Cancer and Poverty

Colorado 2001-2012

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COLORADO
Department of Public Health & Environment

Table of Contents

Executive Summary

Health disparities still persist in Colorado, namely among the poor. Over the time period of this report, there has been a widening income and wealth gap between those in the lowest and highest poverty groups in the country. Poverty continues to be an important risk factor in cancer incidence, stage of diagnosis and mortality. The relationships between poverty and cancer are not surprising given the differences between socioeconomic groups in tobacco use, use of cancer screening tests and access to appropriate cancer treatment.

Many cancers can be prevented by avoiding tobacco use, staying physically active, and maintaining a healthy diet and weight. Even when cancer does develop, risk of dying from it can be reduced by diagnosing cancer at an early stage and by applying effective treatments. However, poverty presents many barriers to cancer prevention, early diagnosis and treatment. The purpose of this report is to examine the relationships between poverty, the known risk factors for cancer, incidence rates, early stage diagnosis and survival from cancer in Colorado. Understanding of such relationships may help develop better cancer prevention and control strategies for everyone in the state.

The publication of Cancer and Poverty in Colorado: 2001-2012, prepared by the Comprehensive Cancer Program (CCP) of the Colorado Department of Public Health and Environment (CDPHE), is a continuation of a series of reports on cancer in Colorado. This report provides updated screening and prevention guidelines, data and analyses on the relationship between poverty and cancer using data from the years 2007-12 compared to 2001-06. The previous report on this topic covered the years 1995-2006. The report may be useful to policy makers, healthcare professionals and community groups in developing and evaluating prevention and intervention strategies, identifying high risk populations and prioritizing resource allocations for cancer-related services.

This report uses information on cancer incidence, stage and survival from the Colorado Central Cancer Registry (CCCR), information on cancer-related behaviors and screening from the Colorado Behavioral Risk Factor Surveillance System (BRFSS) surveys and poverty and population data from the U.S. Census Bureau. Information on insurance status of cancer cases is also obtained from the CCCR. Categories of poverty were defined in the BRFSS survey data from self-report of household income. Poverty categories were defined for the cancer registry data using 2000 US Census and 2007-11 American Community Survey information about the percentage of persons living in poverty in the neighborhoods in which cancer cases resided. For more information on data and methods, see the Data, Methods and Definitions chapter of this report.

Poverty continues to be an important risk factor in cancer incidence, stage of diagnosis and mortality.

Colorado cancer rates, preventive measures and the underlying relationship between poverty and cancer in this report are consistent with those in previous reports:

- Coloradans living in poverty were more likely to smoke tobacco, be obese, be less physically active and report lower screening estimates for breast, cervical or colorectal cancer compared to those not living in poverty.
- For most cancers, Coloradans who lived in poorer neighborhoods and were uninsured were more likely to have had a more advanced stage of cancer at the time of diagnosis.
- For most cancers, Coloradans who lived in poorer neighborhoods were more likely to die within the first five years following cancer diagnosis.

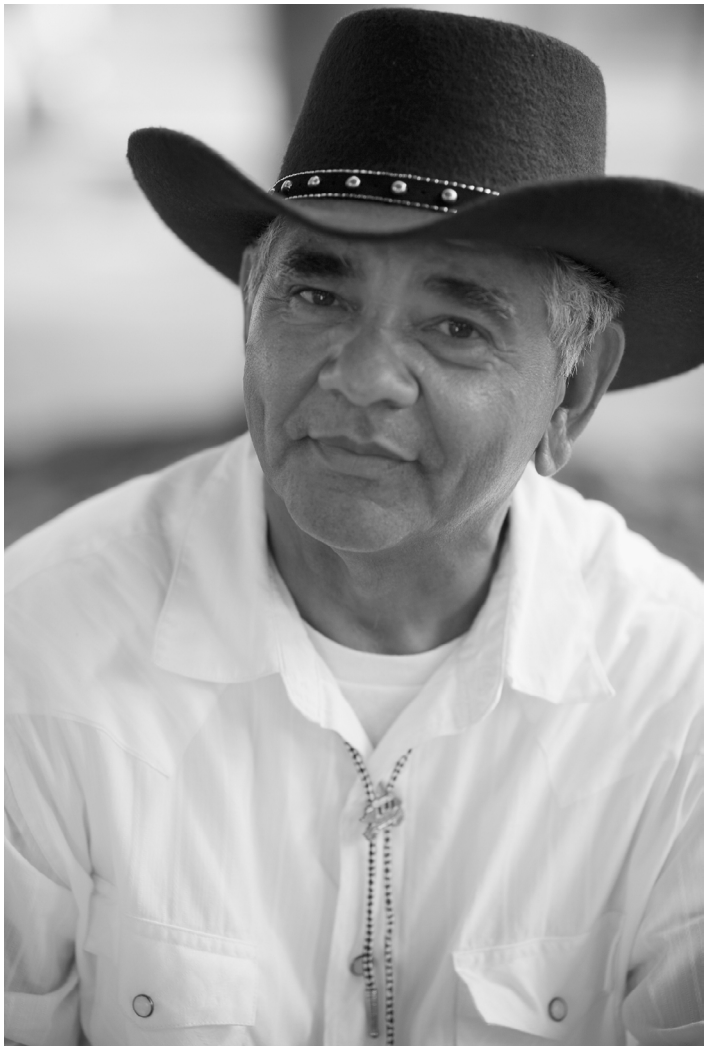
Executive Summary

These relationships were seen among men and women and people of different races and ethnicities. Importantly, though, the relationships between poverty and stage of cancer, as well as survival after cancer, were less apparent after age 65.

Solutions to the problems caused by poverty are, of course, complex. Individuals and organizations could have an impact on Colorado's cancer burden by participating in the following types of efforts:

- Engage public health agencies and policymakers in efforts to reduce health disparities caused by poverty.
- Ensure Coloradans, regardless of income, have access to quality health education, cancer screening and cancer treatment.
- Fund programs to encourage adoption of healthy behaviors, increase access to preventive health services for early detection of cancer and increase access to timely initiation of effective cancer treatment right after cancer diagnosis.
- Report data in regularly produced cancer surveillance reports according to poverty levels in addition to commonly used demographic groups.
- Target risk factor reduction efforts to those living in poverty to impact cancer outcomes in that group.

In the future, this report could also be used to assess changes due to healthcare reform efforts, including health insurance coverage, cancer screening rates and cancer outcomes before and after the implementation of the Affordable Care Act.



Introduction

Since 2004, cancer has been the leading cause of death in Colorado.[1] Although significant progress has been made in reducing cancer mortality rates since 1990, inequalities remain among racial and ethnic populations in Colorado. Many types of cancer can be prevented. Once a cancer has developed, outcomes can be substantially improved through early detection and proper treatment. Factors important in reducing cancer risk and improving outcomes include:

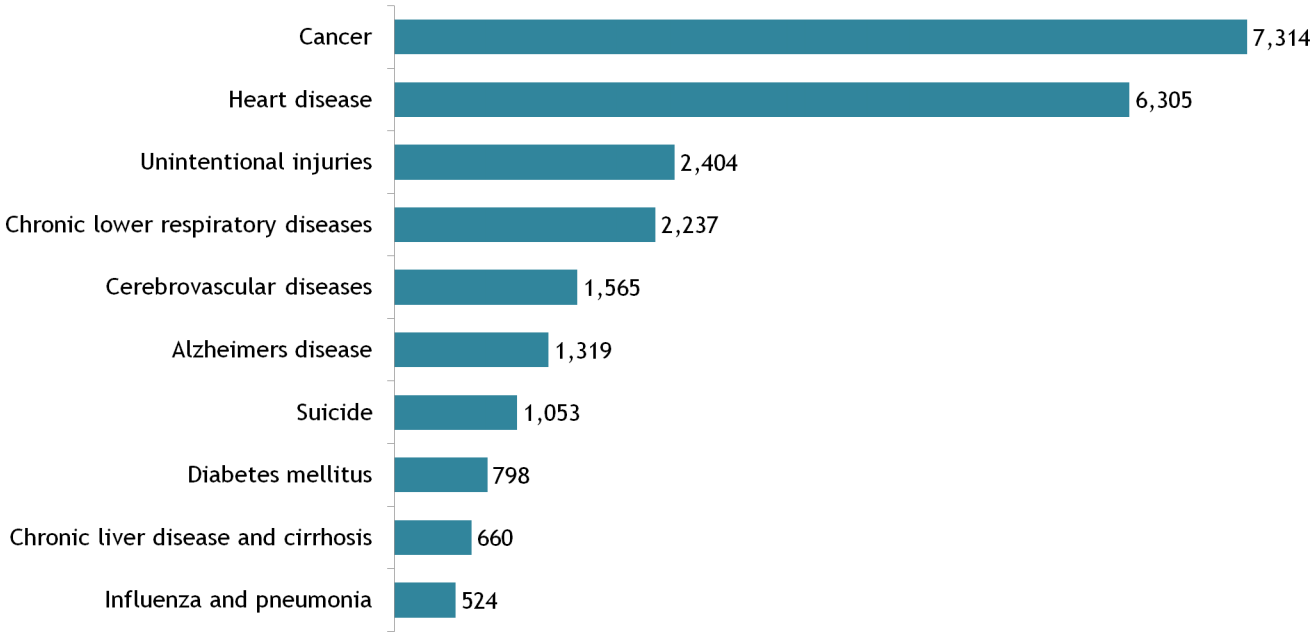
1. Adopting healthy behaviors such as not smoking, eating a healthy diet, preventing obesity and increasing physical activity
2. Obtaining recommended screening tests, such as mammography, Pap tests, and colorectal screening at recommended intervals
3. Initiating a complete course of the latest and most effective cancer treatments as soon as possible after diagnosis

As of 2012, cancer remains the leading cause of death in Colorado (Figure 1). However, in the past few years, better early detection and progress in cancer treatment have kept the number of cancer deaths down in Colorado. In this report, the top seven cancer sites in Colorado that have beneficial preventive measures available to lower risk of cancer are presented.

The two most commonly diagnosed cancers in Colorado are female breast cancer and prostate cancer.[2] Because of preventive measures (like tobacco cessation), early cancer stage diagnosis and better treatment options, deaths due to cancer have remained low among the seven cancer sites discussed in this report. Unfortunately, lung cancer as a cause of death still remains high (Figure 2).

In Colorado, poverty continues to be an important factor that increases the risk of getting cancer, having cancer diagnosed at a later stage and dying

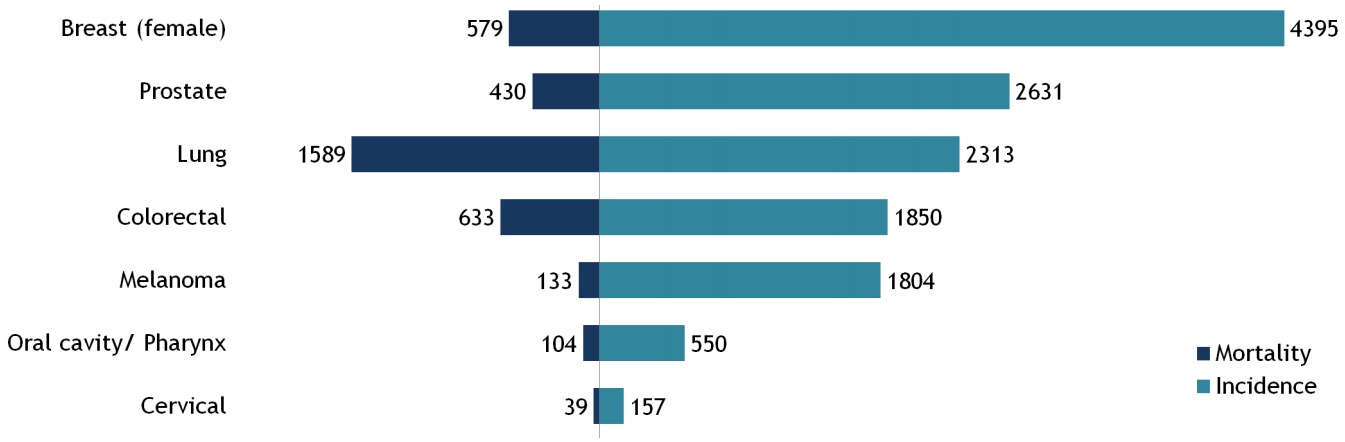
Figure 1: Top Ten Leading Causes of Death in Colorado, 2012



Source: Vital Statistics Program, Colorado Department of Public Health and Environment

Introduction

Figure 2: Incidence and Death Counts for Selected Cancers in Colorado, 2012



Note: Incidence counts include *in situ* cases
Source: Colorado Central Cancer Registry, Colorado Department of Public Health and Environment

of cancer. The relationships between poverty and cancer are not surprising given the socioeconomic differences in tobacco use, the use of cancer screening tests and the access to appropriate cancer treatment.

Socioeconomic status, race/ethnicity and gender are important factors in determining the relationship between cancer risk and outcomes,[3,4] and poverty is an important contributor to the racial/ethnic disparities evident in the burden of cancer. In 2012, 13.6 percent of Coloradans were living in poverty.[5] While that figure, as a whole, was lower than the overall U.S. poverty rate of 15.9 percent, wide disparities still remain within the state. According to the 2007-11 American Community Survey, poverty rates within Colorado census tracts ranged from no residents living in poverty to more than 75 percent of residents living in poverty.[6] Racial/ethnic minority groups in Colorado bear a disproportionate burden of poverty. Only 8.5 percent of non-Hispanic Whites live in poverty, compared to 10.6 percent of Asian/ Pacific Islanders, 23.7 percent of American Indian/ Alaska Natives, 24.3 percent of Blacks, and 24.4 percent of Hispanics.[7]

Lack of health insurance contributes to health disparities. Among uninsured Coloradans under age 65, 34 percent are living at under 138 percent of the Federal Poverty Level and are more likely to experience worse cancer outcomes due to diminished access to preventive care, delayed diagnosis and less complete treatment.[8,9] In 2011, an estimated 16 percent of Coloradans, or more than 829,000 individuals, lacked health insurance. Twenty-six percent of Hispanics had no health insurance coverage, in comparison to 12 percent of non-Hispanic Whites and 15 percent of other races.[10]

Racial/ethnic minority groups in Colorado bear a disproportionate burden of poverty. Only 8.5 percent of non-Hispanic Whites live in poverty, compared to 10.6 percent of Asian/Pacific Islanders, 23.7 percent of American Indian/Alaska Natives, 24.3 percent of Blacks, and 24.4 percent of Hispanics.

Introduction

Measures Used in this Report

This analysis was based on information collected by the Colorado Central Cancer Registry (CCCR), the Colorado Behavioral Risk Factor Surveillance System (BRFSS), the U.S. Census Bureau and the American Community Survey. Information on health insurance status, cancer incidence, cancer stage and survival after cancer was provided by the CCCR. Because information on individual income was not reported to state cancer registries, the poverty level of the census tract where each cancer case lived was used to assign socioeconomic poverty level for that cancer case. Information on household income and poverty in Colorado was obtained through the 2010 U.S. Census and the 2007-2011 American Community Survey and used to define census tract areas based on three levels of poverty:

1. Less than 10 percent poverty
2. 10-19 percent poverty
3. 20+ percent poverty

The Health Statistics Section of the Colorado Department of Public Health and Environment (CDPHE) provided information related to health behaviors drawn from the Colorado BRFSS. Individual insurance information (based on the primary payer at diagnosis) was available for most cancer cases reported to the CCCR. Categories of insurance coverage presented were: not insured, private insurance (including TRICARE and Military coverage), Medicaid and Medicare. Cancer case counts insufficient to display insurance category by poverty level were: federal (including Veteran's Affairs and Indian/Public Health Service), Medicare under age 65, Medicaid age 65 and older and uninsured age 65 and older.

The detailed methods used in this analysis are presented in the Data, Methods and Definitions chapter.

Introduction

Language Use

The Comprehensive Cancer Program (CCP) recognizes the challenge of defining racial/ethnic groups, and acknowledges that not everyone identifies him or herself with these categories. The CCP respects the importance of cultural differences in how individuals and communities prefer to be defined. The program also recognizes that race and ethnicity are social categories representing distinct cultures and histories of groups within the United States, and are not categories based on specific biological or genetic differences.

In this report, terms used to describe the racial/ethnic background of groups of people are non-Hispanic White, Black, Hispanic, Asian/Pacific Islander, and American Indian. Non-Hispanic White refers to the standard data collection category of White, but not Hispanic. Hispanic refers to the standard data collection category of White and Hispanic. The term "Black" refers to Black, regardless of Hispanic identification. Asian/Pacific Islander refers to the standard collection category of Asian or Pacific Islander. The term American Indian refers to the standard collection category of Native American not including Alaskan Native.

Poverty was defined differently in the BRFSS survey data and the CCCR data. For the BRFSS survey data, weighted average poverty thresholds published each year by the U.S. Census Bureau and household income data from BRFSS were used to define three poverty categories:

- In Poverty -Less than 100 percent of poverty threshold
- At/Near Poverty -100-199 percent of poverty threshold
- Not in Poverty -200 percent or above of poverty threshold

For the CCCR data, poverty level was assigned to each case based on the poverty level of the census tract where each cancer case resided, obtained through the 2000 U.S. Census (for 2001-06 diagnosis years) or the 2007-11 American Community Survey (for 2007-12 diagnosis years). Each case was assigned to one of the three following poverty groups:

- Less than 10 percent poverty- Low poverty areas
- 10-19 percent poverty- Middle poverty areas
- 20+ percent poverty- High poverty areas

For the CCCR data, poverty level was assigned to each case based on the poverty level of the census tract where each cancer case resided.

