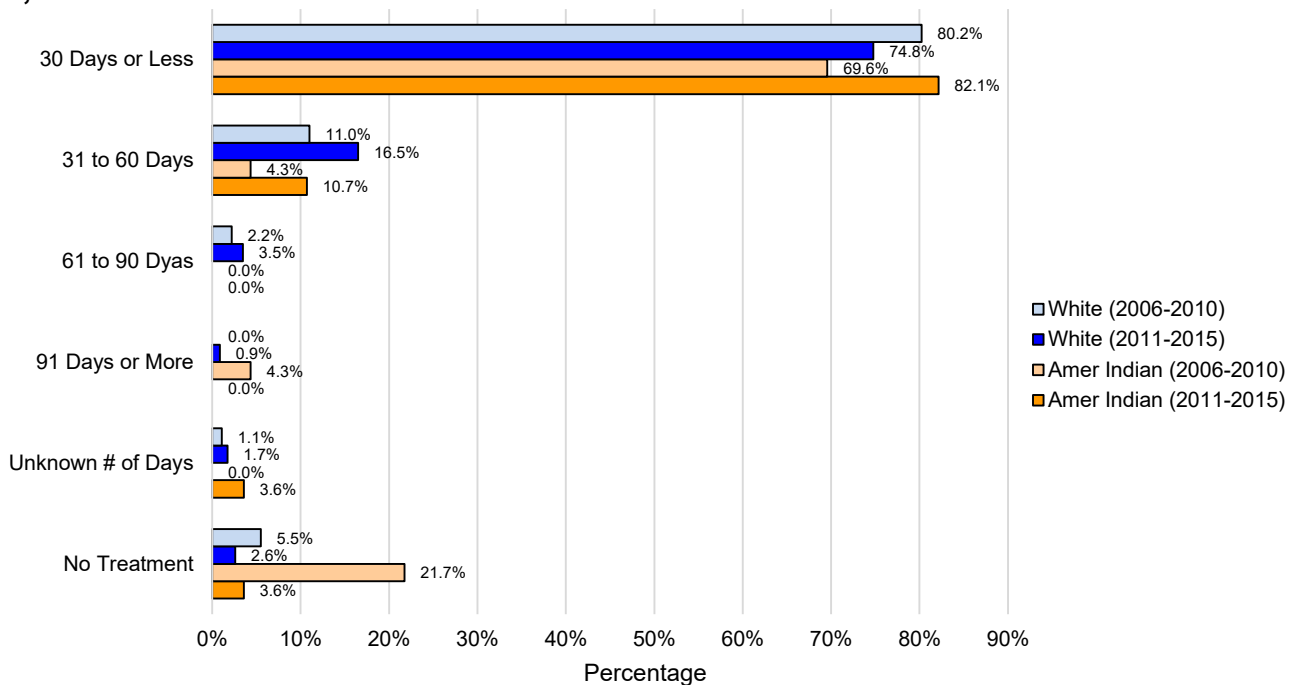
Source: South Dakota Department of Health

The CDC's National Breast and Cervical Cancer Early Detection Program Core Program Performance Indicators from the Data Quality Indicator Guide (DQIG) indicates that 80% or more of High-Grade Squamous Intraepithelial Lesions (HSIL), Cervical Intra-epithelial Neoplasia 2 (CIN2), Cervical Intra-epithelial Neoplasia 3 (CIN3), and Carcinoma in situ (CIS) cervical cancer should have treatment within 90 days of diagnosis. Eighty percent or more of invasive cervical carcinoma should have treatment within 60 days of diagnosis.[1]

Women Age 21-65 Who Have Received a Pap Test in the Past 3 Years, by Race, 2014 and 2016
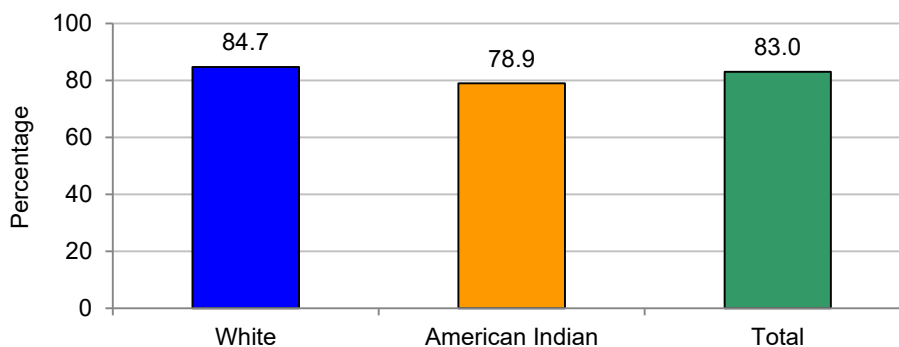
White: 84.7, American Indian: 78.9, Total: 83.0

Source: South Dakota Department of Health Behavioral Risk Factor Surveillance System

Risk and Associated Factors

Almost all cervical cancers are caused by human papillomavirus (HPV). Cervical cancer screening can find cervical cancer early, when the chance of being cured is very high. The USPSTF (United States Preventive Services Task Force) recommends screening for cervical cancer every 3 years in women aged 21 to 29 years. Depending on the screening test used, women aged 30 to 65 years may lengthen the screening interval to 5 years. Women should talk with their doctor about ways to lower their risk and recommendations about individualized screening. The HPV vaccine is recommended for males and females ages 11-26. [3]
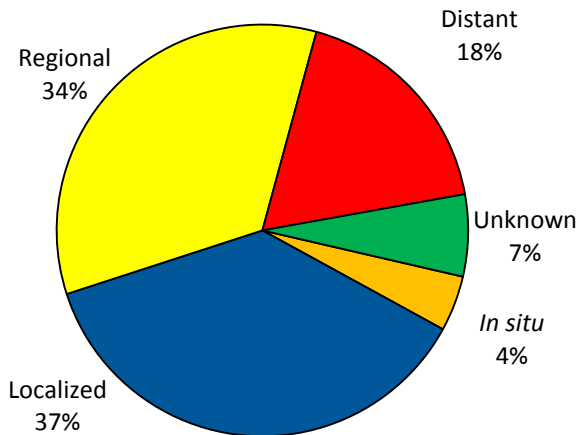
Colorectal Cancer

The South Dakota colorectal cancer age-adjusted rate for the years 2011 to 2015 was 42.6. For the same time period it was 48.9 for men and 36.8 for women. There were a total of 2,126 newly diagnosed colorectal cases. The median age at diagnosis was 70 years of age. For whites the age-adjusted rate was 42.0 with a median age of 71 years of age. The American Indian age-adjusted rate was 58.9 and the median age at diagnosis was 62 years of age. American Indian males have the highest age-adjusted rate for colorectal cancer at 67.3, American Indian females was 50.5.

SEER Summary Stage

The pie chart represents colorectal cancer stage at diagnosis, South Dakota, 2011-2015.

Source: South Dakota Department of Health

5-Year Relative Survival for Colorectal Cancer, U.S.

Stage at Diagnosis	5-Year Relative Survival, 2008-2014		
	Total	Male	Female
Localized	89.8%	89.1%	90.6%
Regional	71.1%	70.9%	71.3%
Distant	13.8%	12.8%	14.9%
Unknown	35.0%	38.4%	31.9%

Source: SEER Program www.seer.cancer.gov

As with all cancers, the sooner it is diagnosed the greater the survival rate. The chart below displays the 5-year age-adjusted rate by stage and race with 95% confidence intervals (CI).

South Dakota Colorectal Cancer Age-Adjusted Rate by Stage and Race, 2011-2015
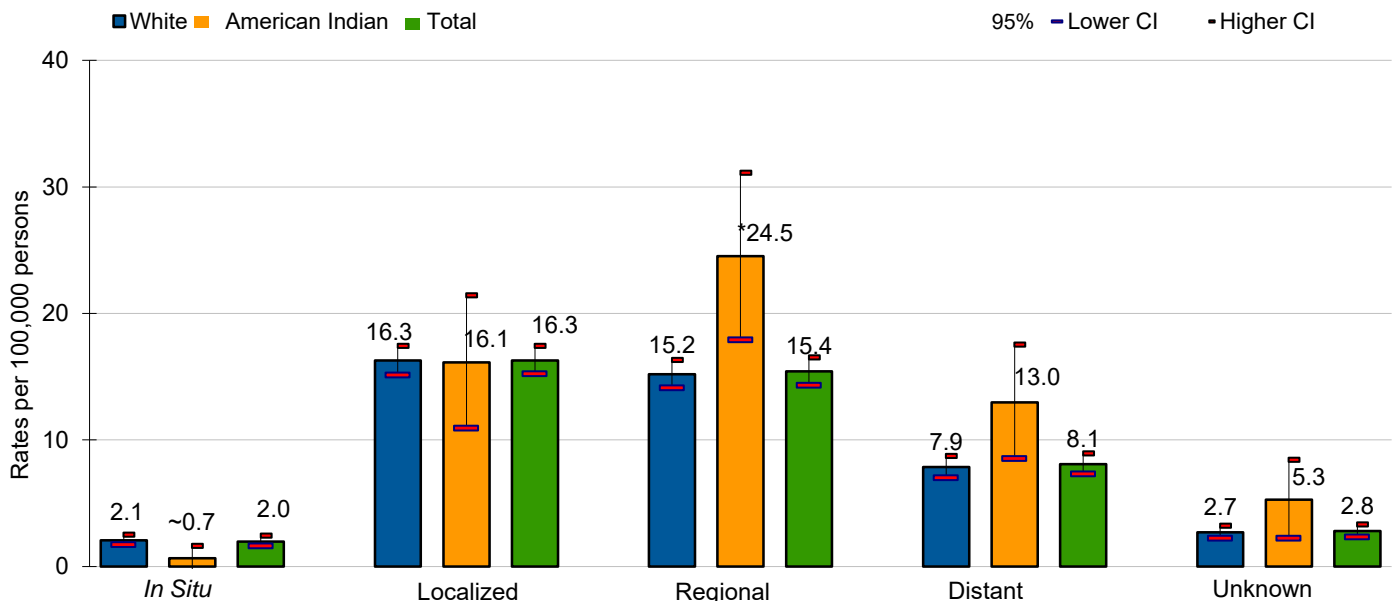
~ Rate significantly lower than white rate, * rate significantly higher than white rate.
Source: South Dakota Department of Health

Colorectal Cancer

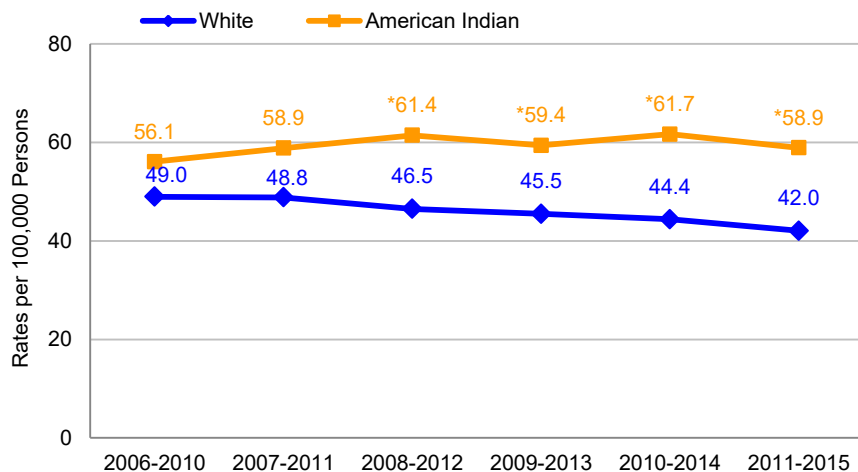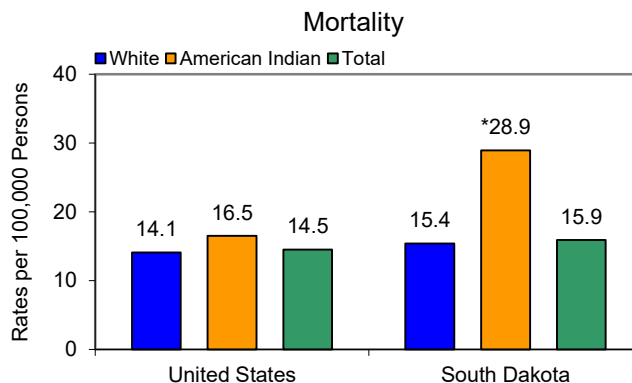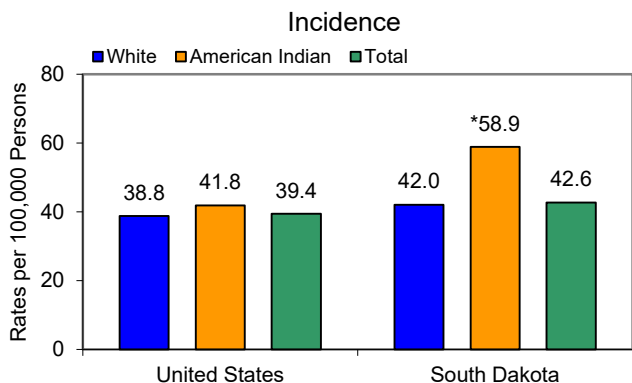**South Dakota Colorectal Cancer 5-Year Age-Adjusted Incidence Rate by Race and Number of Cases, 2006-2015**

Number of Cases	White	American Indian
2006-2010	2,164	111
2007-2011	2,183	120
2008-2012	2,105	130
2009-2013	2,086	129
2010-2014	2,055	137
2011-2015	1,968	132

White: 49.0, 48.8, 46.5, 45.5, 44.4, 42.0
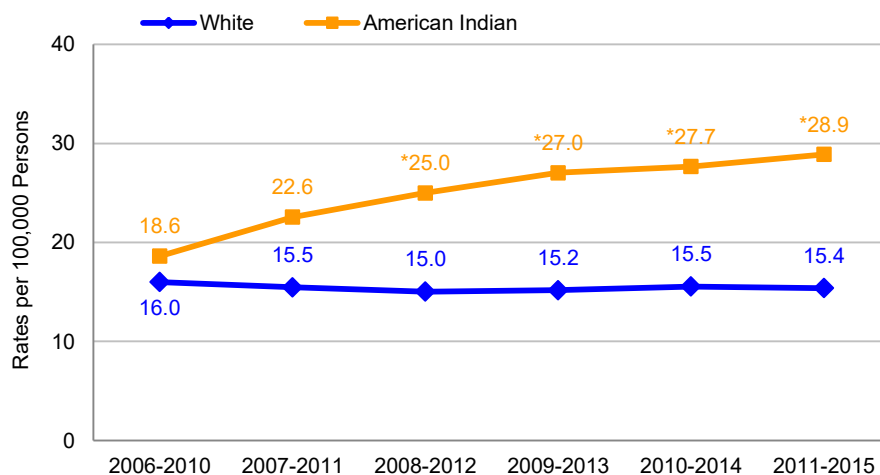American Indian: 56.1, 58.9, *61.4, *59.4, *61.7, *58.9