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Cancer Prevention

Cancer affects millions of people in this country every year. Many cancers could be avoided entirely through healthy lifestyle modifications. It is estimated that about half of all cancers diagnosed in the U.S. could be prevented by avoiding exposure to tobacco and heavy alcohol use, eating a healthful diet, exercising and avoiding obesity.

Smoking

Smoking greatly increases the risk of developing and dying from cancer. The severity of that risk depends on when a person starts smoking and how much and how long he or she smokes. Smoking is known to cause many different types of cancer, including the following: [1]

- Lung cancer
- Oropharyngeal cancer
- Esophageal cancer
- Tracheal cancer
- Bronchial cancer
- Bladder cancer
- Laryngeal (voice box) cancer
- Stomach cancer
- Pancreatic cancer
- Kidney cancer
- Cervical cancer
- Bladder cancer
- Liver cancer
- Colon cancer
- Rectal cancer
- Acute myeloid leukemia (AML)

Evidence also suggests that smoking and exposure to secondhand smoke cause breast cancer. Secondhand smoke is classified as a human carcinogen by the U.S. Environmental Protection Agency, the U.S. National Toxicology Program, the U.S. Surgeon General and the International Agency for Research on Cancer.

According to the American Cancer Society (ACS), smoking will cause an estimated 176,000 cancer deaths in 2014.[2]

Cancer Prevention

Poverty has been shown to be associated with a higher likelihood of smoking.[3] Among Colorado residents, those reporting lower incomes were more than twice as likely to be current smokers compared to those who are not in poverty (Figure 1). While smoking rates seem to be higher for the lower income group in 2011-12 than in 2007-10, it is important to note that data collected by the Behavioral Risk Factor Surveillance System (BRFSS) before 2011 cannot be compared to that collected in 2011 or later due to changes in methodology. Therefore, reliable conclusions about changes in smoking rates over time cannot be drawn from this data.

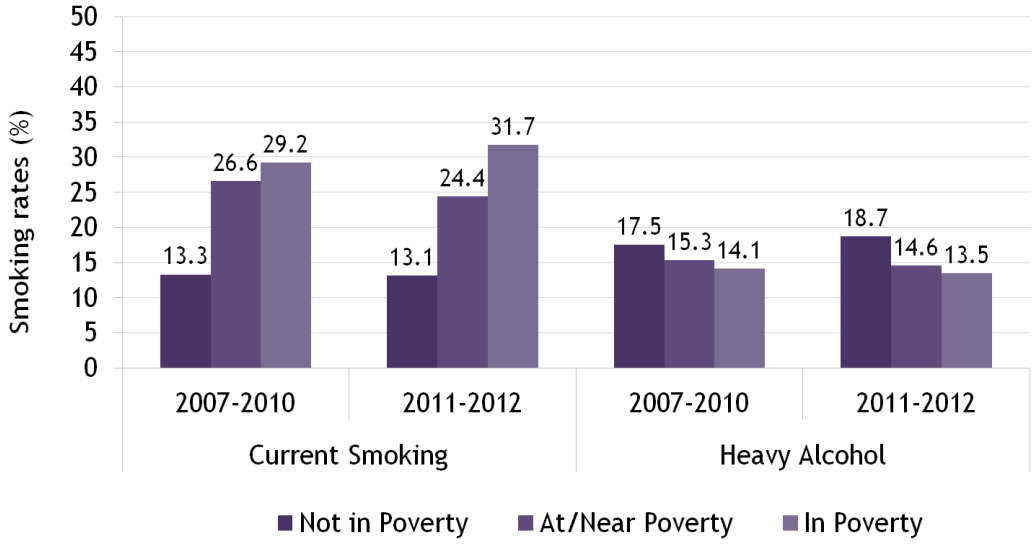
While smoking increases the risk of cancer, current smokers can decrease that risk by quitting. It can take a number of years for the risk to decline, but the benefits of quitting increase over time.[1] For people being treated for cancer, quitting smoking helps improve the body's ability to heal and respond to therapy.[1,3] It also lowers the risk of pneumonia and respiratory failure. Moreover, quitting smoking may lower the risk of cancer recurrence or development of a second cancer.[4,5,6]

Smoking is known to cause cancers of the lung, oral cavity and pharynx, larynx (voice box), esophagus, bronchus, stomach, pancreas, kidney, cervix, trachea, bladder, liver, colon, rectum and acute myeloid leukemia (AML).

Alcohol

Research has also shown that heavy or regular alcohol consumption increases the risk of developing cancers of the oral cavity (excluding the lips), pharynx (throat), larynx (voice box), esophagus, liver, breast, colon and rectum. The risk of developing cancer increases with the amount of alcohol a person drinks.[3,7] Figure 1 shows that among Colorado adults, those who were not in poverty were more likely to report heavy alcohol use in both time periods.

Figure 1: Rates of Smoking and Heavy Alcohol Use Among Coloradans Ages 18+, 2007-2012



Source: Colorado Behavioral Risk Factor Surveillance System; Health Statistics, Colorado Department of Public Health and Environment.

Cancer Prevention

Obesity and Physical Activity

According to the American Cancer Society, it is estimated that 1 out of every 3 cancer deaths in the United States is linked to excess body weight, poor nutrition and/or physical inactivity.[8] Obesity is a known risk factor for cancers of the colon and rectum, breast in postmenopausal women, uterus, esophagus, kidney, thyroid and gallbladder.[9]

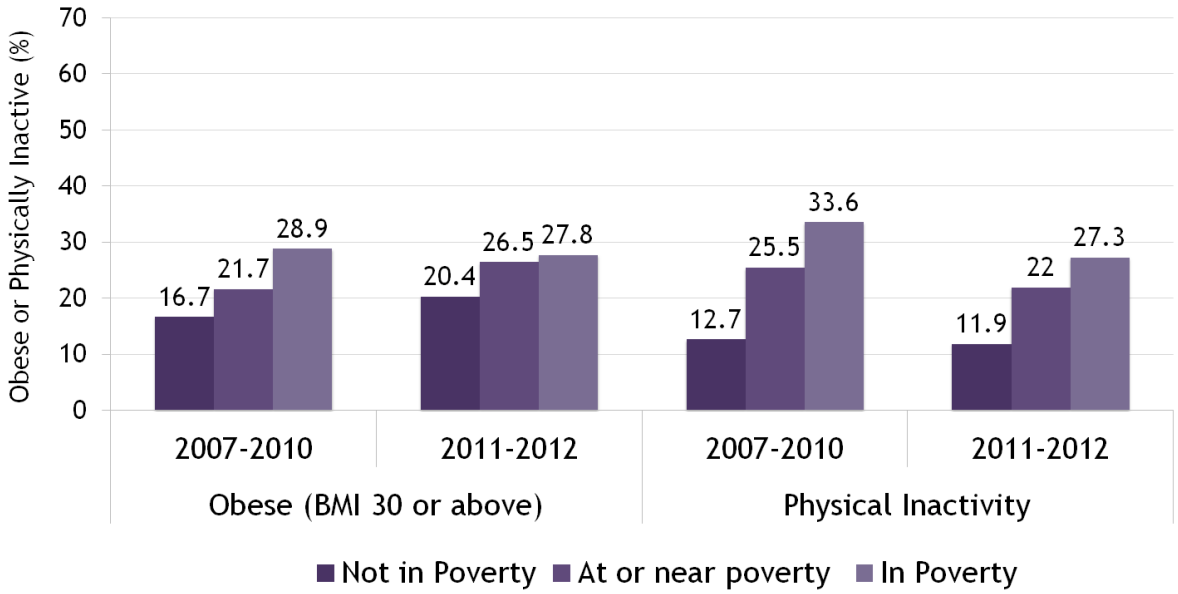
Research has established that regular physical activity can improve health by: [10]

- Helping to control weight
- Maintaining healthy bones, muscles, and joints
- Reducing the risk of developing high blood pressure and diabetes
- Promoting how the mind works and how thoughts and feelings affect behavior
- Reducing the risk of death from heart disease
- Reducing the risk of premature death

Evidence also shows that physical activity reduces the risk of cancers of the breast, colon, lung, prostate and uterus.[11]

In Colorado, adults in poverty reported more obesity and less physical activity compared to those not in poverty in both the 2007-2010 and 2011-2012 time periods (Figure 2).

Figure 2: Percent of Colorado Adults who are Currently Obese (BMI 30 or above) or Physically Inactive, 2007-2010 and 2011-2012



Source: Colorado Behavioral Risk Factor Surveillance System; Health Statistics, Colorado Department of Public Health and Environment.

Cancer Prevention
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All Cancers Combined

Key Points & Definitions

Cancer is a term for a large number of diseases in which abnormal cells divide without control and may invade other tissues.

Data Sources:

The **Behavioral Risk Factor Surveillance System (BRFSS)** provides screening data and self-reported income used to assess poverty for screening rate comparisons. Poverty groups for BRFSS data are divided as follows:

1. In Poverty- Income less than 100% of the Federal Poverty Level (FPL)
2. At or Near Poverty- Income between 100% and 199% of FPL
3. Not in Poverty- Income is at or above 200% of the FPL

The **Colorado Central Cancer Registry (CCCR)** provides data on cancer incidence, stage at diagnosis, payer and survival.

U.S. Census Bureau data was used to determine area poverty level for all non-BRFSS related comparisons. Census tracts were divided into one of three groups:

1. Less than 10% of households in the census tract living below the FPL
2. 10-19% of households in the area are living below the FPL
3. 20% or more of households in the area living below the FPL

See Data, Methods and Definitions for more information

Cancer is not just one disease. Rather, it is a term used to account for over 100 types of diseases in which abnormal cells grow uncontrollably and may invade other tissues in the body. The lifetime risk of being diagnosed with cancer in Colorado is approximately 1 in 2 for males, and 2 in 5 for females.[1] This chapter accounts for data on all types of cancers collected at state cancer registries. The following chapters will go into more detail about a few specific types of cancer. In the U.S. the majority of all cancer deaths are attributable to tobacco use, physical inactivity, poor nutrition, obesity and/or failure to access existing screening tests for cancer.[2]

Poverty and incidence

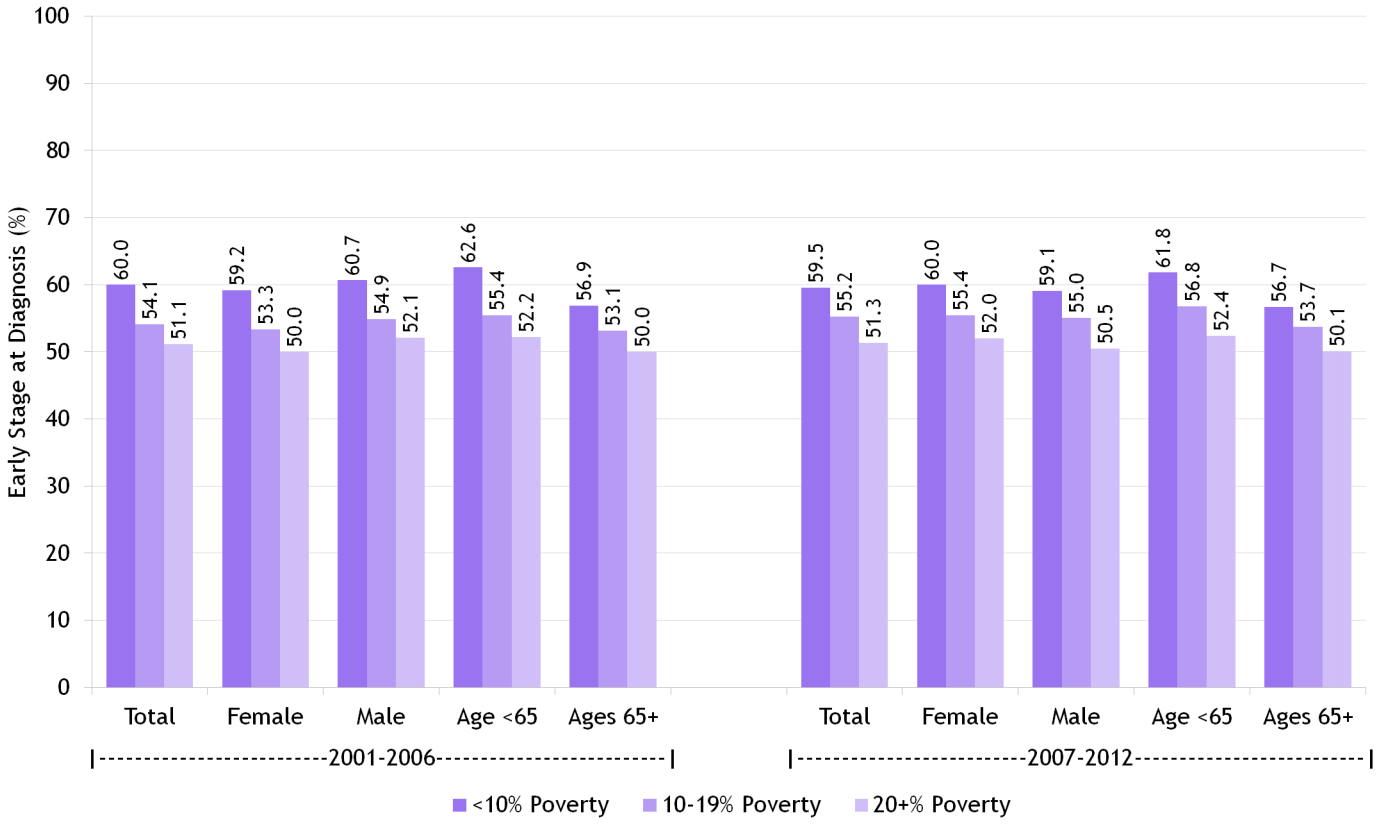
An average of 21,500 malignant cancers are diagnosed annually in Colorado. The poorest areas of the state had higher incidence rates of cancers of the oral cavity and pharynx, colon/rectum, lung and cervix, and lower incidence rates of melanoma, breast and prostate cancer. These specific types of cancers will be explored in more depth in subsequent chapters.

All Cancers Combined

Early Detection by Poverty, Age and Gender

Approximately 60 percent of all cancer cases were diagnosed at an early stage in Colorado in both 2001-06 and 2007-12 (Figure 1). Only small differences were seen, overall, between men and women and between the age groups examined. However, a smaller proportion of cancers were diagnosed early among Coloradans living in poor areas, regardless of age or sex. These patterns were similar across the 2001-06 and 2007-12 time periods.

Figure 1: Early Stage at Diagnosis for All Cancers by Area Poverty Level, Gender and Age: 2001-2006 & 2007-2012



Source: Colorado Central Cancer Registry, Colorado Department of Public Health and Environment

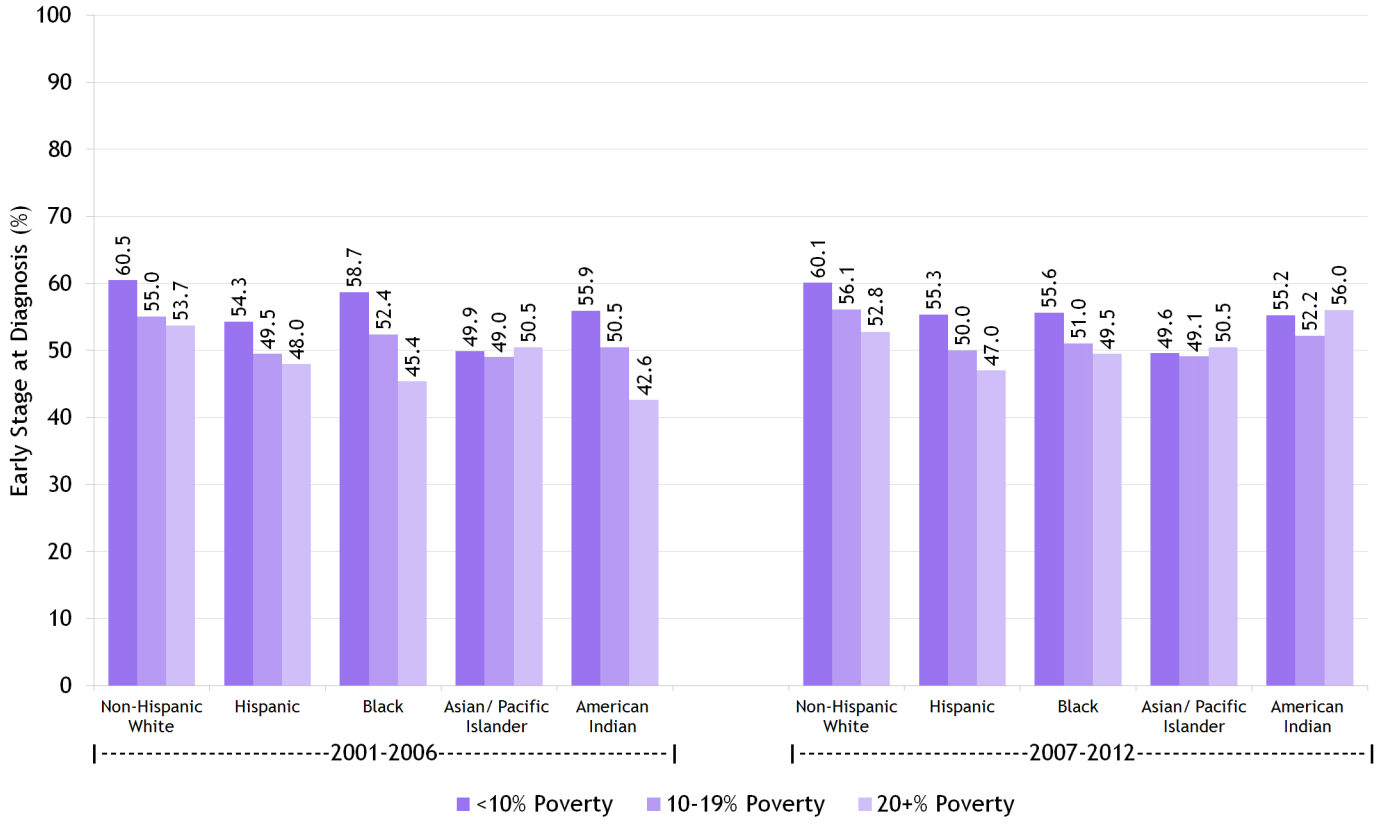
A smaller proportion of cancers were diagnosed early among Coloradans living in poor areas, regardless of age or sex.