* Rate significantly higher than white rate.
Source: South Dakota Department of Health

South Dakota Colorectal Cancer 5-Year Age-Adjusted Incidence and Mortality Rate by Race, United States and South Dakota, 2011-2015

Incidence:
United States — White 38.8, American Indian 41.8, Total 39.4
South Dakota — White 42.0, American Indian *58.9, Total 42.6

Mortality:
United States — White 14.1, American Indian 16.5, Total 14.5
South Dakota — White 15.4, American Indian *28.9, Total 15.9

* Rate significantly higher than South Dakota white rate.
Source: SEER Program www.seer.cancer.gov, South Dakota Department of Health

South Dakota Colorectal Cancer 5-Year Age-Adjusted Mortality Rate by Race and Number of Deaths, 2006-2015

Number of Deaths	White	American Indian
2006-2010	751	37
2007-2011	733	43
2008-2012	721	48
2009-2013	731	52
2010-2014	758	54
2011-2015	756	58

White: 16.0, 15.5, 15.0, 15.2, 15.5, 15.4
American Indian: 18.6, 22.6, *25.0, *27.0, *27.7, *28.9

* Rate significantly higher than white rate.
Source: South Dakota Department of Health

South Dakota Late Stage Colorecatal Cancer 5-Year Age-Adjusted Incidence Rate, by County, 2006-2010 and 2011-2015

2006-2010

SD Age-Adjusted Rate: 24.6

Below the state age-adjusted rate

Above the state age-adjusted rate

Significantly higher than the state rate

Significantly lower than the state rate

American Indian reservations

2011-2015

SD Age-Adjusted Rate: 23.5
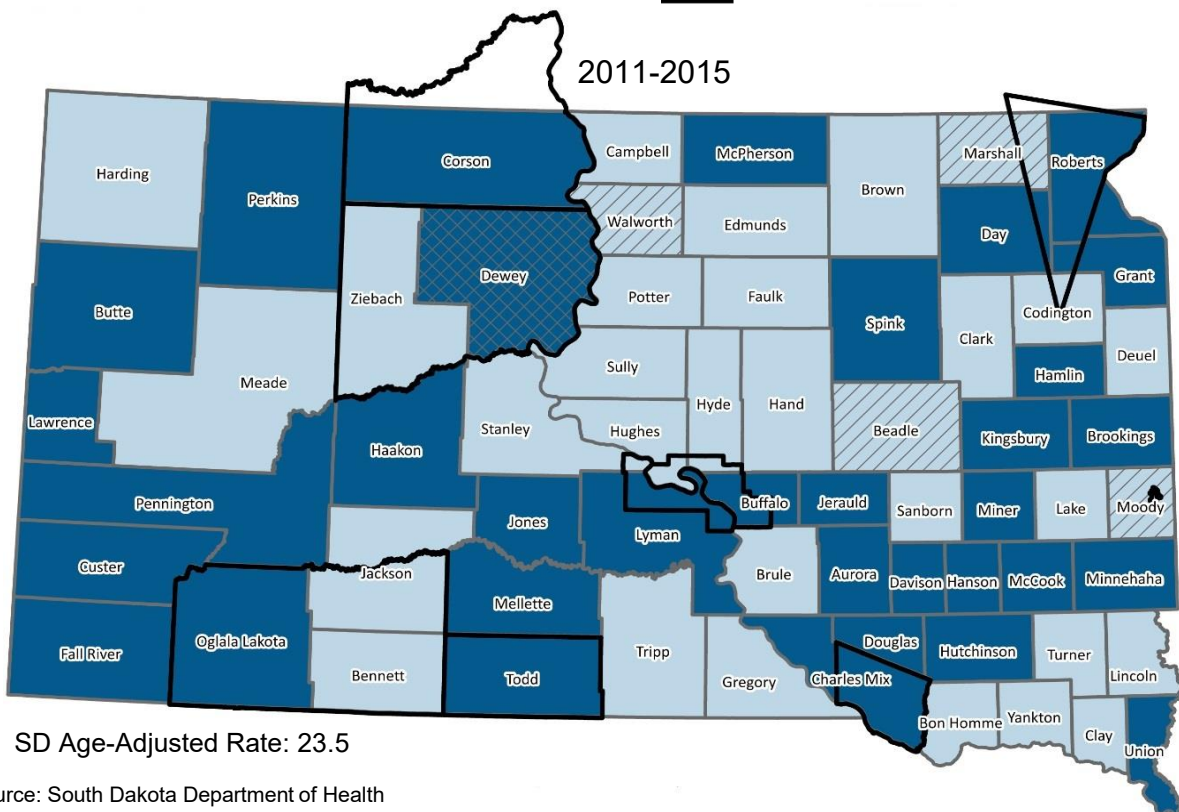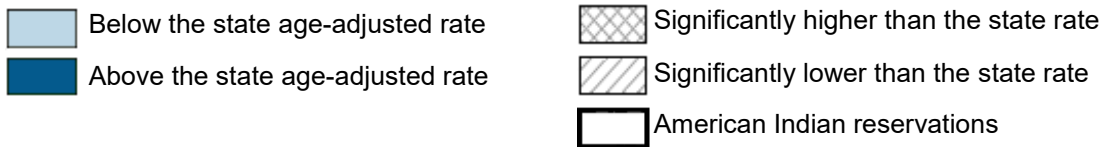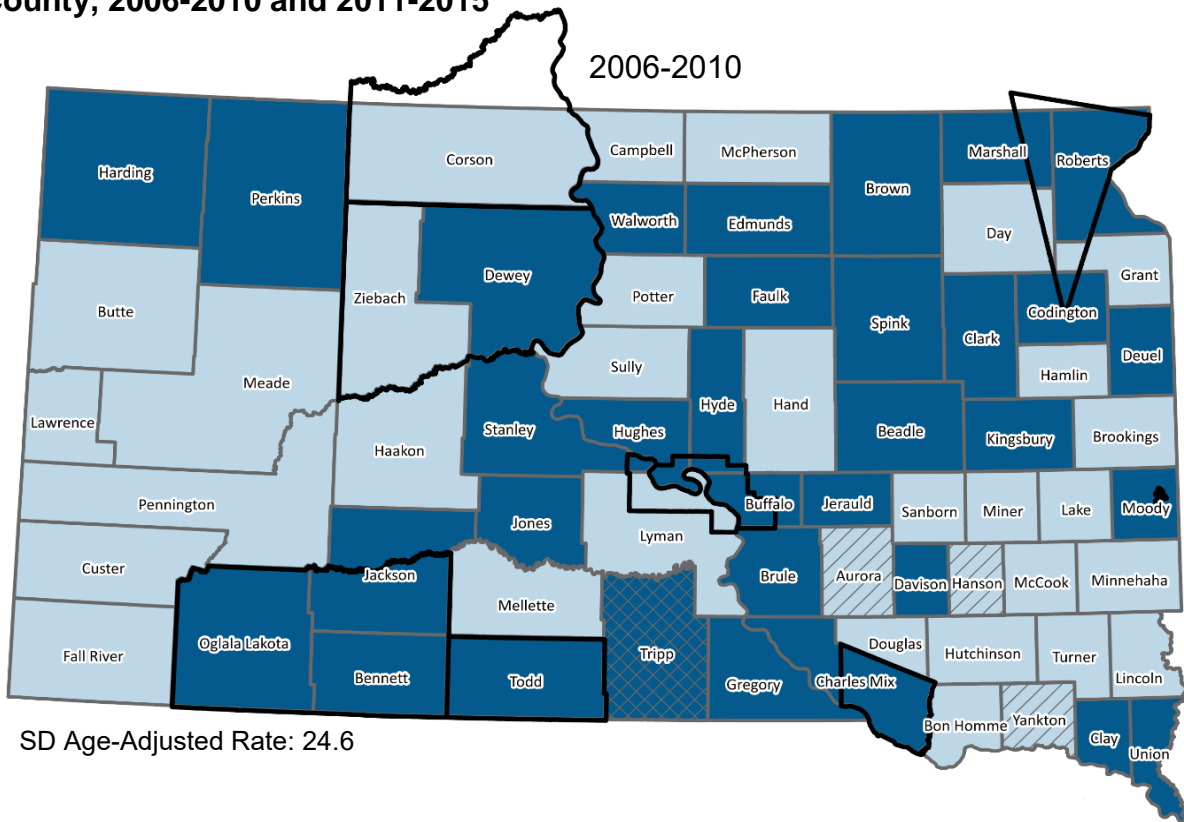
Source: South Dakota Department of Health

South Dakota Colorectal Cancer Time from Diagnosis to Treatment By Race, 5-Year Time Periods, 2006-2010 and 2011-2015
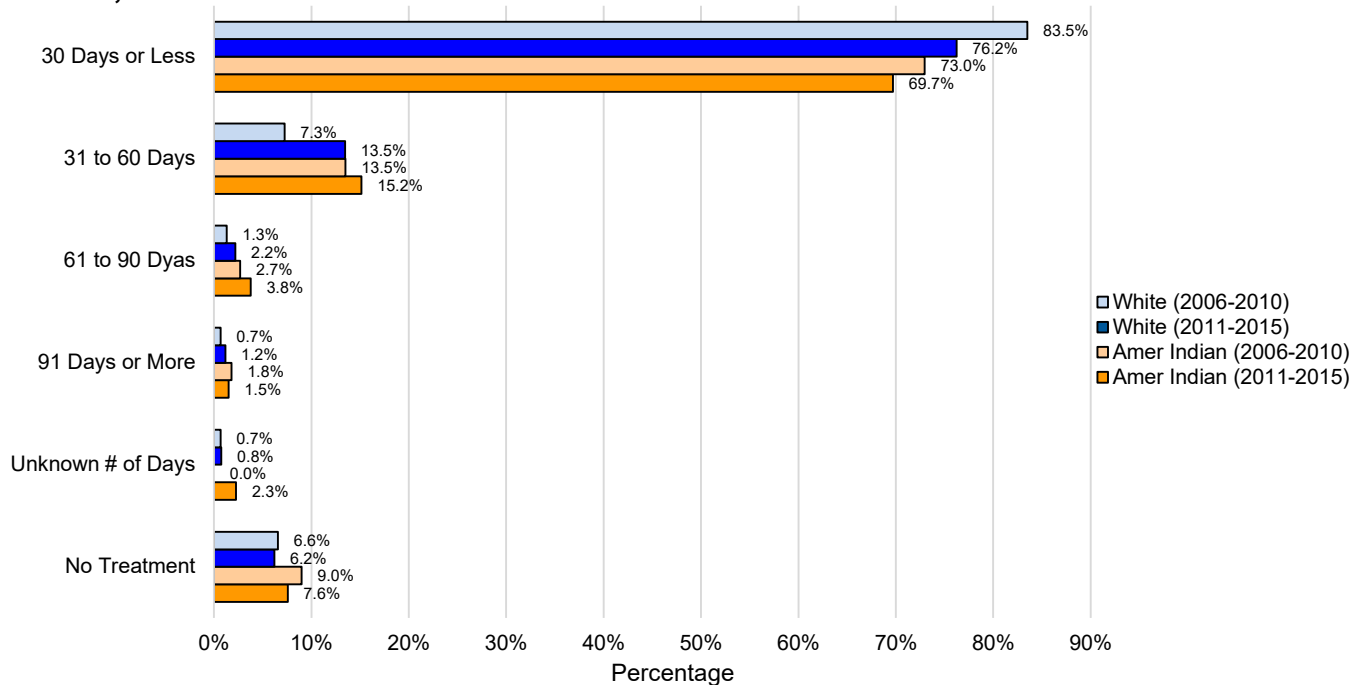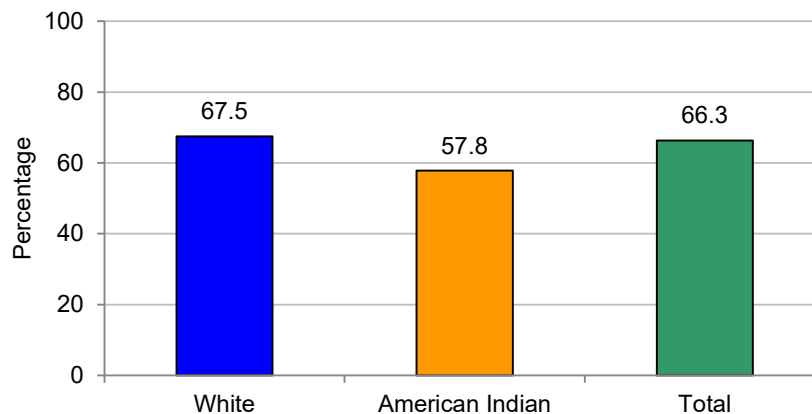

Source: South Dakota Department of Health

The CDC's Colorectal Cancer Control Core Program Performance Indicators from the Data Quality Indicator Guide (DQIG) states that 80% or more of colorectal cancer patients should have treatment within 60 days of diagnosis. [4]

Adults Age 50-75 Up to Date with Colorectal Cancer Screening Recommendations, 2014 and 2016

Source: South Dakota Department of Health Behavioral Risk Factor Surveillance System

Risk and Associated Factors

Colorectal cancer increases with age, but getting regular physical activity and keeping a healthy weight may help lower risk. Colorectal cancer screening can find precancerous polyps so they can be removed before they turn into cancer. In this way, colorectal cancer is prevented. Screening can also find colorectal cancer early, when there is a greater chance that treatment will be most effective and lead to a cure. The USPSTF recommends those at average risk should begin screening at age 50. Patients should talk to their doctor about ways to lower their risk and receive recommendations about individualized screening. [5]

[4] https://www.cdc.gov/cancer/ncccp/ccc_plans.htm
[5] https://www.cdc.gov/cancer/colorectal/basic_info/risk_factors.htm

Lung Cancer

The South Dakota lung cancer age-adjusted rate for the years 2011 to 2015 was 58.1. For the same time period it was 66.1 for men and 51.1 for women. There were a total of 2,922 newly diagnosed lung cancer cases. The median age at diagnosis was 71 years of age. For whites the age-adjusted rate was 57.1 also with a median age of 71 years of age at diagnosis. The American Indian age-adjusted rate was 102.2 and the median age at diagnosis was 69 years of age. For this time period, American Indian males have the highest age-adjusted rate for lung cancer at 121.7, American Indian females was 90.8.