All Cancers Combined

Early Detection by Poverty and Race

Early detection rates did not vary greatly between different racial groups. However, smaller proportions of cancers were diagnosed early in the poorest areas *within* some racial groups. This trend is especially apparent in Blacks diagnosed in the 2001-2006 time frame, and Non-Hispanic Whites and Hispanics in the 2007-2012 time frame.

Figure 2: Early Stage at Diagnosis for All Cancers by Area Poverty Level and Race, 2001-2006 & 2007-2012



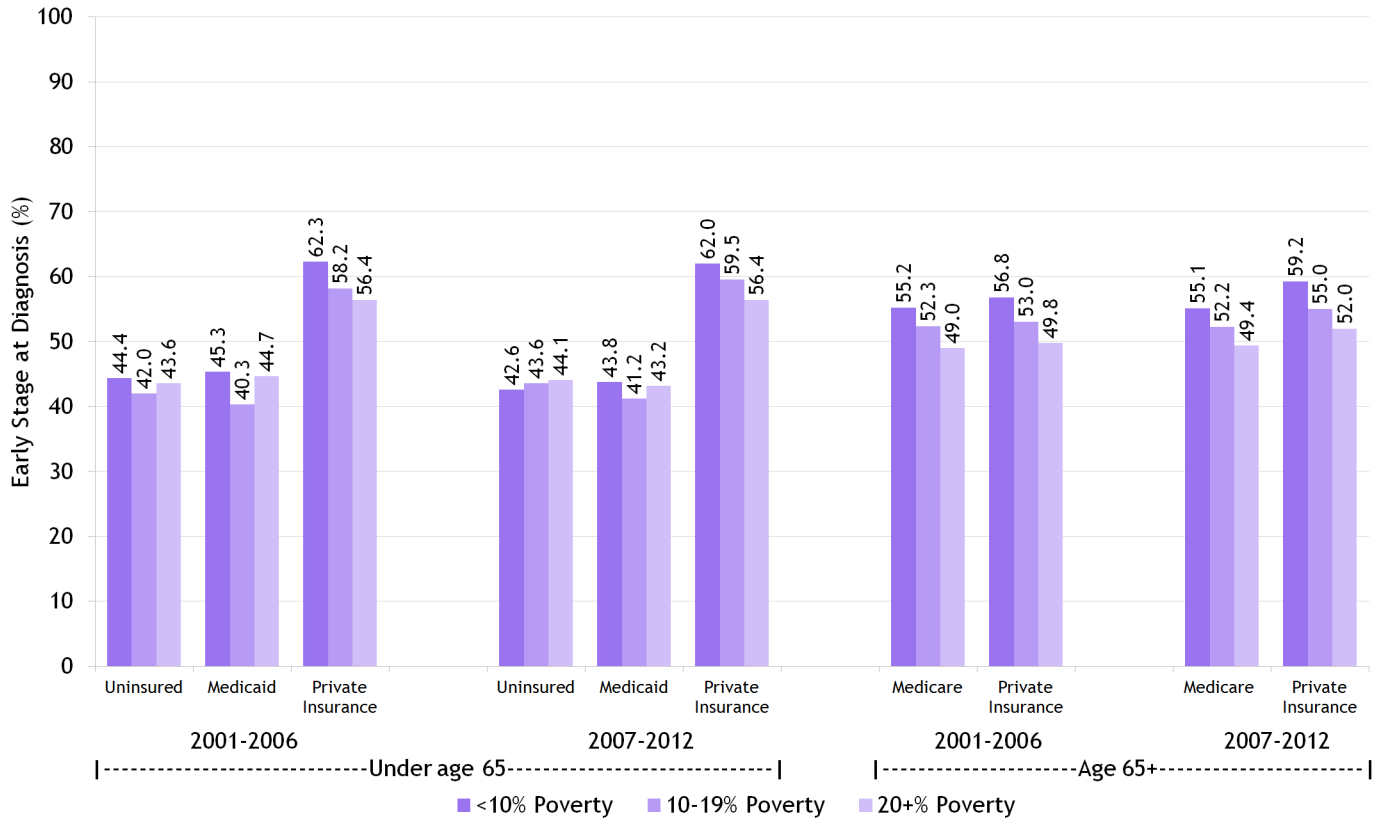
Source: Colorado Central Cancer Registry, Colorado Department of Public Health and Environment

All Cancers Combined

Early Detection and Insurance Status

Coloradans with greater access to health care and health insurance were diagnosed at an earlier stage compared to those who were uninsured during both time periods (Figure 3). Similarly, cancers among those younger than 65 years old were more likely to be diagnosed early in those with private insurance compared to those who had no insurance or Medicaid. Coloradans older than 65 years from poorer areas had lower rates of early detection whether Medicare or private insurance was the payer for care.

Figure 3: Early Stage at Diagnosis for All Cancers by Area Poverty Level, Age and Insurance Status, 2001-2006 & 2007-2012



Source: Colorado Central Cancer Registry, Colorado Department of Public Health and Environment

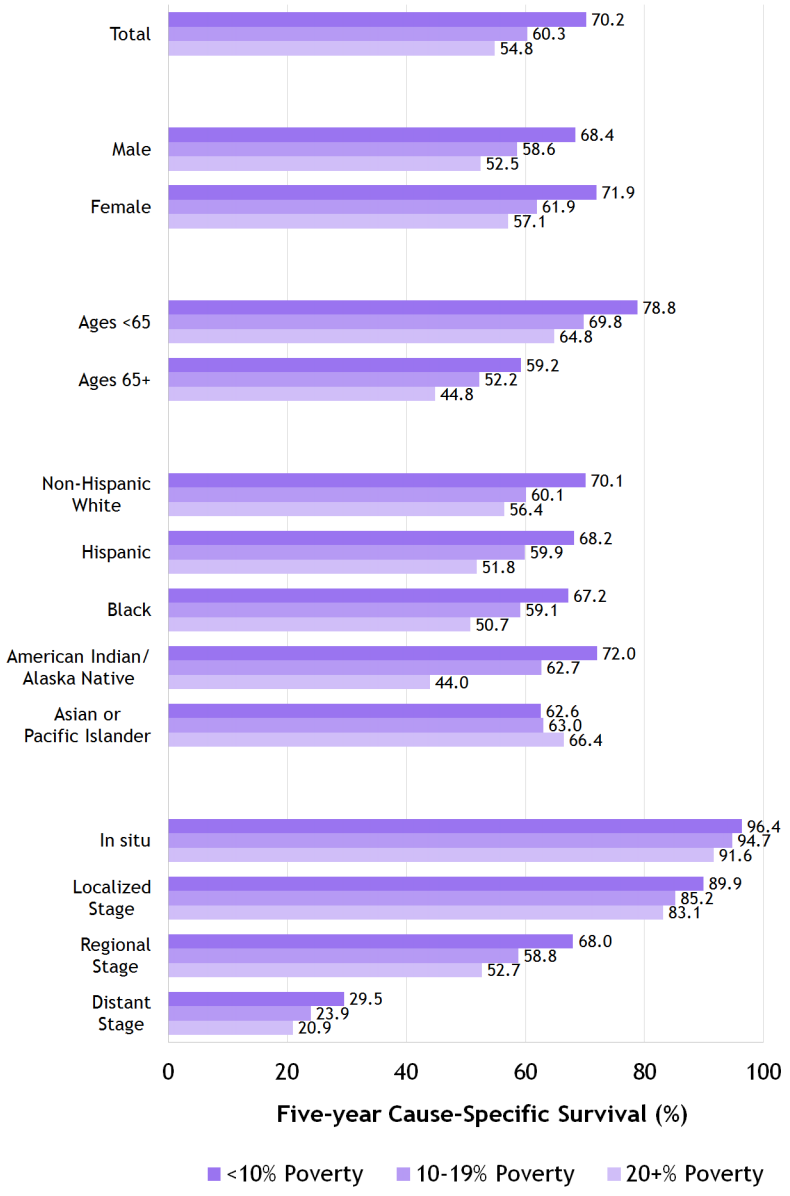
All Cancers Combined

Poverty and Survival

Five-year survival rates were about 15 percent lower for persons living in the poorest areas compared to those living in the wealthiest areas (Figure 4). Coloradans from poorer areas had worse survival rates for cancer overall. This disparity was seen in nearly all race/ethnicity, gender and age groups. An examination of cancers by stage showed the largest disparity in survival among the regional stage, with a 15 percent difference between wealthy and poor populations. The difference was more than 8.5 percent in the distant stage and nearly 7 percent in the localized stage.

Coloradans from poorer areas had worse survival rates for cancer overall. This disparity was seen in nearly all race/ethnicity, gender and age groups.

Figure 4: Five-year Survival for All Cancers by Area Poverty Level and Age, Gender, Race and Stage: 2001-2006



Source: Colorado Central Cancer Registry, Colorado Department of Public Health and Environment

All Cancers Combined
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Breast Cancer

Key Points & Definitions

Breast cancer is a type of cancer in which cells in the breast divide and grow without normal control and form a tumor.

Data Sources:

The **Behavioral Risk Factor Surveillance System (BRFSS)** provides screening data and self-reported income used to assess poverty for screening rate comparisons. Poverty groups for BRFSS data are divided as follows:

1. In Poverty - Income less than 100% of the Federal Poverty Level (FPL)
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See Data, Methods and Definitions for more information

Among women in Colorado, breast cancer is the most common cancer diagnosed and second leading cause of cancer-related death.[1] In Colorado, one in seven women will develop breast cancer in their lifetime.[2]

Breast Cancer Prevention and Risk Factors

Being a woman and aging are important risk factors in developing breast cancer. Other individual factors that increase a woman's risk for developing breast cancer include:[3]

- Family or personal history of breast cancer
- Genetic mutations, such as the BRCA gene mutation
- Different races and ethnicities tend to experience differences in breast cancer incidence and mortality
- Dense breast tissue
- Certain benign breast conditions (non-proliferative lesions, proliferative lesions with and without atypia)
- Lobular carcinoma in situ (LCIS)
- A history of long menstrual cycles
- Previous chest radiation
- DES (diethylstilbestrol) exposure
- Women who never give birth or those who had their first child after 30
- Certain forms of birth control
- Hormonal therapy after menopause
- Drinking alcohol
- Being overweight or obese
- Lack of physical activity

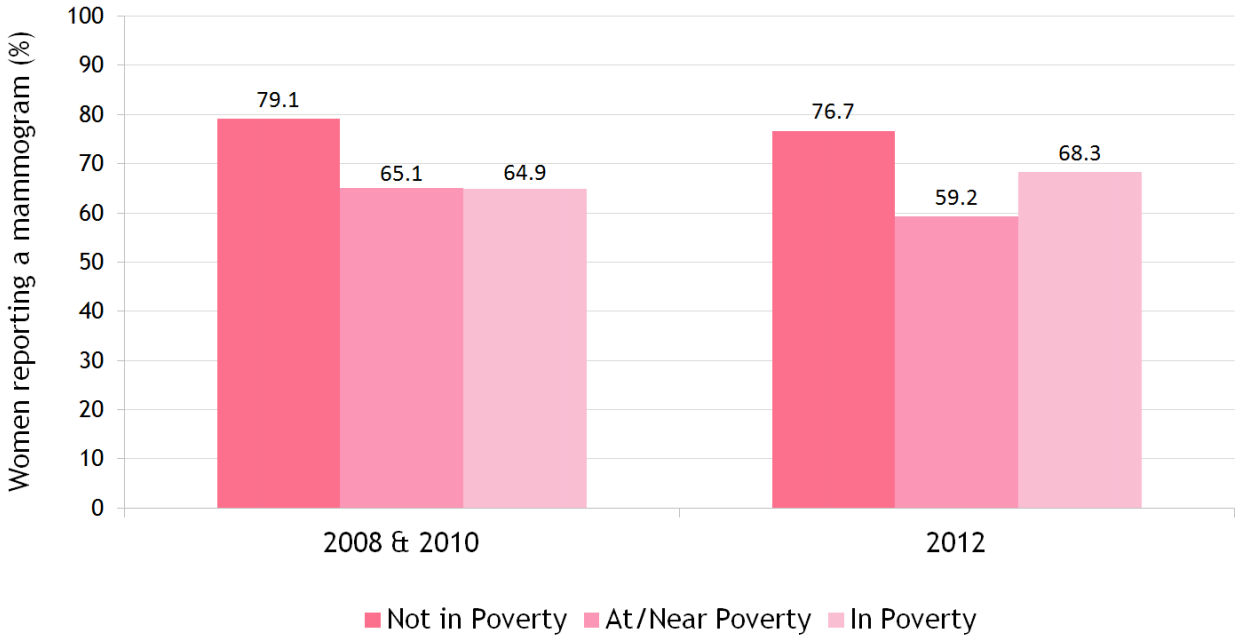
Breast Cancer

Screening

Over time breast cancer cells can spread to other organs in the body, so it is important to detect breast cancer early. The U.S. Preventive Services Task Force recommends a screening mammogram every two years for women 50 to 74 years of age. For women younger than 50 years old, a decision about biennial screening mammograms "should be an individual one and take patient context into account, including the patient's values regarding specific benefits and harms."[3] Any woman with a breast lump, breast pain, discharge from the nipple or skin changes on their breast should be seen by a health care provider right away.

Cancer screening questions are asked on even years as a part of the state-wide Behavioral Risk Factor Surveillance System (BRFSS) survey. In Colorado, data from 2008, 2010 and 2012 show that breast cancer screening rates are consistently higher for women who report household incomes above the poverty level (Figure 1).

Figure 1: Colorado Women Age 50 Years and Older who Received a Mammogram in the Past Two Years, 2008-2010 and 2012



Source: Colorado Behavioral Risk Factor Surveillance System; Health Statistics, Colorado Department of Public Health and Environment.

What We're Doing in Colorado

Early detection of breast cancer is one of the key outcomes of an adequately screened population. Comprehensive efforts in breast cancer screening need to focus on including women with lower incomes across the state. As part of the state's efforts, the Women's Wellness Connection (WWC) provides breast and cervical cancer screening (clinical breast exams, mammograms, Pap tests and pelvic exams) to eligible women at more than 130 sites in Colorado through cooperative efforts of multiple providers.[5]

Breast Cancer

Poverty and Incidence

Every year, nearly 3,400 women are diagnosed with malignant breast cancer in Colorado (not including in situ cases).[2] During the most recent time period, the incidence rate of breast cancer was 124.6 new cases per year per 100,000 women in areas of the state with less than 10 percent poverty, 113.2 cases per year per 100,000 women for the areas with 10-19 percent poverty, and 111.6 cases per year per 100,000 for the poorest areas with 20 percent or more poverty. This difference in incidence may be due in part to the higher prevalence of screening in women who are not in poverty. With higher screening rates, more cancers at an earlier stage are likely to be diagnosed. Other factors affecting the incidence rates might include differences among the three groups in average age at first pregnancy and use of hormone replacement therapy.

Every year, nearly 3,400 women are diagnosed with malignant breast cancer in Colorado.