SEER Summary Stage

The pie chart represents lung cancer stage at diagnosis, South Dakota, 2011-2015.

Distant 52%
Unknown 5%
In situ 0%
Localized 22%
Regional 21%
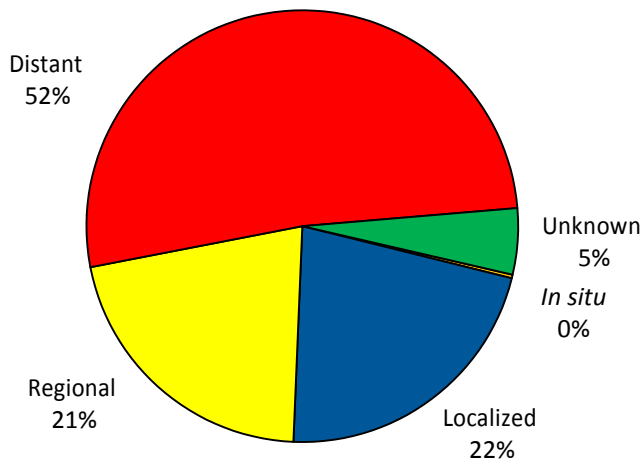
Source: South Dakota Department of Health

5-Year Relative Survival for Lung Cancer, U.S.

Stage at Diagnosis	5-Year Relative Survival, 2008-2014		
	Total	Male	Female
Localized	56.3%	50.2%	61.5%
Regional	29.7%	26.2%	33.6%
Distant	4.7%	3.9%	5.7%
Unknown	7.8%	7.2%	8.4%

Source: SEER Program www.seer.cancer.gov

Most lung cancers are at an advanced stage or have widely spread when they are first found. The USPSTF recommends annual screening for lung cancer with low-dose computed tomography (LDCT) in adults aged 55 to 80 years who have a 30 pack/year[6] smoking history and currently smoke or have quit within the last 15 years. The goal of screening is to identify cancer at an early stage so that it can be successfully treated.

South Dakota Lung Cancer Age-Adjusted Rate by Stage and Race, 2011-2015
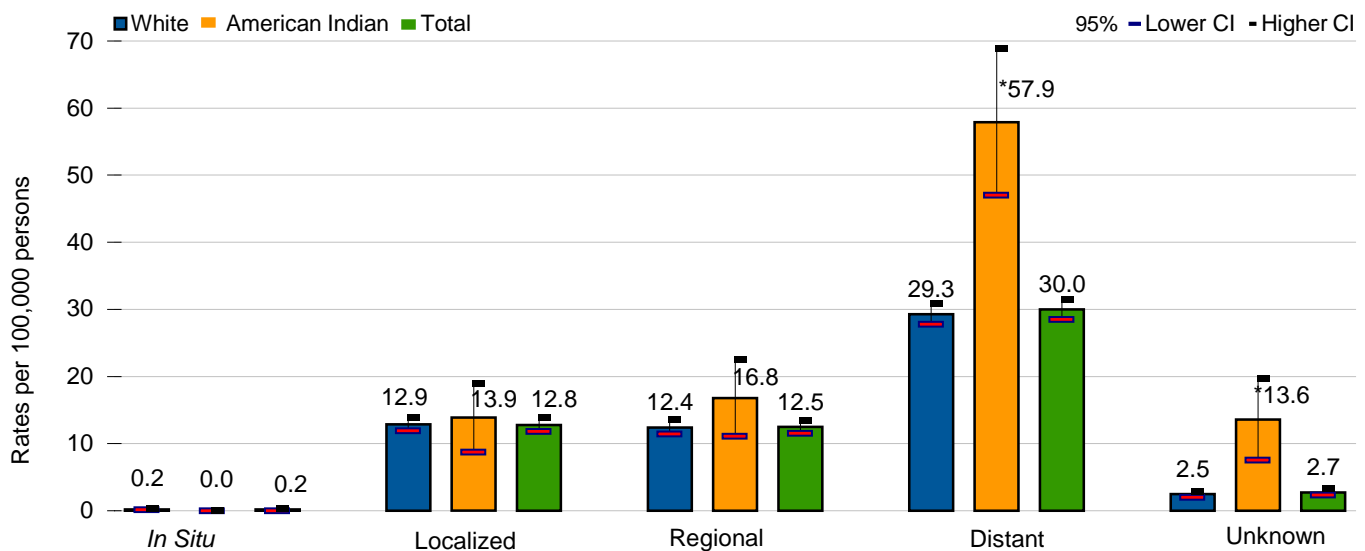
* Rate significantly higher than white rate. Source: South Dakota Department of Health

[6] A "pack year" is smoking an average of one pack of cigarettes per day for a year. A person could have a 30 pack-year history by smoking one pack a day for 30 years or two packs a day for 15 years. One pack equals 20 cigarettes.

Lung Cancer

South Dakota Lung Cancer 5-Year Age-Adjusted Incidence Rate by Race and Number of Cases, 2006-2015
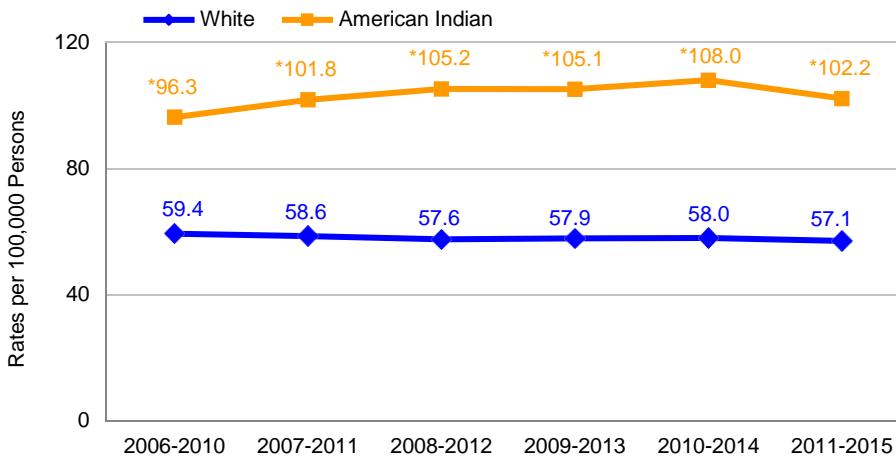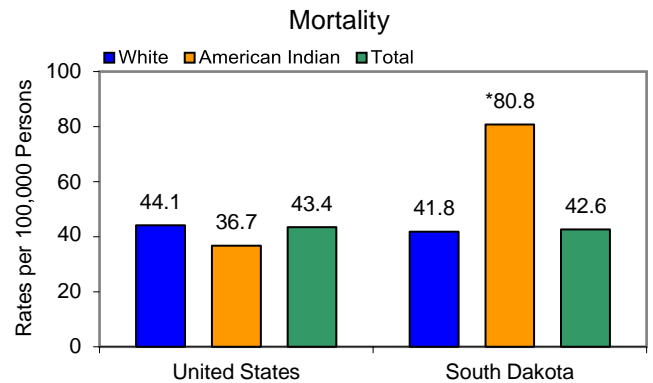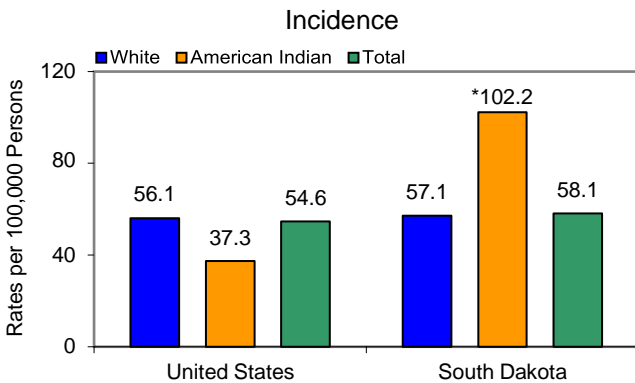

White: 2006-2010: 59.4, 2007-2011: 58.6, 2008-2012: 57.6, 2009-2013: 57.9, 2010-2014: 58.0, 2011-2015: 57.1
American Indian: 2006-2010: *96.3, 2007-2011: *101.8, 2008-2012: *105.2, 2009-2013: *105.1, 2010-2014: *108.0, 2011-2015: *102.2

Number of Cases		
	White	American Indian
2006-2010	2,607	166
2007-2011	2,606	176
2008-2012	2,597	188
2009-2013	2,653	194
2010-2014	2,700	193
2011-2015	2,711	189

* Rate significantly higher than white rate.
Source: South Dakota Department of Health

South Dakota Lung Cancer 5-Year Age-Adjusted Incidence and Mortality Rate by Race, United States and South Dakota, 2011-2015

Incidence

United States — White: 56.1, American Indian: 37.3, Total: 54.6
South Dakota — White: 57.1, American Indian: *102.2, Total: 58.1

Mortality

United States — White: 44.1, American Indian: 36.7, Total: 43.4
South Dakota — White: 41.8, American Indian: *80.8, Total: 42.6

* Rate significantly higher than South Dakota white rate.
Source: SEER Program www.seer.cancer.gov, South Dakota Department of Health

South Dakota Lung Cancer 5-Year Age-Adjusted Mortality Rate by Race and Number of Deaths, 2006-2015

White: 2006-2010: 44.8, 2007-2011: 44.8, 2008-2012: 44.0, 2009-2013: 42.6, 2010-2014: 42.7, 2011-2015: 41.8
American Indian: 2006-2010: *68.8, 2007-2011: *68.4, 2008-2012: *75.7, 2009-2013: *75.7, 2010-2014: *83.4, 2011-2015: *80.8

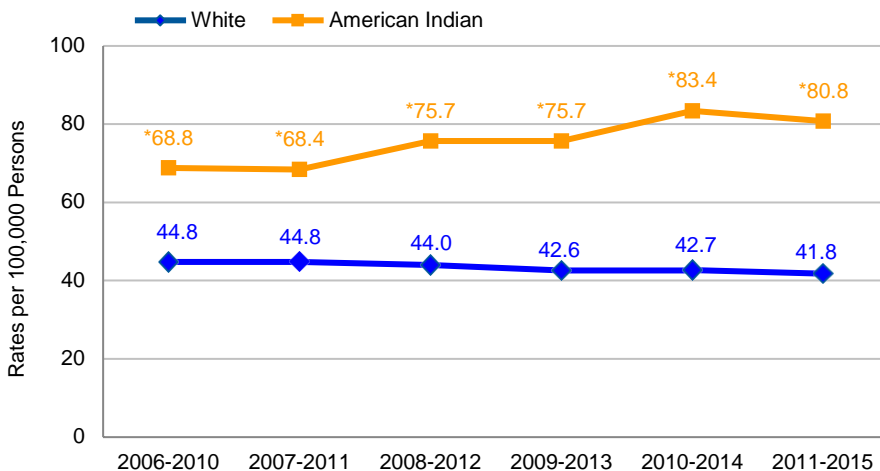| Number of Deaths		
	White	American Indian
2006-2010	1,999	114
2007-2011	2,019	115
2008-2012	2,016	127
2009-2013	1,981	131
2010-2014	2,023	142
2011-2015	2,014	143

* Rate significantly higher than white rate.
Source: South Dakota Department of Health

South Dakota Late Stage Lung Cancer 5-Year Age-Adjusted Incidence Rate, by County, 2006-2010 and 2011-2015
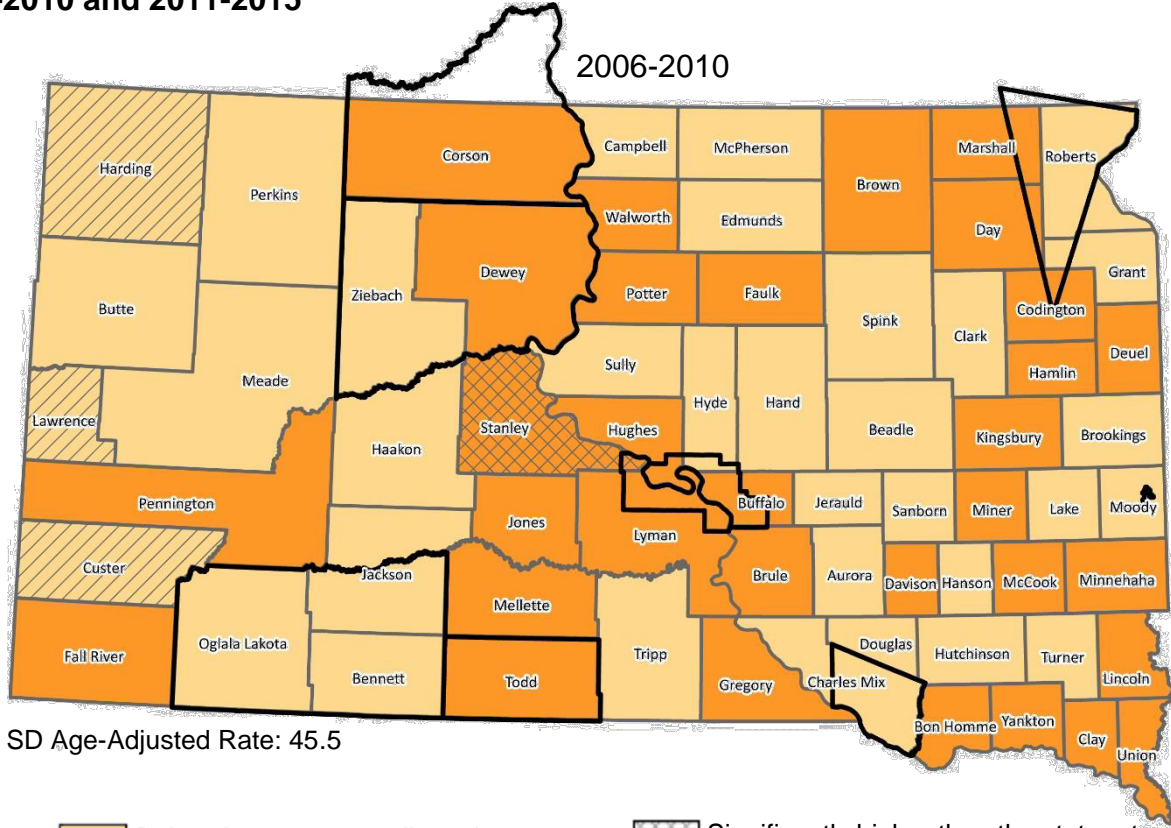
2006-2010

SD Age-Adjusted Rate: 45.5

Below the state age-adjusted rate	Significantly higher than the state rate
Above the state age-adjusted rate	Significantly lower than the state rate
	American Indian reservations