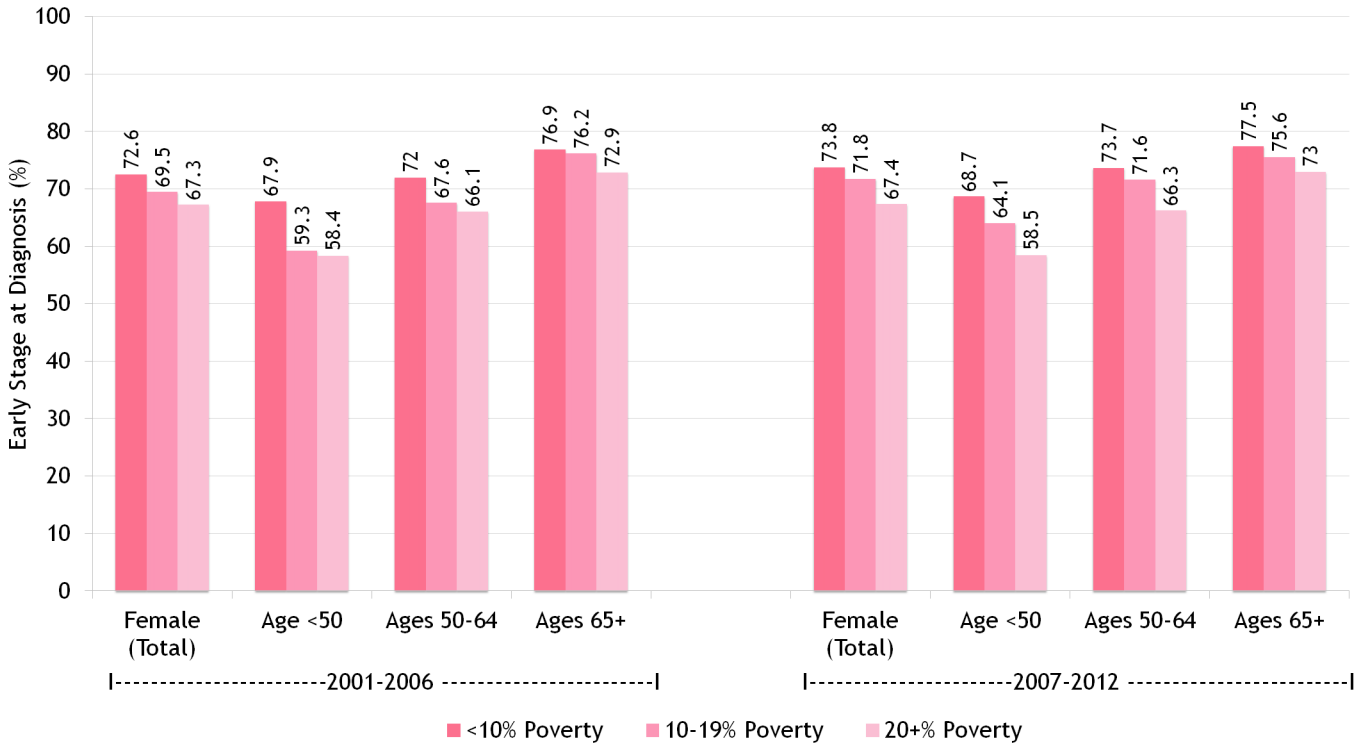
Breast Cancer

Early Detection, Poverty and Age

Nearly three in four breast cancers in Colorado women were detected at an early, more curable stage.[2] In general, breast cancers were less likely to have been detected at an early stage in poorer areas of the state. There was no difference in early detection between 2001-06 and 2007-12 regardless of poverty level (Figure 2).

Similarly, a smaller percentage of poorer younger women were detected early compared to wealthier, older women. For women aged 65 years and older, Medicare mammography benefits may help explain the smaller differences seen between the poverty groups.

Figure 2: Early Stage at Diagnosis for Female Breast Cancer by Area Poverty Level and Age, 2001-2006 & 2007-2012



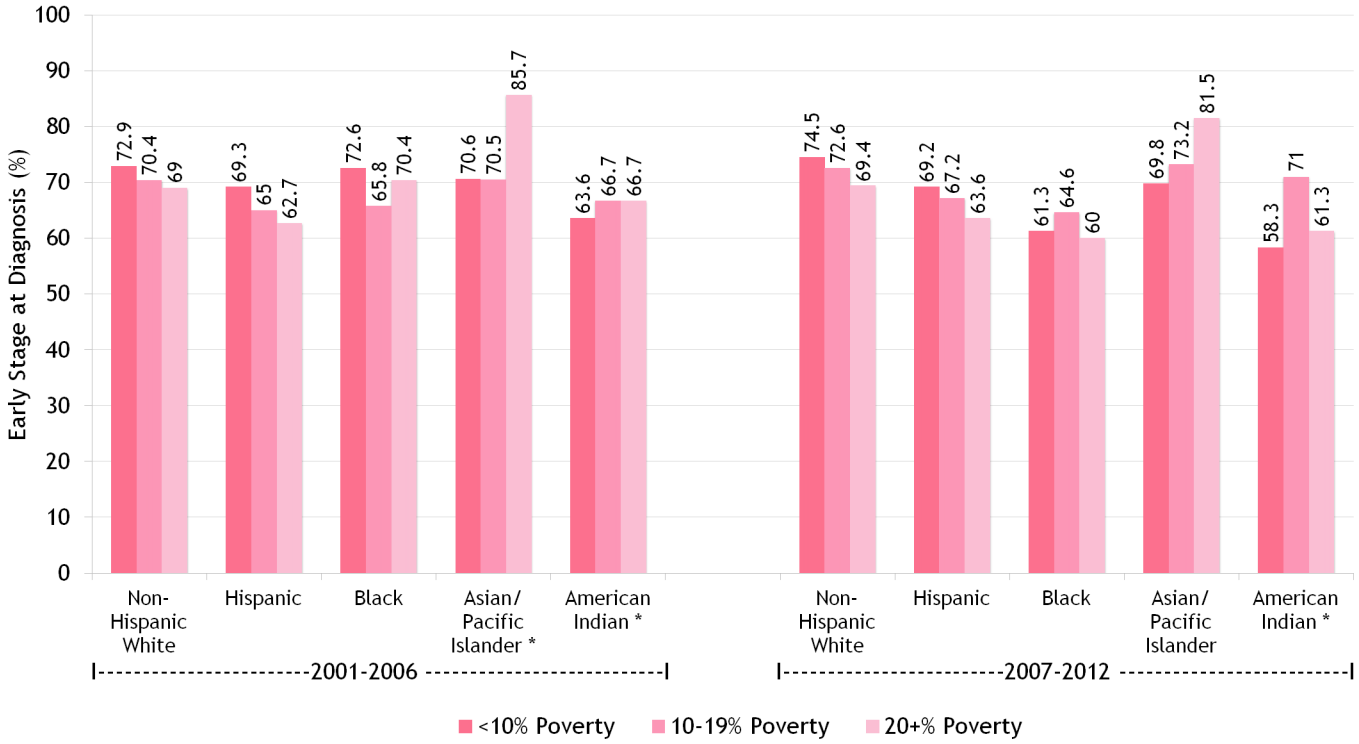
Source: Colorado Central Cancer Registry, Colorado Department of Public Health and Environment

Breast Cancer

Early Detection, Poverty and Race

When examining early diagnosis by poverty and race, breast cancers were less likely to be detected early among poorer groups for Non-Hispanic White and Hispanic women. This trend is inconsistent among the other racial groups, which may be due to small numbers in those populations. Interestingly, while the percentage of cases diagnosed early stayed relatively consistent among Non-Hispanic Whites and Hispanics between the earlier time period and the most recent one, rates declined in Black women. This was true of each poverty group within that racial group.

Figure 3: Early Stage at Diagnosis for Female Breast Cancer by Area Poverty Level and Race, 2001-2006 & 2007-2012



** Case counts in one or more of the poverty categories for this group are small (n<20). Use with caution.*

Source: Colorado Central Cancer Registry, Colorado Department of Public Health and Environment

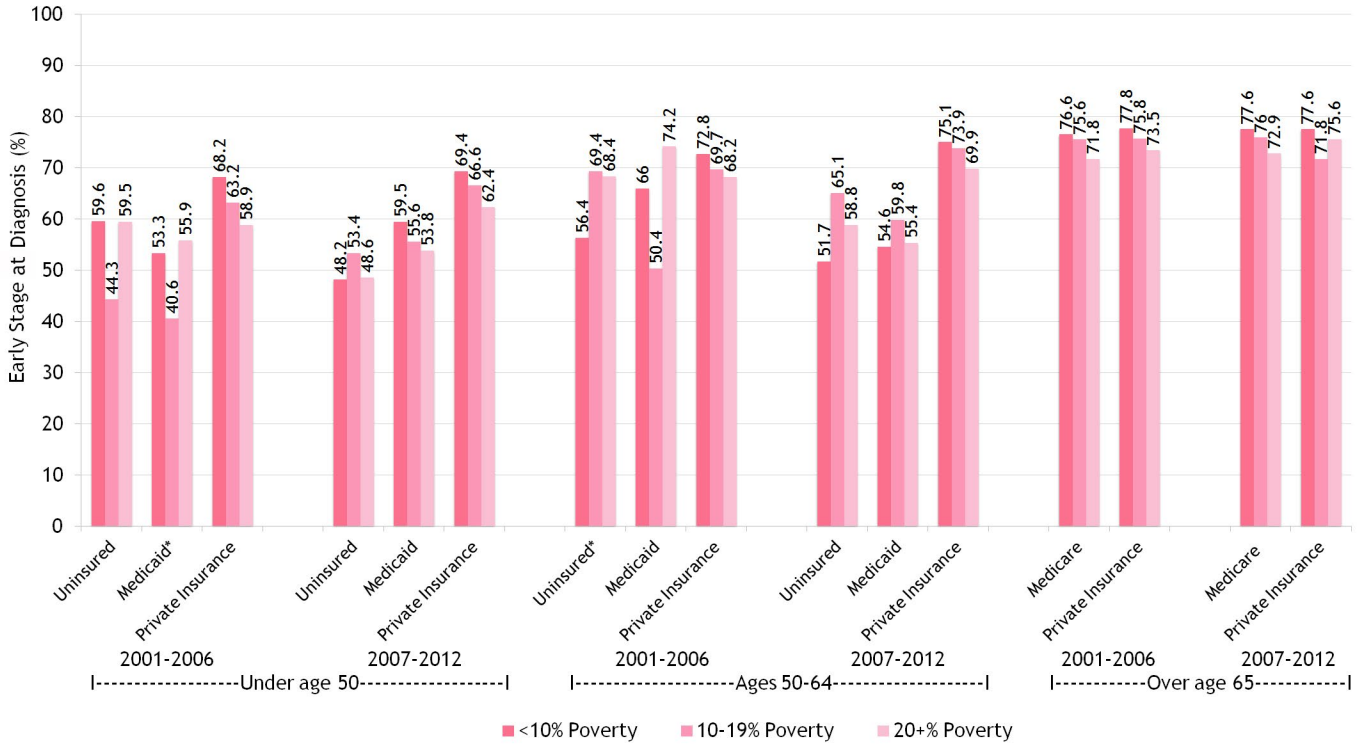
Breast Cancer

Early Detection, Poverty and Insurance Status

In both time periods analyzed and among all women aged 64 years and younger, those with private insurance had better early stage diagnosis than those with either Medicaid or no insurance. During 2001-06, Medicaid enrollees under age 50 years and those ages 50-64 years from the poorest areas of the state had better early stage detection of breast cancer than Medicaid enrollees from the middle income and wealthier areas.

During both time periods, women aged 65 years and older with Medicare or private insurance had a higher percentage of early detection than their younger counterparts. For women aged 65 years and older, although poorer areas showed somewhat later detection compared to wealthier areas, only slight differences in early detection were seen between those having Medicare and those with private insurance (Figure 4). This may be due to Medicare providing screening mammography and treatment for beneficiaries, regardless of income.

Figure 4: Early Stage at Diagnosis for Female Breast Cancer by Area Poverty Level, Age and Insurance Status, 2001-2006 & 2007-2012



** Case counts in one or more of the poverty categories for this group are small (n<20). Use with caution.*

Source: Colorado Central Cancer Registry, Colorado Department of Public Health and Environment

Breast Cancer

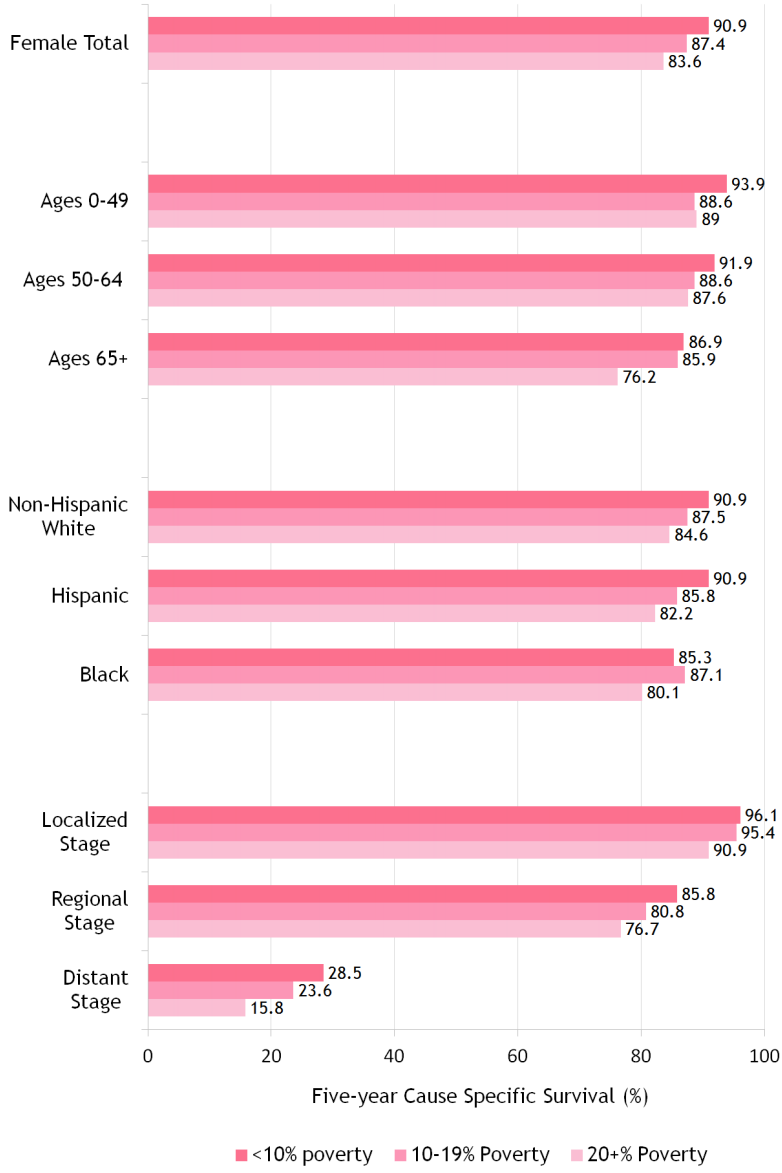
Survival and Poverty

Women in poorer areas of the state had worse five-year survival rates than those in wealthier areas of the state, regardless of age, race or stage at diagnosis (Figure 5). Among women aged 65 years or older, those who lived in a high poverty area had the lowest survival rate at 76.2 percent.

In general, early detection leads to better survival because cancer is more treatable when caught at an earlier stage. However, women from the poorest areas of the state saw lower survival rates regardless of the stage of diagnosis. The association between poverty and survival was especially apparent with breast cancer diagnosed at regional and distant stages. At these stages, completeness of adjuvant therapies has been shown to increase survival.[2] Differences in the ability to access and pay for radiation and/or chemotherapy may be one reason for the disparity.

Women in poorer areas of the state had worse five-year survival rates than those in wealthier areas of the state, regardless of age, race or stage at diagnosis.

Figure 5: Five-year Survival for Female Breast Cancer by Area Poverty Level and Age, Race and Stage at Diagnosis, 2001-2006



Source: Colorado Central Cancer Registry, Colorado Department of Public Health and Environment

Breast Cancer
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Cervical Cancer

Key Points & Definitions

In this report, cervical cancer refers to malignancies that have invaded the thin layer of cells covering the cervix. This data does **not** include in-situ cancers.

Data Sources:

The **Behavioral Risk Factor Surveillance System (BRFSS)** provides screening data and self-reported income used to assess poverty for screening rate comparisons. Poverty groups for BRFSS data are divided as follows:

1. In Poverty - Income less than 100% of the Federal Poverty Level (FPL)
2. At or Near Poverty- Income between 100% and 199% of FPL
3. Not in Poverty- Income is at or above 200% of the FPL

The **Colorado Central Cancer Registry (CCCR)** provides data on cancer incidence, stage at diagnosis, payer and survival.

U.S. Census Bureau data was used to determine area poverty level for all non-BRFSS related comparisons. Census tracts were divided into one of three groups:

1. Less than 10% of households in the census tract living below the FPL
2. 10-19% of households in the area are living below the FPL
3. 20% or more of households in the area living below the FPL

See Data, Methods and Definitions for more information

Before introduction of the Pap screening test more than 50 years ago, invasive cervical cancer was the most common cause of cancer death among U.S. women.[1] Due to advances in early diagnosis and treatment, the lifetime risk of invasive cervical cancer for a female in Colorado is now only 1 in 191 women.[2]

Cervical Cancer Prevention and Risk Factors

Human Papilloma Virus (HPV) is a common sexually transmitted infection and the leading cause of cervical cancer. According to the Centers for Disease Control and Prevention (CDC), approximately 79 million Americans (both men and women) are currently infected with HPV, and about 14 million people become newly infected each year.[3] Two strains of the virus (strains 16 and 18) are responsible for 70 percent of all cases of cervical cancer. HPV can also cause cancer of the penis and anus, and is responsible for a recent increase in cases of head and neck cancers.

Using latex condoms with every sexual encounter, getting the HPV vaccine and being in a mutually monogamous relationship all lower the risk of contracting HPV. The HPV vaccine is recommended for all children ages 11-12 years old. Women who have received the vaccine should continue to be screened according to age appropriate guidelines because the need for screening cytology (also known as Pap testing) is not yet established in this population.

Cigarette smoking is also associated with increased cervical cancer risk.[4] Screening for tobacco use and promoting tobacco cessation services continue to be important components of any visit with a healthcare provider.

Cervical Cancer

Screening

Early detection of cervical cancer through screening saves lives by diagnosing cancers before they become invasive and less treatable. According to the American Cancer Society, most pre-cancers of the cervix develop slowly. Therefore, most precancerous lesions can be prevented from progressing to invasive cancer cases with routine screening.[4]

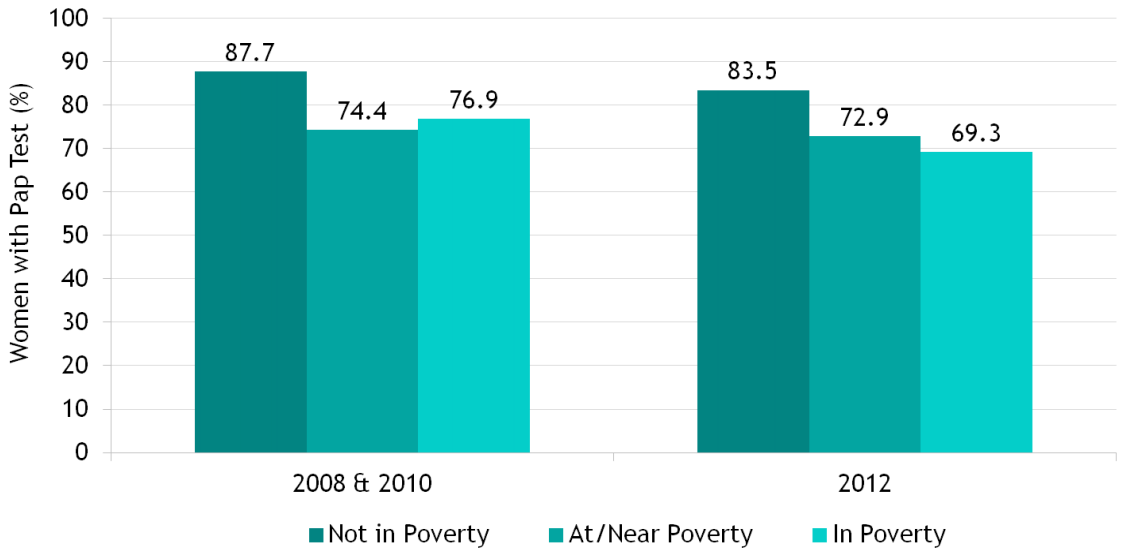
New guidelines were released in 2012 regarding cervical cancer screening. The U.S. Preventive Services Task Force (USPSTF) now recommends that women start screening at age 21. In women 21-29 years old, Pap testing alone is recommended every three years. In women 30-65 years, co-testing (cytology and HPV testing) is recommended every five years. HPV co-testing is not recommended in women younger than 30 years old. Screening is no longer recommended for women older than 65 years if adequate cervical cancer screening history is known. Women who have never been screened for cervical cancer or who have not been screened in the past five years should be screened using co-testing.[5] It is important that women continue to schedule regular preventative care appointments with a provider and discuss appropriate screening methods and intervals.

Access to preventive services like cervical cancer screening is more difficult for those in poverty. In both time periods, women who were near poverty or in poverty were significantly less likely to have a cervical cancer screening exam compared to women who were not in poverty (Figure 1).

What We're Doing in Colorado

In Colorado, the Women's Wellness Connection (WWC), administered by the Colorado Department of Public Health and Environment, has provided breast and cervical cancer screenings for low-income women, aged 40-64 years, since 1991.

Figure 1: Colorado Women (Age 18+) with a Pap Test in the Past Three Years, by Poverty Level, 2008-2010 and 2012



Source: Colorado Behavioral Risk Factor Surveillance System (BRFSS); Health Statistics, Colorado Department of Public Health and Environment.

Cervical Cancer

Poverty and Incidence

An average of 150 cases of invasive cervical cancer are diagnosed annually in Colorado. In the wealthier areas of the state, the incidence rate was 5.1 new cancers per 100,000 women per year, while the rate for the next lower poverty level was 5.8, and the rate for the poorest areas was 8.1.

It is important to remember that invasive cervical cancer is rare, and the small number of recorded cases can make the data difficult to interpret.

Early Detection and Poverty

Early stage detection for cervical cancer would be calculated using in situ cases. These cases are not reported to state cancer registries. Therefore, early detection rates cannot be calculated. Cervical cancers detected at any invasive stage are considered failures of screening and are less treatable.

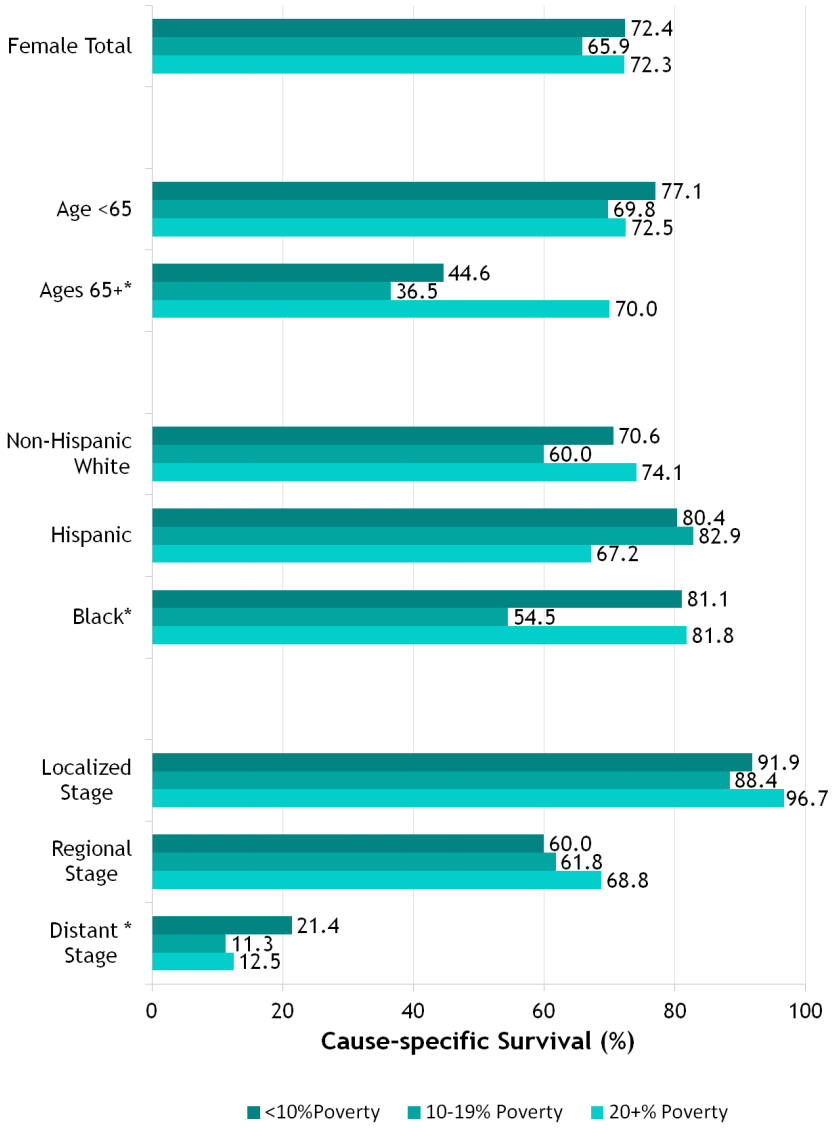
The HPV vaccine is recommended for all children ages 11-12 years old.

Cervical Cancer

Survival and Poverty

Survival rates among women in the wealthiest and poorest areas of the state were similar to one another, while the middle poverty group had lower survival rates (Figure 2). Similarly, women in the middle poverty group who were younger than 65 years of age had lower survival rates than women in the high poverty and low poverty groups. Among women 65 years of age and older (who are likely eligible for Medicare), the high poverty group had the highest survival rate. However, due to the small number of cases diagnosed in this age group this observation is not likely to be statistically significant. Non-Hispanic White and Black women in the middle poverty areas had the lowest survival rates for their respective race/ethnicity. Hispanic women in middle poverty areas had the highest survival rate of the three poverty levels (82.9%). Interestingly, when data is broken down by stage at diagnosis, the highest poverty groups seem to have the highest survival rates for localized and regional diagnosis. In the distant stage data, the survival rate in the lowest poverty group was 9 to 10 percentage points higher than other poverty levels. However, small numbers also make this data difficult to interpret.

Figure 2: Five-year Survival for Cervical Cancer by Area Poverty Level, Age, Race and Stage, 2001-2006



** Case counts in one or more of the poverty categories for this group are small (n<20). Use with caution.*

Source: Colorado Central Cancer Registry, Colorado Department of Public Health and Environment

Survival rates among women in the wealthiest and poorest areas of the state were similar to one another, while the middle poverty group had lower survival rates.

Cervical Cancer
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5. U.S. Preventive Services Task Force. (April 2012). *Screening for cervical cancer*. Topic page. Retrieved from www.uspreventiveservicestaskforce.org/uspstf/uspscerv.htm

Colorectal Cancer

Key Points & Definitions

Colorectal cancer is defined as a cancer that forms in the tissues of the colon or rectum. Anal cancers are not included in this data.

Data Sources:

The **Behavioral Risk Factor Surveillance System (BRFSS)** provides screening data and self-reported income used to assess poverty for screening rate comparisons. Poverty groups for BRFSS data are divided as follows:

1. In Poverty - Income less than 100% of the Federal Poverty Level (FPL)
2. At or Near Poverty- Income between 100% and 199% of FPL
3. Not in Poverty- Income is at or above 200% of the FPL

The **Colorado Central Cancer Registry (CCCR)** provides data on cancer incidence, stage at diagnosis, payer and survival.

U.S. Census Bureau data was used to determine area poverty level for all non-BRFSS related comparisons. Census tracts were divided into one of three groups:

1. Less than 10% of households in the census tract living below the FPL
2. 10-19% of households in the area are living below the FPL
3. 20% or more of households in the area living below the FPL

See Data, Methods and Definitions for more information

Colorectal cancer (CRC) is the second leading cause of death from cancer in Colorado and the third most common cancer for both men and women. In Colorado, one in 19 men and one in 24 women will develop colorectal cancer in their lifetimes.[1]

Colorectal Cancer Prevention and Risk Factors

The most important risk factor for colorectal cancer is an individual's age. More than 90 percent of colorectal cancers occur in persons over 50 years. Other risk factors include the following: [2]

- Family history of colorectal cancer and/or polyps
- Personal history of colon polyps or inflammatory bowel disease
- Smoking
- Obesity
- Physical inactivity
- A diet high in red or processed meat
- Low consumption of fruits and vegetables
- Heavy consumption of alcohol

Unlike most cancers, CRC is often preventable through screening. During routine endoscopic screening tests (like colonoscopies or sigmoidoscopies), pre-cancerous polyps can be found and removed before they progress to cancer. Screening is also important for the identification of early stage cancers.

Colorectal Cancer

Screening

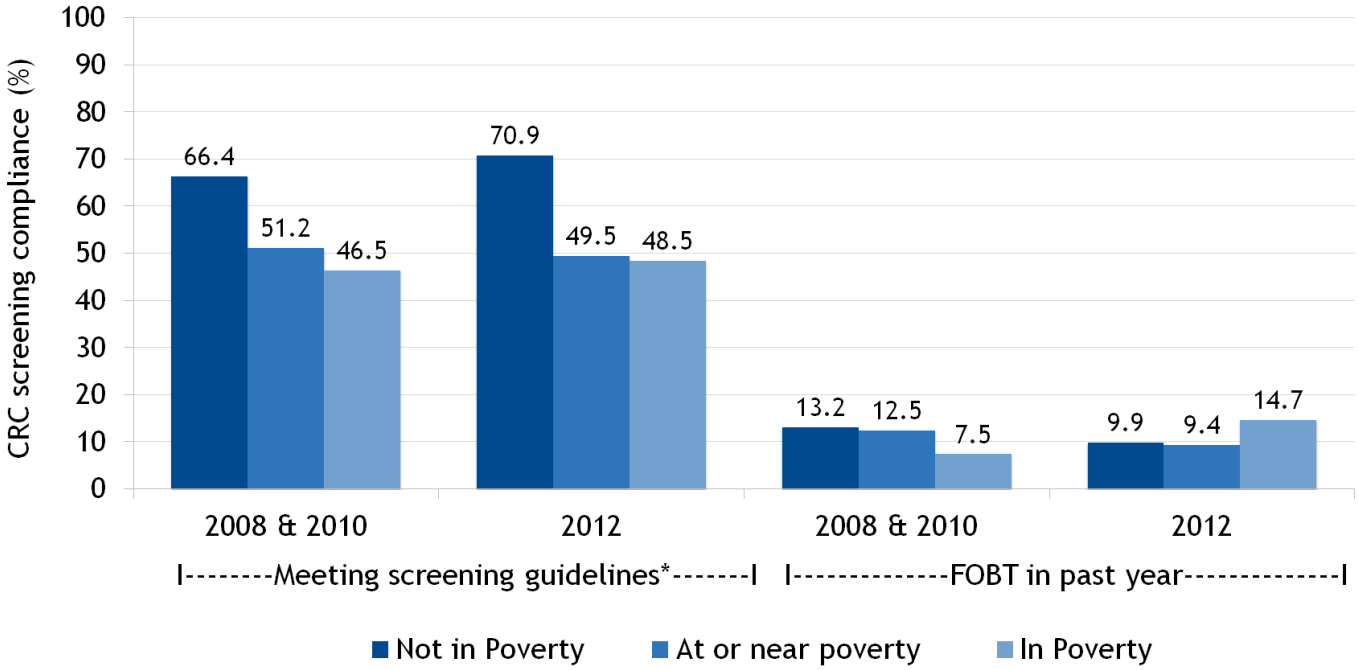
The U.S. Preventive Services Task Force recommends that colorectal cancer screening begin at age 50 for all adults at average risk. Screening options for colorectal cancer include high-sensitivity fecal occult blood testing (FOBT) or fecal immunochemical test (FIT) every year, flexible sigmoidoscopy every five years, double contrast barium enema every five years or colonoscopy every 10 years.

Figure 1 shows that Colorado residents who were in or near poverty were less likely to be compliant with screening guidelines, overall, compared to those who were not in poverty. Among those who were not in poverty, a higher percentage of people reported meeting the screening guidelines in the 2012 survey than the earlier 2008 and 2010 surveys. However, screening rates did not improve in those who reported being near or in poverty. Only a small percentage of the surveyed population reported receiving an FOBT in the previous year, despite the fact that this test is much less costly than an endoscopy.

What We're Doing in Colorado

Colorado's statewide goal is to screen 80% of the total population eligible for CRC screening. The Colorado Colorectal Cancer Control Program and the Colorado Colorectal Screening Program are examples of programs implementing strategies to reach the statewide CRC screening goal.

Figure 1: Percent of Colorado Residents, Ages 50-75, who Reported a Colorectal Screening, by Poverty Level, 2008-2010 and 2012



*A person was considered to have met the screening guidelines if he or she had a sigmoidoscopy within the past 5 years, a colonoscopy within the past 10 years, or an FOBT within the past year.

Source: Colorado Behavioral Risk Factor Surveillance System; Health Statistics, Colorado Department of Public Health and Environment.

Colorectal Cancer

Poverty and Incidence

Approximately 1,700 malignant colorectal cancers are diagnosed annually in Colorado. For the wealthier areas of the state, the incidence rate was 33.0 new cancers per 100,000 persons per year. The middle poverty level areas had a rate of 35.0 new cancers per 100,000 persons per year, while the poorest areas showed the highest rate at 41.6 new cancers per 100,000 persons per year.[1]

Colorado's statewide goal is to screen 80% of the total population eligible for CRC screening.