2011-2015

SD Age-Adjusted Rate: 42.5
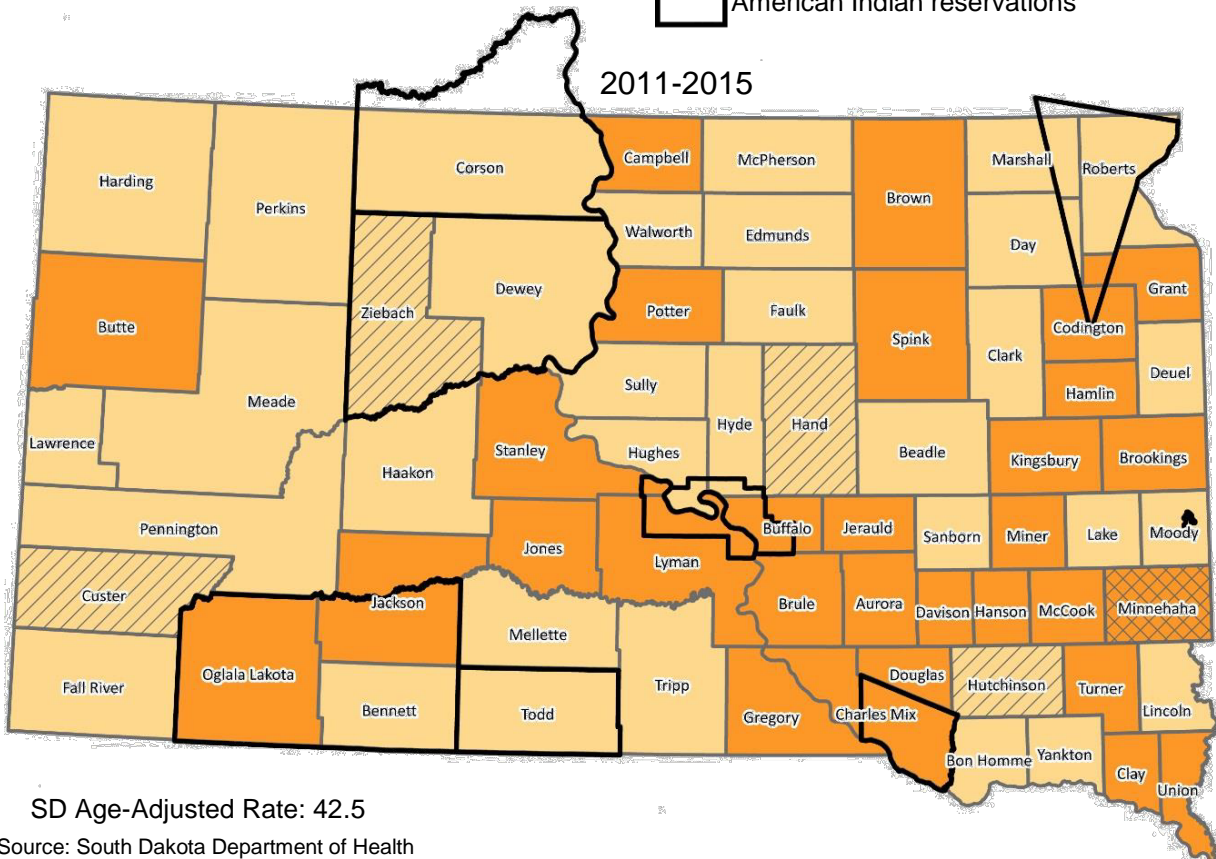
Source: South Dakota Department of Health

South Dakota Lung Cancer Time from Diagnosis to Treatment By Race, 5-Year Time Periods, 2006-2010 and 2011-2015
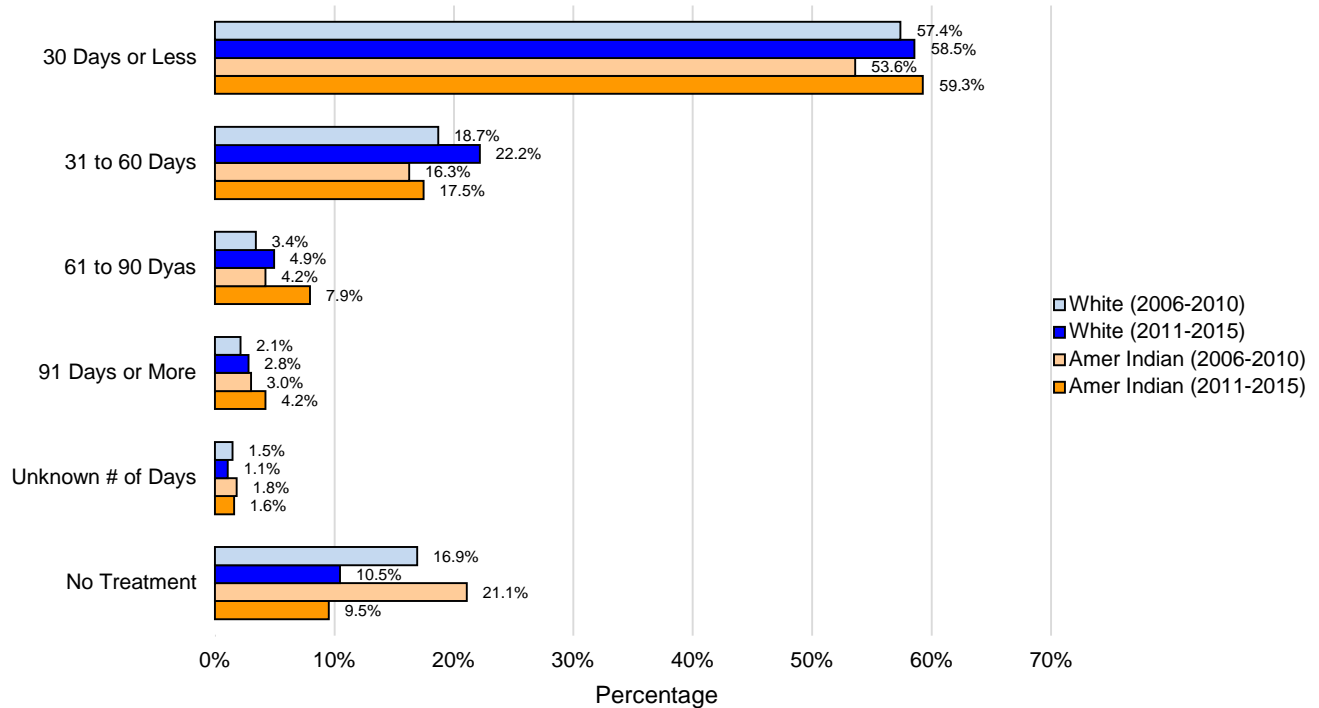
Source: South Dakota Department of Health