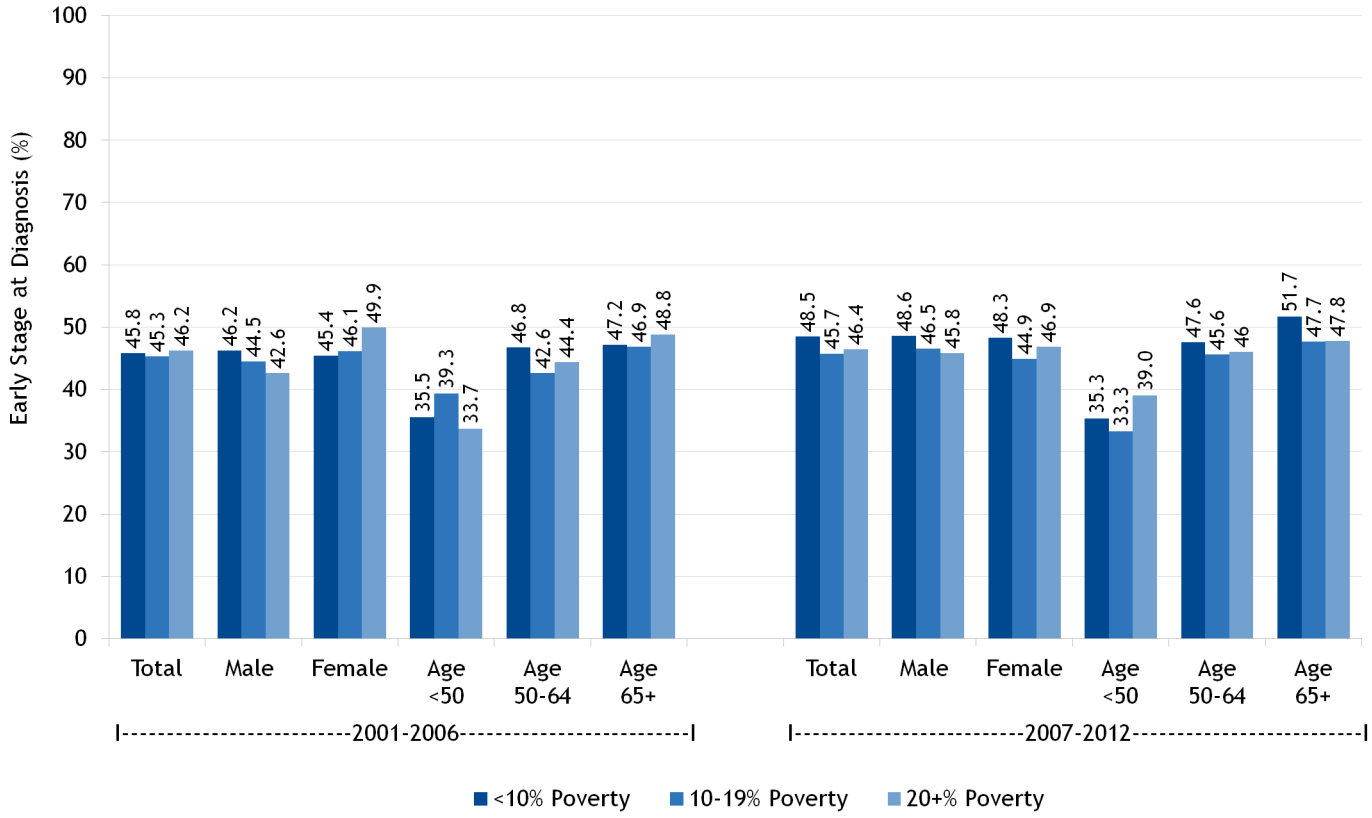
Colorectal Cancer

Early Detection, Poverty, Age and Gender

Early detection of colorectal cancer is important because cancer is typically easier to treat and more curable when diagnosed early. For both time periods assessed (2001-2006 and 2007-2012), less than half of colorectal cancers in the state were diagnosed at an early stage, regardless of poverty group. Early detection did not vary considerably by poverty level within age groups, but was lower among those under age 50 (Figure 2). Early detection is similar between the two time periods overall and within each age group and gender for areas with 10 percent poverty or more. Areas with less than 10 percent poverty showed small but consistent improvements in early detection in the most recent time period compared to the previous one.

Less than half of colorectal cancers in the state were diagnosed at an early stage, regardless of poverty group.

Figure 2: Early Stage Diagnosis of Colorectal Cancer by Area Poverty Level, Gender and Age, 2001-2006 & 2007-2012



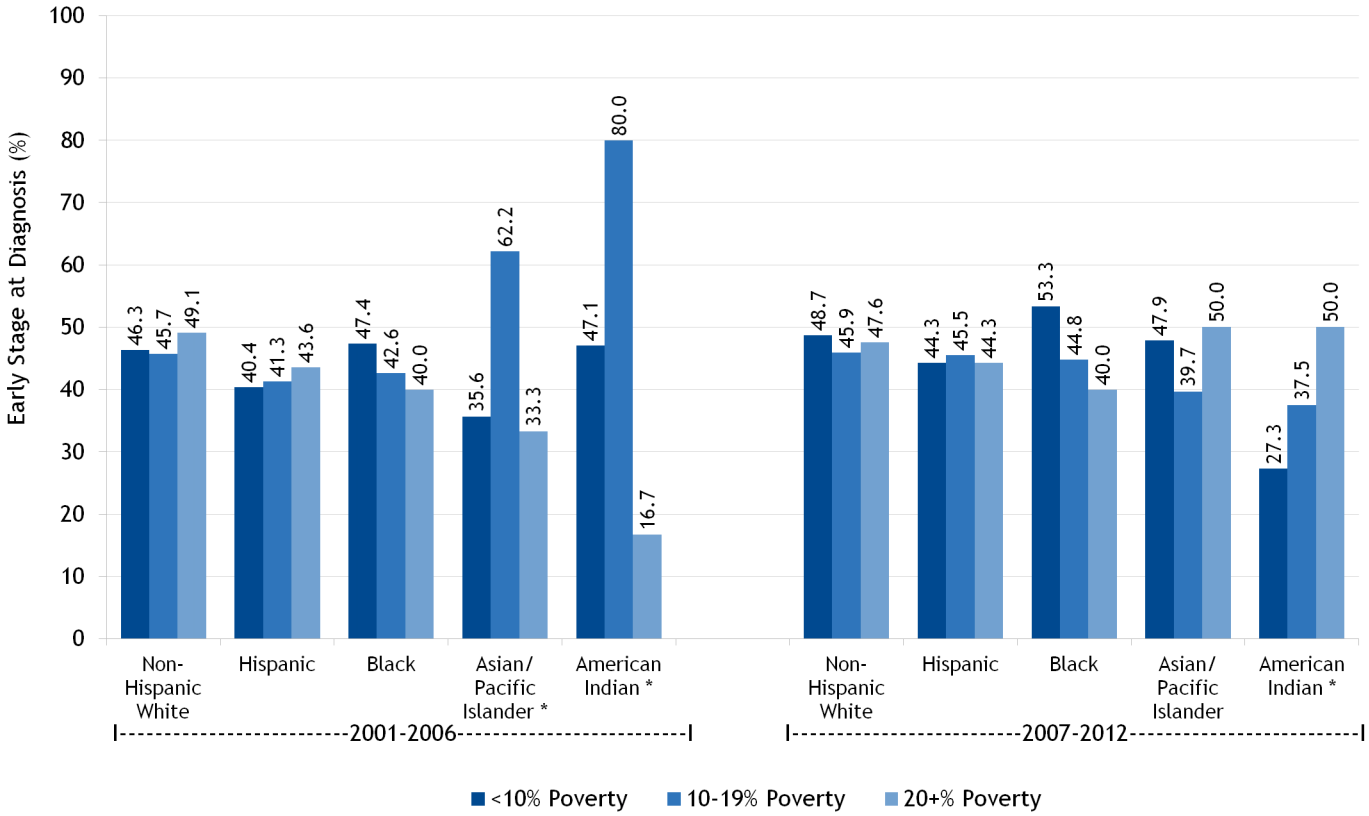
Source: Colorado Central Cancer Registry, Colorado Department of Public Health and Environment

Colorectal Cancer

Early Detection, Poverty and Race

Differences in early stage diagnosis between poverty groups are negligible for Non-Hispanic Whites and Hispanics (Figure 3). However, among Black Coloradans, the percentage of colorectal cancers diagnosed early was lowest in the poorest areas for both time periods. There also seems to be a larger difference between poverty groups among Blacks compared to that seen in other races. Please note that large fluctuations in the data for the Asian/Pacific Islander and American Indian populations may be caused by a very small number of cases in those groups.

Figure 3: Early Stage at Diagnosis of Colorectal Cancer by Area Poverty Level and Race, 2001-2006 & 2007-2012



** Case counts in one or more of the poverty categories for this group are small (n<20). Use with caution.*

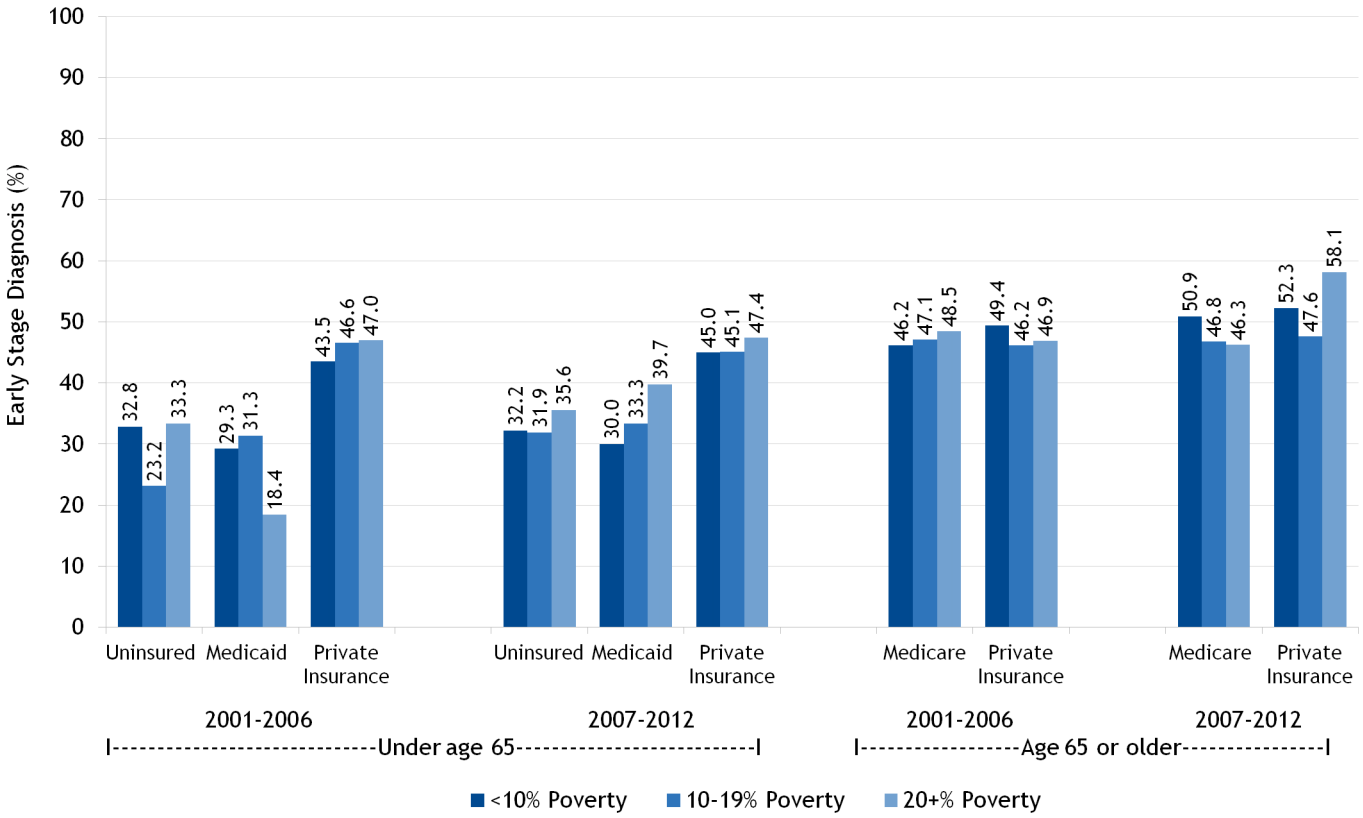
Source: Colorado Central Cancer Registry, Colorado Department of Public Health and Environment

Colorectal Cancer

Early Detection, Poverty and Insurance Status

Insurance status was a key indicator for early detection among Coloradans under age 65. During both time periods, colorectal cancers were more likely to be diagnosed at an early stage for people with private insurance compared to those who were uninsured or on Medicaid. Among Coloradans ages 65 and older, the percentage of colorectal cancers diagnosed at an early stage was slightly higher among those with private insurance than those with Medicare for the most recent time period (Figure 4). Medicare has provided universal coverage for colorectal cancer screening tests among individuals over age 65 since 2001, which may explain why there is only a small difference in early stage detection between Medicare and private insurance coverage. The variation in screening estimates in those younger than 65 may be partially attributed to the increased risk for developing colorectal cancer with age and current colorectal screening recommendations starting at age 50. Early detection by poverty level showed a larger disparity for those with Medicaid than those with private insurance (Figure 4).

Figure 4: Early Stage at Diagnosis for Colorectal Cancer by Area Poverty Level, Age and Insurance Status, 2001-2006 & 2007-2012



** Case counts in one or more of the poverty categories for this group are small (n<20). Use with caution.*

Source: Colorado Central Cancer Registry, Colorado Department of Public Health and Environment

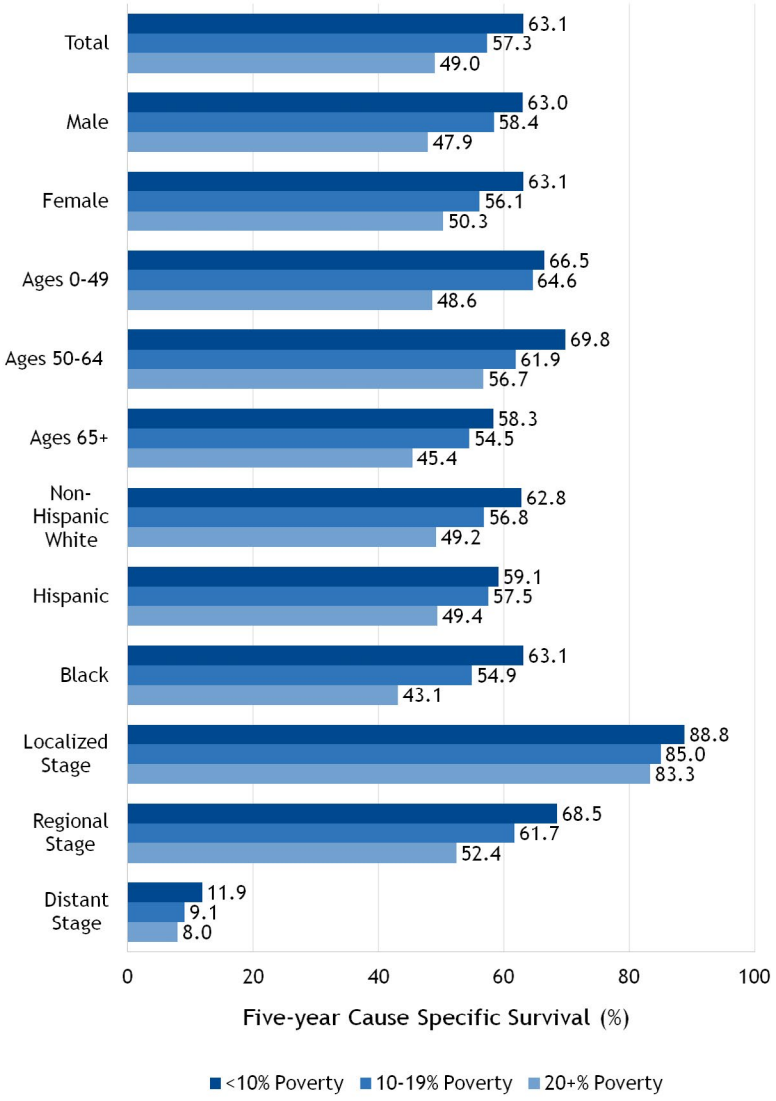
Colorectal Cancer

Survival and Poverty

While differences in early stage diagnosis were small and isolated to certain groups, poverty level revealed dramatic differences in all groups for five-year cause-specific survival. Persons from the poorest areas of the state showed the worst survival rates for colorectal cancer regardless of race/ethnicity, sex, age or stage at diagnosis. The greatest disparities were noted among Blacks and persons younger than age 50, where survival rates were lower in the poorest areas compared to the wealthier areas by 20.0 and 17.9 percentage points, respectively (Figure 5). A large disparity among the three poverty groups was also seen for cases diagnosed at the regional stage. Completing chemotherapy has been shown to substantially increase survival in those with a regional stage diagnosis, so differences in the ability to access and pay for chemotherapy may be one reason for this disparity.

Persons from the poorest areas of the state showed the worst survival rates for colorectal cancer regardless of race/ethnicity, sex, age or stage at diagnosis.

Figure 5: Five-year Survival for Colorectal Cancer by Area Poverty Level and Age, Gender, Race and Stage at Diagnosis, 2001-2006



Source: Colorado Central Cancer Registry, Colorado Department of Public Health and Environment

Colorectal Cancer
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2. American Cancer Society. *Colon cancer prevention and early detection*. Retrieved from www.cancer.org/cancer/colonandrectumcancer/index

Lung Cancer

Key Points & Definitions

Lung cancer forms in tissues of the lung, usually in the cells lining air passages. The two main types are small cell and non-small cell lung cancer.

Data Sources:

The **Behavioral Risk Factor Surveillance System (BRFSS)** provides screening data and self-reported income used to assess poverty for screening rate comparisons. Poverty groups for BRFSS data are divided as follows:

1. In Poverty - Income less than 100% of the Federal Poverty Level (FPL)
2. At or Near Poverty- Income between 100% and 199% of FPL
3. Not in Poverty- Income is at or above 200% of the FPL

The **Colorado Central Cancer Registry (CCCR)** provides data on cancer incidence, stage at diagnosis, payer and survival.

U.S. Census Bureau data was used to determine area poverty level for all non-BRFSS related comparisons. Census tracts were divided into one of three groups:

1. Less than 10% of households in the census tract living below the FPL
2. 10-19% of households in the area are living below the FPL
3. 20% or more of households in the area living below the FPL

See Data, Methods and Definitions for more information

Lung cancer is the second leading cause of cancer death in both men and women in the United States.[1] It is also the leading cause of cancer death in men and women in Colorado.

The lifetime risk of developing lung cancer in Colorado is one in 13 for men and one in 16 for women.[2] Most lung cancers can be prevented by avoiding the use of tobacco, as well as testing for radon in homes. Poverty plays an important role in understanding lung cancer in Colorado.

Lung Cancer Prevention and Risk Factors

Avoiding tobacco is the best way to prevent lung cancer and other types of associated cancers. The risk of developing lung cancer increases as the quantity and duration of cigarette smoking increase.[3] Quitting early and permanently lessens an individual's lifetime risk of developing lung cancer. The longer a smoker stays smoke-free the less risk there is of developing lung cancer. Exposure to secondhand or "passive" tobacco smoke can also increase the risk of lung cancer in nonsmokers. The U.S. Surgeon General estimates that living with a smoker increases the risk of lung cancer in non-smokers by twenty to thirty percent.[4]

For more information on smoking as a risk factor for lung and other cancers, as well as information about smoking rates in Colorado, see the Cancer Prevention chapter of this report.

Lung Cancer

Risk Factors (continued)

Radon is the second leading cause of lung cancer. Approximately 50% of the homes in Colorado have radon levels in excess of the Environmental Protection Agency (EPA) action level of 4 PCi/L.[5] Furthermore, it is estimated that between 250 and 500 deaths from lung cancer result from radon each year in Colorado.[5] It is recommended that all homes in Colorado be tested for radon. If elevated levels are detected, radon mitigation should be performed. Radon resistant building techniques can also be used during the construction process for new buildings.

Screening

Symptoms of lung cancer usually do not appear until the cancer is advanced, making detection at an early stage difficult. As of December 2013, the U.S. Preventative Services Task Force (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 smoking history and who currently smoke or have quit within the past 15 years. Screening should be discontinued once a person has not smoked for 15 years or develops a health problem that substantially limits life expectancy or the ability or willingness to have curative lung surgery. [6]

Because the screening recommendation was not in place during the time of this report, it is expected that early stage diagnosis rates will be low during the years examined (2001-12). However, this report could serve as an important baseline for assessing whether or not screening improves outcomes across poverty groups equally in the future.

> Annual screening for lung cancer with low-dose computed tomography is recommended for adults aged 55 to 80 years who have a 30 pack-year smoking history and who currently smoke or have quit in the past 15 years.

What We're Doing in Colorado

The Colorado QuitLine (www.coquitline.org) offers free, personalized, confidential telephone and web-based support for anyone who wants to quit using tobacco. Additionally, the QuitLine offers text messaging support, self-help quit tools, referral to community tobacco treatment programs and relapse prevention techniques.[7]

The Colorado Radon Program (www.coloradoradon.info) offers low cost test kits to Colorado residents and provides information on radon mitigation.[8]

Lung Cancer

Poverty and Incidence

More than 2,250 malignant lung cancers are diagnosed annually in Colorado. For the wealthier areas of the state, the incidence rate was 41.8 new cases per 100,000 persons per year, while the rate for the middle poverty areas was 47.8, and the poorest areas had the highest rate of 56.4.[2] The difference in incidence rates can largely be attributed to difference in tobacco use by socioeconomic status as discussed in the Cancer Prevention chapter.

More than 2,200 malignant lung cancers are diagnosed annually in Colorado.

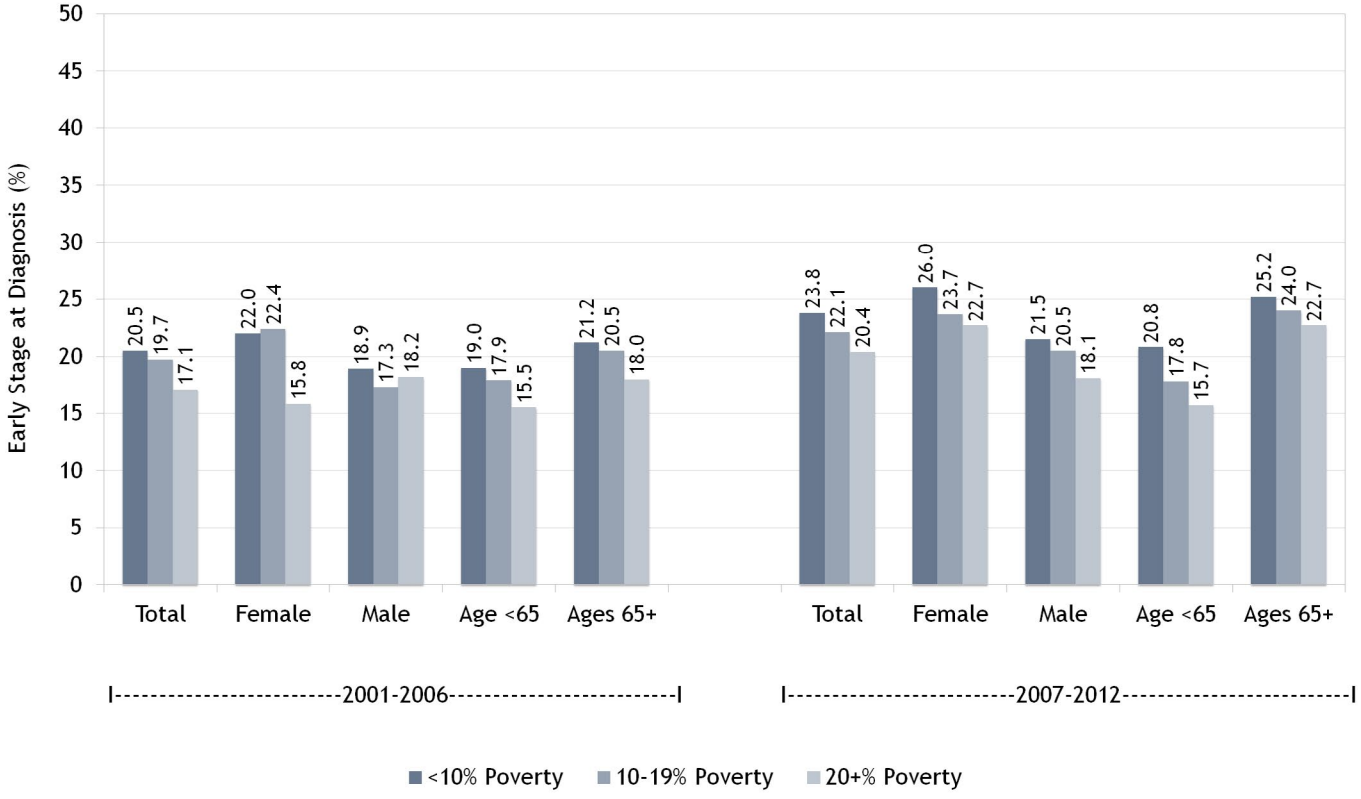
Lung Cancer

Early Detection, Poverty, Age and Gender

Early diagnosis is important for all cancers, and this is especially true for lung cancer. If caught at a distant stage, five-year cause-specific survival rates are less than five percent. Yet early detection rates are still very low, with less than 26 percent of lung cancers in Colorado diagnosed at an early, more curable stage in both 2001-06 and 2007-12 (Figure 1). This remains true regardless of overall poverty level, sex or age. However, most groups did show slight improvement in 2007-12 compared to 2001-06.

In general, most sex and age groups had slightly higher early detection rates among those living in low poverty areas, with a trend toward later diagnoses in areas with more poverty. Females seem to have slightly higher early detection rates compared to males. Also, those age 65 and over have improved early detection rates compared to people younger than 65 years, especially in the more recent time period.

Figure 1: Early Stage at Diagnosis by Area Poverty Level, Gender and Age, 2001-2006 & 2007-2012



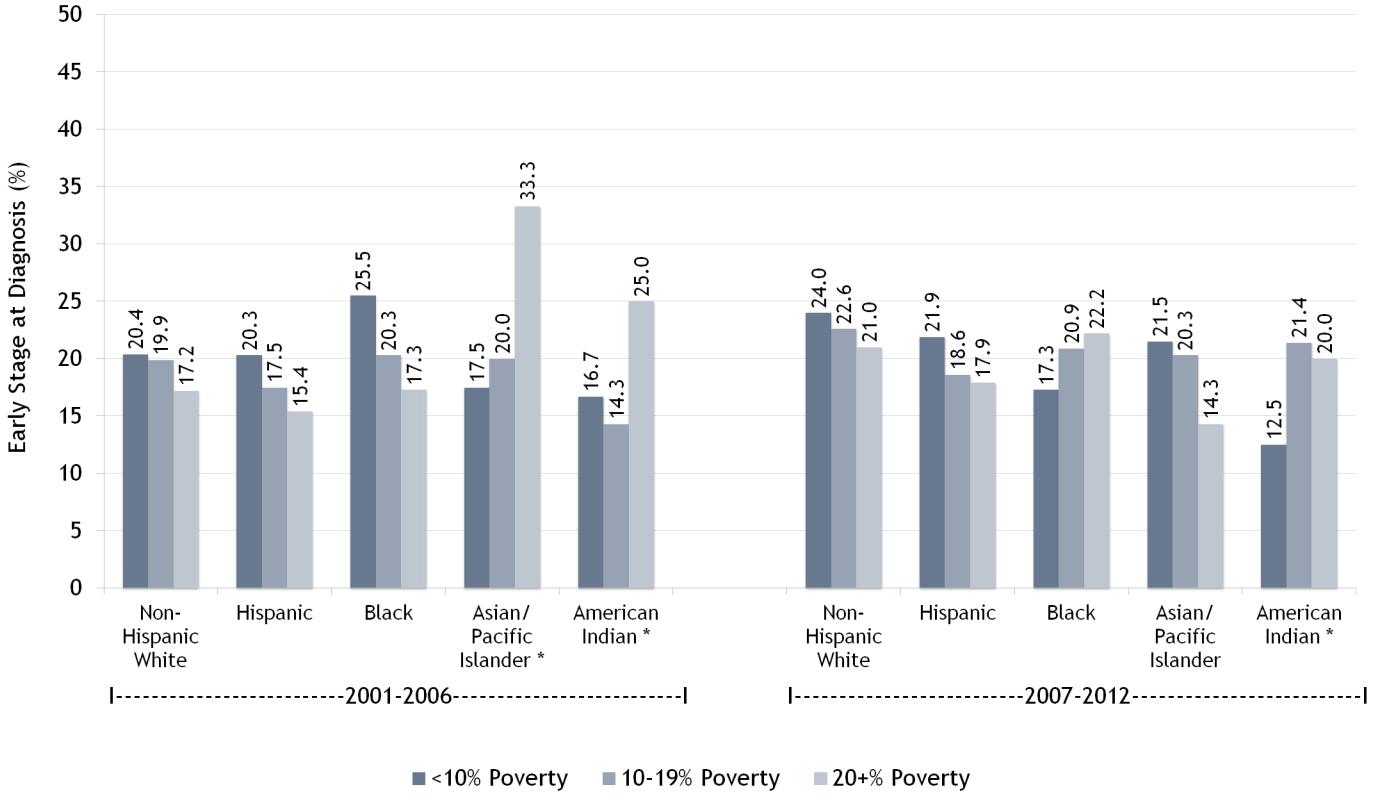
Source: Colorado Central Cancer Registry, Colorado Department of Public Health and Environment

Lung Cancer

Early Detection, Poverty and Race

There were no large differences between racial groups in early detection of lung cancer (Figure 2). However, when comparing poverty groups within each racial group, there was a small trend toward later stage at diagnosis in those living in high poverty areas. Blacks in 2001-2006 clearly follow this trend, however in 2007-12 the earliest detection rates are found in the highest poverty areas. Also, while there seems to be wide variation among the Asian/ Pacific Islander and American Indian populations, it is important to note that the number of cases in those groups is very small and could lead to bias in the data.

Figure 2: Early Stage at Diagnosis by Area Poverty Level and Race, 2001-2006 & 2007-2012



** Case counts in one or more of the poverty categories for this group are small (n<20). Use with caution.*

Source: Colorado Central Cancer Registry, Colorado Department of Public Health and Environment

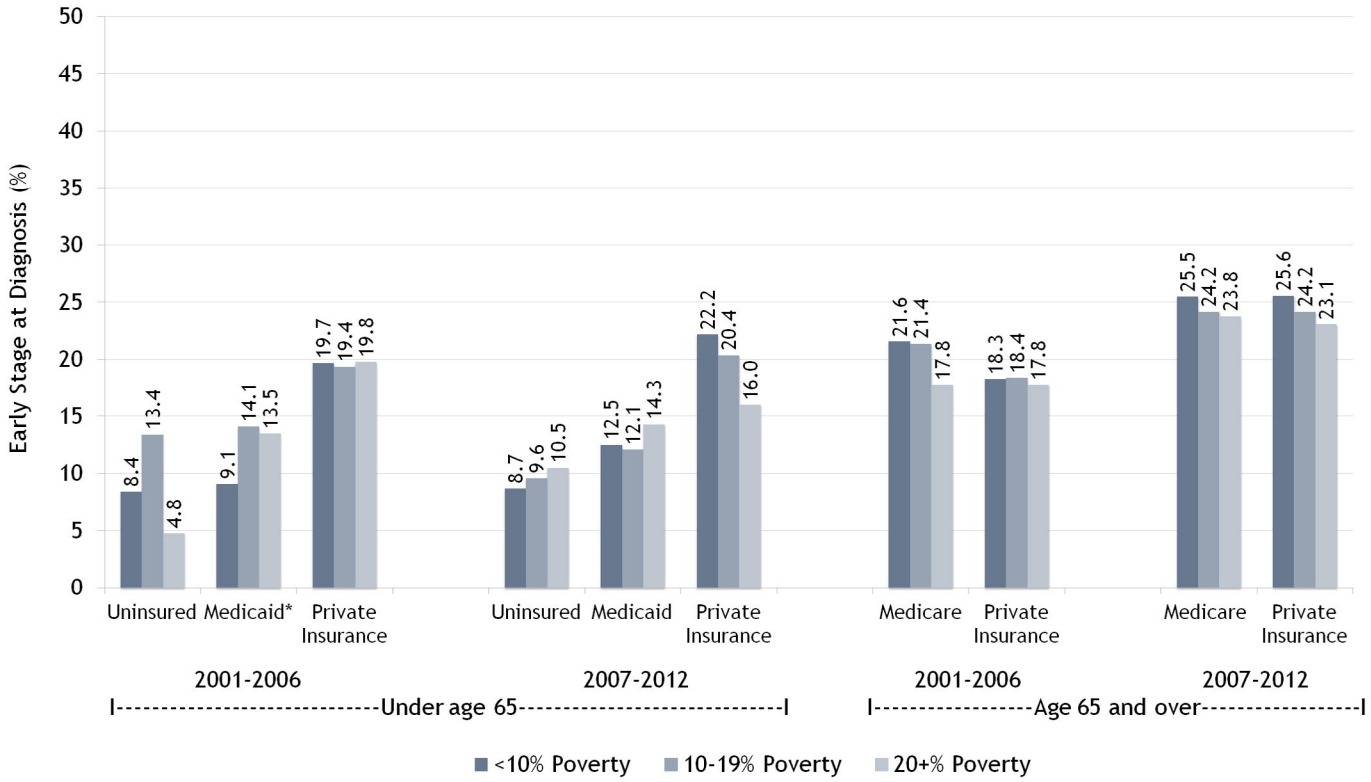
Lung Cancer

Early Detection, Poverty and Insurance Status

In Coloradans under age 65, early diagnosis rates were highest in people with private insurance and lowest in the uninsured population (Figure 3). After age 65, the difference between the privately insured and Medicare recipients is small. In 2007-12, diagnosis of lung cancer at an early stage occurred more often for those who had some form of insurance coverage. In this time period, those who were uninsured in the wealthiest areas of Colorado had the worst early stage detection of lung cancer. The highest rates of early stage detection for lung cancer were found in Coloradans over 65 years old.

Diagnosis of lung cancer at an early stage occurred more often for those who had some form of insurance coverage.