South Dakota Crude Prevalence of Smoking Status by Race, 2015 and 2016
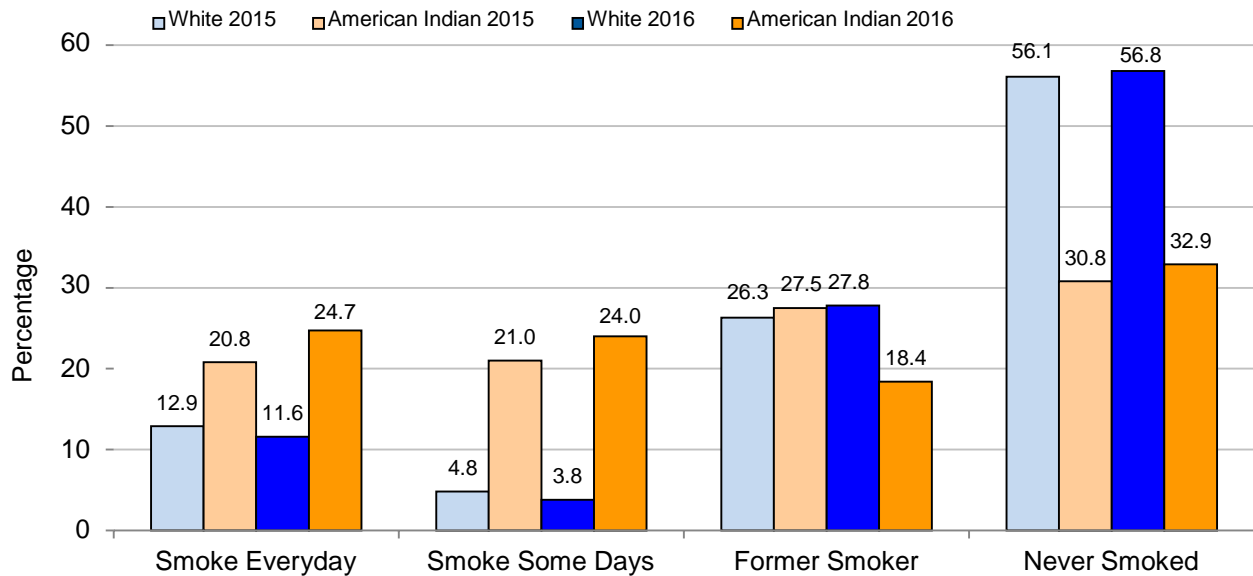
Source: South Dakota Department of Health Behavioral Risk Factor Surveillance System

Risk and Associated Factors

The primary cause of lung cancer in the United States is cigarette smoking and exposure to second hand smoke. Radon, a naturally occurring gas that comes from rocks and dirt and can get trapped in houses and buildings, is the second leading cause of lung cancer. The USPSTF recommends yearly, low-dose CT (LDCT) lung cancer screening for adults at high risk of the disease. Patients should talk to their doctor about ways to lower their risk and to determine if lung cancer screening is appropriate.[6]

[6] https://www.cdc.gov/cancer/lung/basic_info/risk_factors.htm

Conclusions

While cancer incidence and mortality rates are decreasing nationally, alarming disparities exist among certain population groups. Among the American Indian population in South Dakota, incidence and mortality rates are higher compared to the white population for all four cancer types examined, breast, cervical, lung and colorectal, with many being significantly higher. Moreover, rates of breast and lung cancer among American Indians are drastically higher in SD than rates of these cancers among American Indians nationally. For all four cancer types, American Indians were also diagnosed at a later stage than whites, which dramatically decreases survival rates. Additionally, American Indians had a lower screening rate than whites for all cancer types. Positively, rates of no treatment among the American Indian population decreased for both cervical and lung cancer from 2006-2010 to 2011-2015. To reduce these disparities, cancer prevention and control stakeholders should collaborate to implement evidence-based cancer prevention, early detection, treatment and survivorship interventions among the American Indian population in SD.

Data Limitations

A number of factors need to be considered when reviewing cancer statistics and interpreting them. A central cancer registry database is fluid and dynamic, 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 which supports the importance of the reporting of social security numbers.

The central cancer registry staff is committed to data accuracy, quality, and timeliness of all cancer data. However, the standardization for the methodology to collect race and ethnicity does not exist. The two methods used most are self-identification and the perception of the medical staff. There are several procedures in place to eliminate the racial misclassification of American Indians and Alaskan Natives (AI/AN) in the South Dakota Cancer Registry (SDCR) database. The first procedure is an annual data linkage between the SDCR and the Indian Health Service (IHS) Division of Epidemiology and Disease Prevention located within the Centers for Disease Control and Prevention. The purpose of this project is to identify AI/AN cancer patients who may have been misclassified as non-Native. The most recent linkage was completed on November 15, 2018 and contained 77,380 records. Of those, 25 AI/AN records were incorrect for a misclassification rate of 0.04%. The SDCR database was updated with the new racial information and it was provided to the original reporting hospitals, so the hospital databases could be updated too.

Another procedure that is completed to insure complete case finding of AI/AN cancer cases is the pathology reporting from the laboratory used by the South Dakota IHS service units. Even though the pathology laboratory is located out of South Dakota, the SDCR has a reporting agreement in place. Through this process, the SDCR can locate the AI/AN cancer cases that would potentially be missed and follow back to the ordering physician to obtain full information for completion of the cancer case.

The last procedure that will be discussed regarding racial misclassification is the annual death clearance. This process is a linkage between the SDCR database and the deaths from the South Dakota Department of Health (SD DOH) Office of Vital Records. The linkage allows for the identification of cancer-related deaths and ultimately cancer cases that were not previously reported to the SDCR. It is important to note that the SD DOH Office of Vital Records obtains death information on all South Dakotans regardless if the death occurs in South Dakota or another state. An additional benefit of the death clearance process is the opportunity to glean documented information from the death certificates which includes racial misclassification of AI/NA and many other data items used to enhance the quality of the SDCR database. However, it is recognized that if the informant of the demographic information on the death certificate is a family member of the deceased the racial information might be more reliable.

Definitions

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. 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.

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

Confidence Interval (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. CIs are calculated as follows:

The standard error (SE) of a rate is used in health statistics when studying or comparing rates. The SE defines a rate's variability and can be used to calculate a confidence interval (CI) to determine the actual variance of a rate 95 percent of the time. Rates for two different populations are significantly different when their confidence intervals do not overlap. The standard error and confidence intervals are calculated in the following manner. For example, Race A's age-adjusted cervical cancer rate is 6.0. This was based on 115 cervical cancer cases from 2011 through 2015. The square root of 115 is roughly 10.7. By dividing the rate of 6.0 by 10.7, the estimated SE of approximately 0.6 is the result. The estimated SE can then be used to compute a 95 percent CI for the rate. The standard formula for determining the 95 percent CI of a rate is: RATE ± (1.96 * SE) Following this formula produces an equation of 6.0 ± (1.96 * 0.6) and the result is 6.0 ± 1.18. From this the estimated 95 percent CI is from 4.9 to 7.1 percent. It could then be stated, with 95 percent certainty that the actual age-adjusted cervical cancer rate for Race A is between 4.9 and 7.1. Therefore, Race A's age-adjusted cervical cancer rate would not be considered significantly different from the state rate. This is because the confidence intervals for Race A (4.9-7.1) and the state (5.9- 8.2) overlap. Conversely, Race B's age-adjusted cervical cancer rate is considered significantly higher from Race A's and the state rate because their respective confidence intervals (4.9-7.1) and (5.9-8.2) do not overlap with Race B's confidence intervals of 13.2-28.7.

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]

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

Staging: Stage refers to the extent of cancer, including the size of a tumor, whether it has spread, and, if so, how far. Because an accurate diagnosis is so important to effective treatment, physicians might use physical exams, imaging, lab tests, a biopsy, an analysis of the patient's body fluids, and surgery in various combinations in the staging process.

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 is 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.

Statistical Significance: Statistical significance 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. However, if the confidence intervals do not intersect one another, there is statistical significance.

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

[1]http://epi.grants.cancer.gov/ResPort/HDoverview.html

[2]http://www.omni.org/docs/CMHFProceedings.pdf