Figure 3: Early Stage at Diagnosis by Area Poverty Level, Age and Insurance Status, 2001-2006 & 2007-2012



** Case counts in one or more of the poverty categories for this group are small (n<20). Use with caution.*

Source: Colorado Central Cancer Registry, Colorado Department of Public Health and Environment

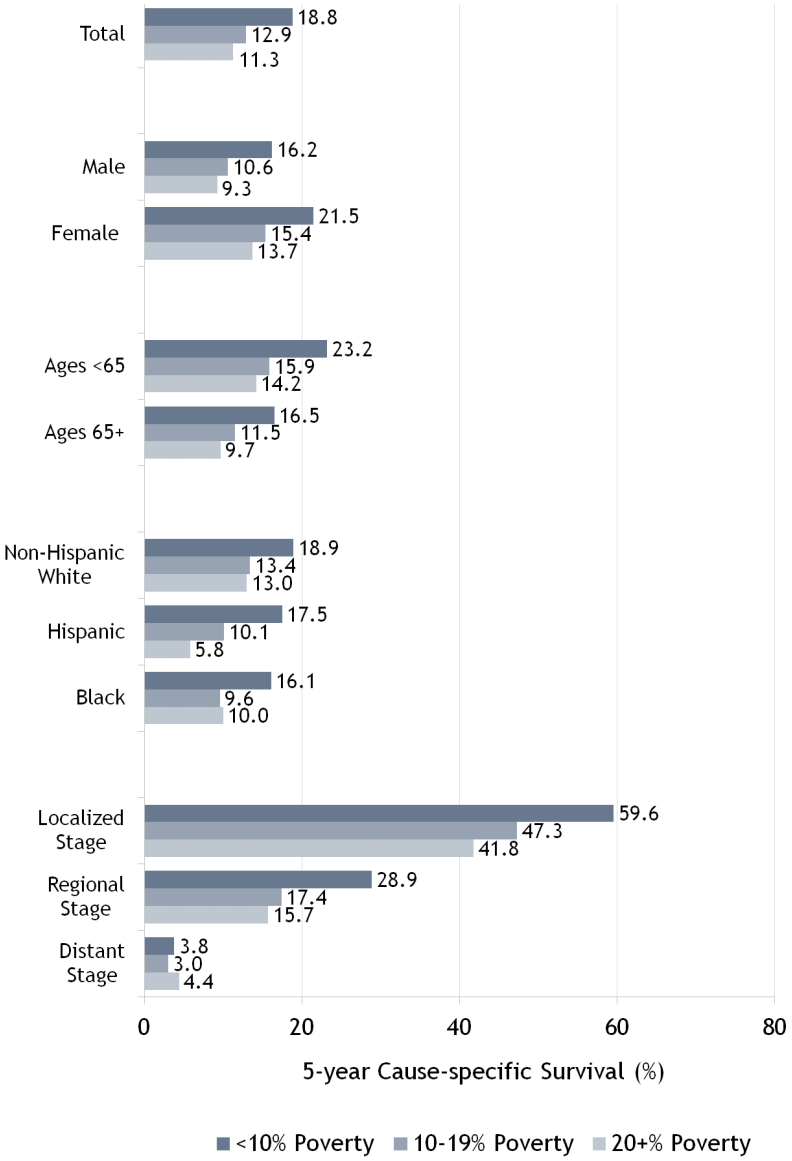
Lung Cancer

Poverty and Survival

Because lung cancer is usually not detected until it has reached an advanced stage, survival rates for lung cancer remain low regardless of race/ethnicity, sex or age. For people diagnosed with lung cancer in 2001-06, less than twenty percent survived five years after diagnosis (Figure 4). When the data is stratified by sex, age, and race, the highest survival rates are consistently seen in the low poverty areas. Among all racial and ethnic groups in Colorado, the worst survival rates were seen among Hispanics living in high poverty areas, where only 5.8 percent survived five years after diagnosis. The largest differences between poverty groups were seen among those diagnosed at a localized stage, where people in low poverty areas had an average survival rate that was 17.8 percentage points higher than those living in high poverty areas.

When the data is stratified by sex, age, and race, the highest survival rates are consistently seen in the low poverty areas.

Figure 4: Five-year Survival for Lung Cancer by Area Poverty Level, Age, Gender, Race and Stage, 2001-2006



Source: Colorado Central Cancer Registry, Colorado Department of Public Health and Environment

Lung Cancer
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Melanoma

Key Points & Definitions

Melanoma is a form of cancer that begins in melanocytes, or cells that make the pigment melanin. This report focuses specifically on melanomas of the skin.

Data Sources:

The **Behavioral Risk Factor Surveillance System (BRFSS)** provides screening data and self-reported income used to assess poverty for screening rate comparisons. Poverty groups for BRFSS data are divided as follows:

1. In Poverty - Income less than 100% of the Federal Poverty Level (FPL)
2. At or Near Poverty- Income between 100% and 199% of FPL
3. Not in Poverty- Income is at or above 200% of the FPL

The **Colorado Central Cancer Registry (CCCR)** provides data on cancer incidence, stage at diagnosis, payer and survival.

U.S. Census Bureau data was used to determine area poverty level for all non-BRFSS related comparisons. Census tracts were divided into one of three groups:

1. Less than 10% of households in the census tract living below the FPL
2. 10-19% of households in the area are living below the FPL
3. 20% or more of households in the area living below the FPL

See Data, Methods and Definitions for more information

Melanoma is the most deadly form of skin cancer. Basal cell and squamous cell carcinomas of the skin occur much more frequently, but most are curable. The lifetime risk of being diagnosed with melanoma in Colorado is approximately one in 24 for males and one in 45 for females.[1] Because melanoma is primarily a disease of fair-skinned persons (rates of melanoma are 23 times higher in Whites than in Blacks),[2] only statistics for non-Hispanic Whites are reported here.

Melanoma Prevention and Risk Factors

Overexposure to ultraviolet (UV) radiation in sunlight is believed to be a contributing factor to some cases of melanoma. Other risk factors include fair skin that burns easily, a personal or family history of melanoma, having many moles (more than 50), having atypical or unusual looking moles, use of tanning booths, having diseases that suppress the immune system and a past history of skin cancer.[2] The American Cancer Society and the U.S. Preventive Services Task Force encourage sun-protection behaviors to prevent skin cancer, such as limiting sun exposure (especially during midday), avoiding indoor tanning, wearing protective clothing when outdoors and applying sunscreen with a sun protection factor (SPF) of 15 or higher.[2,3]

Melanoma

In Colorado, 2012 data shows that there was no difference between poverty groups in the percent of people with a sunburn in the past year. However, people in the middle income group (at or near poverty) were significantly more likely to report always or almost always using a form of sun protection when outside longer than one hour on a sunny day compared to both the in poverty and not in poverty groups (Figure 1). Sun protection includes use of sunscreen, shade structures, long sleeves and/or a hat.

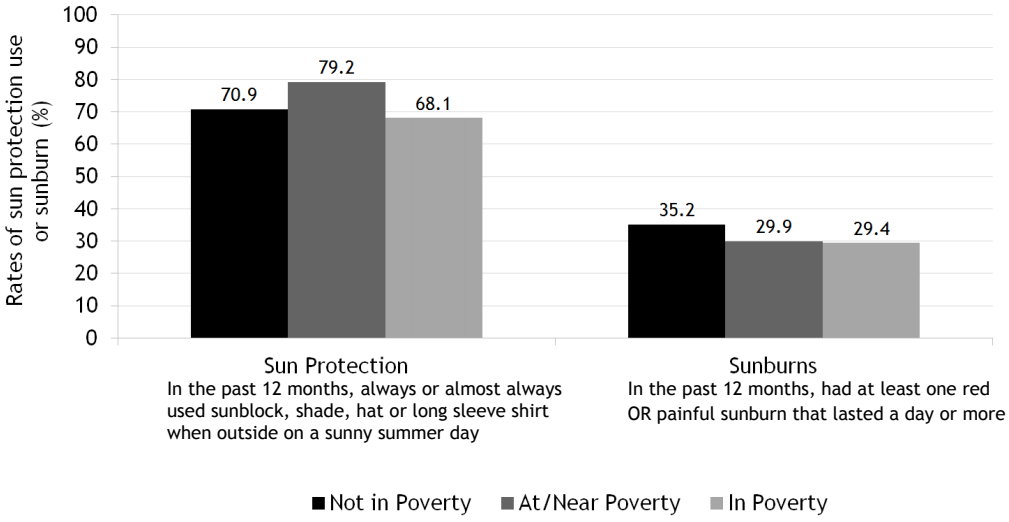
Screening

The U.S. Preventive Services Task Force (USPSTF) has concluded there is insufficient evidence to recommend for or against routine total-body skin examinations by clinicians for the early detection of melanoma, basal cell skin cancer, or squamous cell skin cancer.[3,4] However, the USPSTF advises doctors to be aware that fair-skinned men and women ages 65 years and older, and people with atypical moles or more than 50 moles, are at greater risk for melanoma. For this reason, it is recommended that doctors look for skin abnormalities in this population when performing physical examinations for other reasons. Any suspicious skin lesion should be checked by a physician.

What We're Doing in Colorado

The Colorado Department of Public Health and Environment works with local governments to raise awareness about UV overexposure and promotes policies and environmental approaches to encourage sun protection practices. It also encourages counties and municipalities to increase trees and shade structures in outdoor recreation settings and plan for shade in comprehensive plans and design guidelines.

Figure 1: Use of Sun Protection and Rates of Sunburn in Colorado Adults, by Poverty Level, 2012



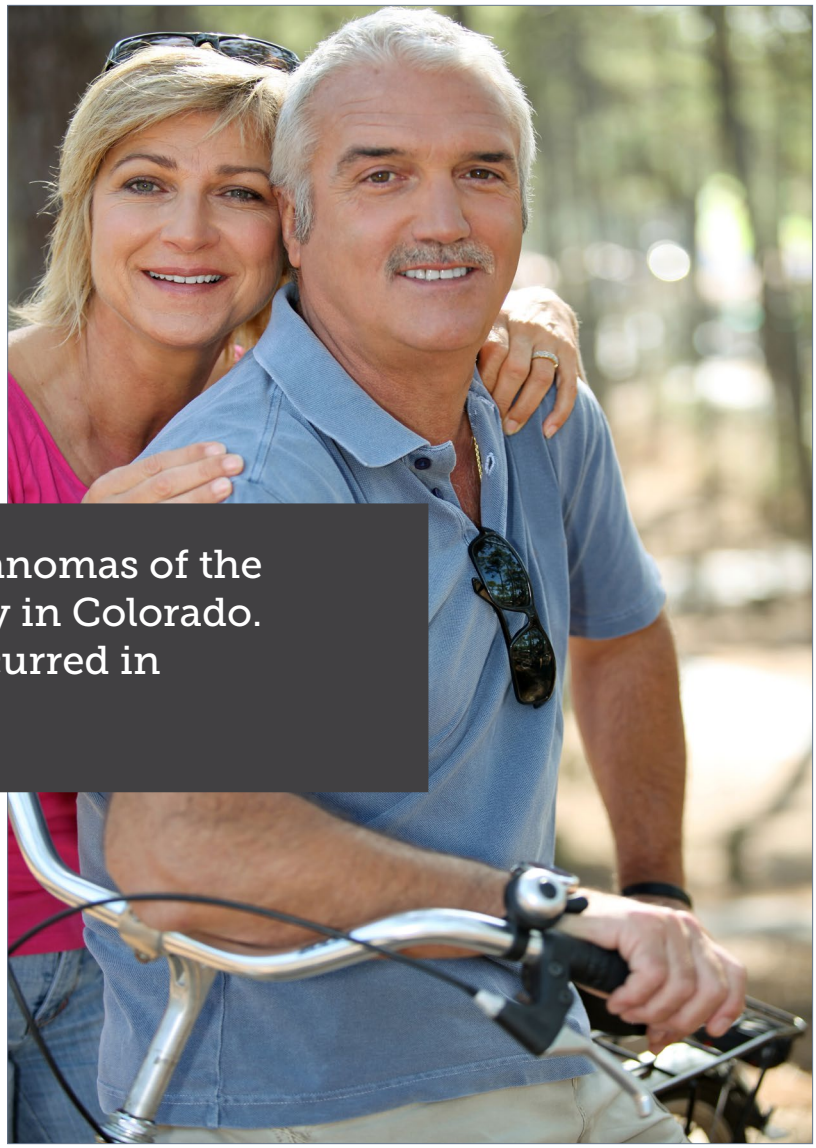
Source: Colorado Behavioral Risk Factor Surveillance System; Health Statistics, Colorado Department of Public Health and Environment.

Melanoma

Poverty and Incidence

About 1,100 malignant melanomas of the skin are diagnosed annually in Colorado from 2001 to 2012.[1] Nearly all of these cases occurred in non-Hispanic Whites. Among Whites in the wealthier areas of the state, the incidence rate was 23.9 new cancers per 100,000 persons per year, while the middle poverty areas had a rate of 18.8, and the rate in the poorest areas was 12.9.

Studies have shown that poverty is less associated with increased risk of melanoma than it is with other cancers. Instead, lower poverty, greater educational attainment, higher income and lower unemployment were more associated with risk of skin cancer.[5,6]



About 1,100 malignant melanomas of the skin are diagnosed annually in Colorado. Nearly all of these cases occurred in non-Hispanic Whites.

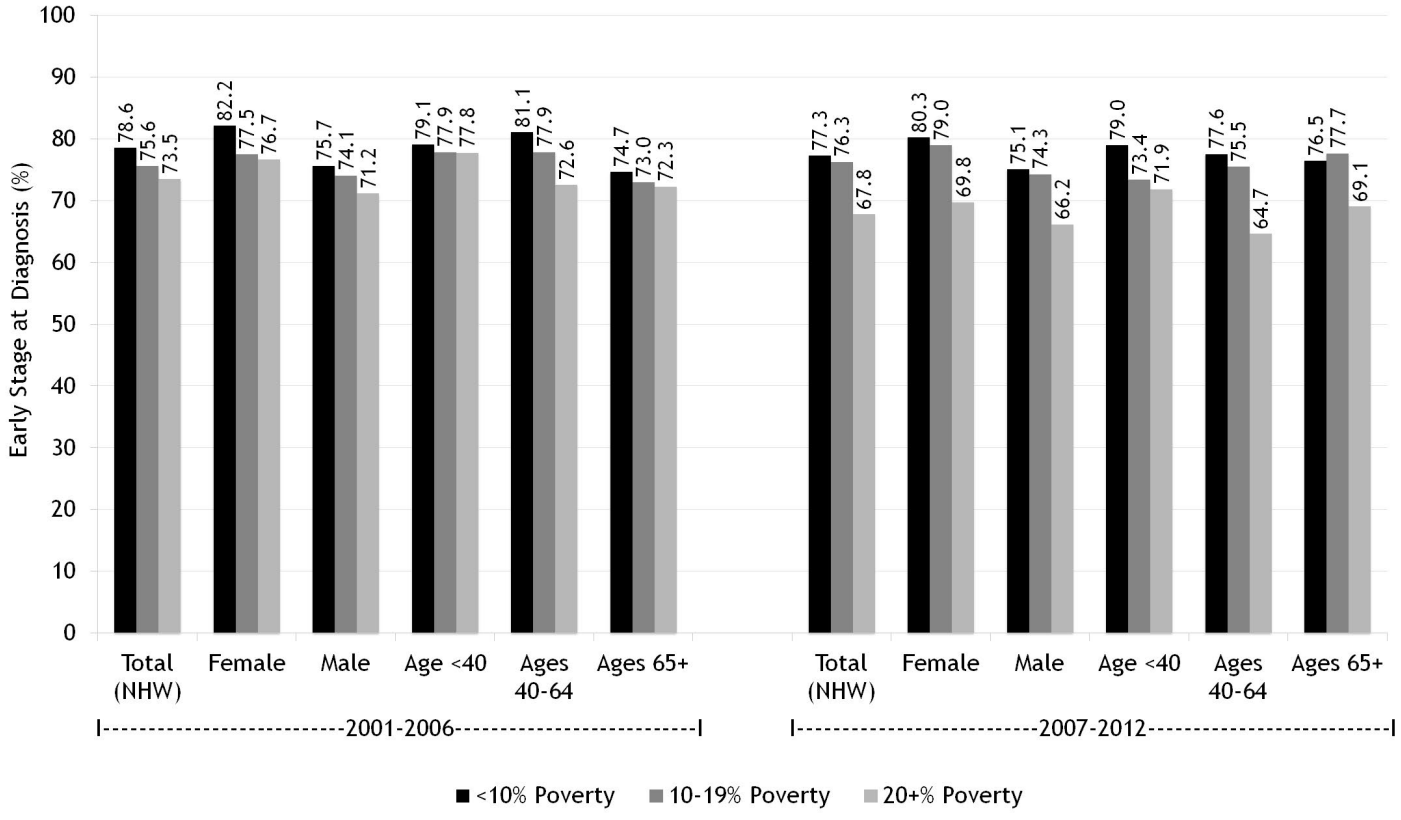
Melanoma

Early Detection by Poverty, Age and Gender

In this report, early stage diagnosis of melanoma is defined as a tumor diagnosed at either in-situ stage OR with a depth of invasion less than or equal to one millimeter. Using this definition, five-year survival among those with an early stage diagnosis is around 90%. While incidence rates are highest in the low poverty group, higher poverty areas tend to experience lower early detection rates. Figure 2 shows that people in the poorest areas consistently had the lowest rates of early detection of melanoma among all subgroups analyzed. Also, males had slightly lower early detection rates than females in both time periods (2001-06 and 2007-12).

While incidence rates are highest in the low poverty group, higher poverty areas tend to experience lower early detection rates.

Figure 2: Early Stage at Diagnosis of Melanoma in Non-Hispanic Whites by Area Poverty Level, Gender and Age, 2001-2006 & 2007-2012



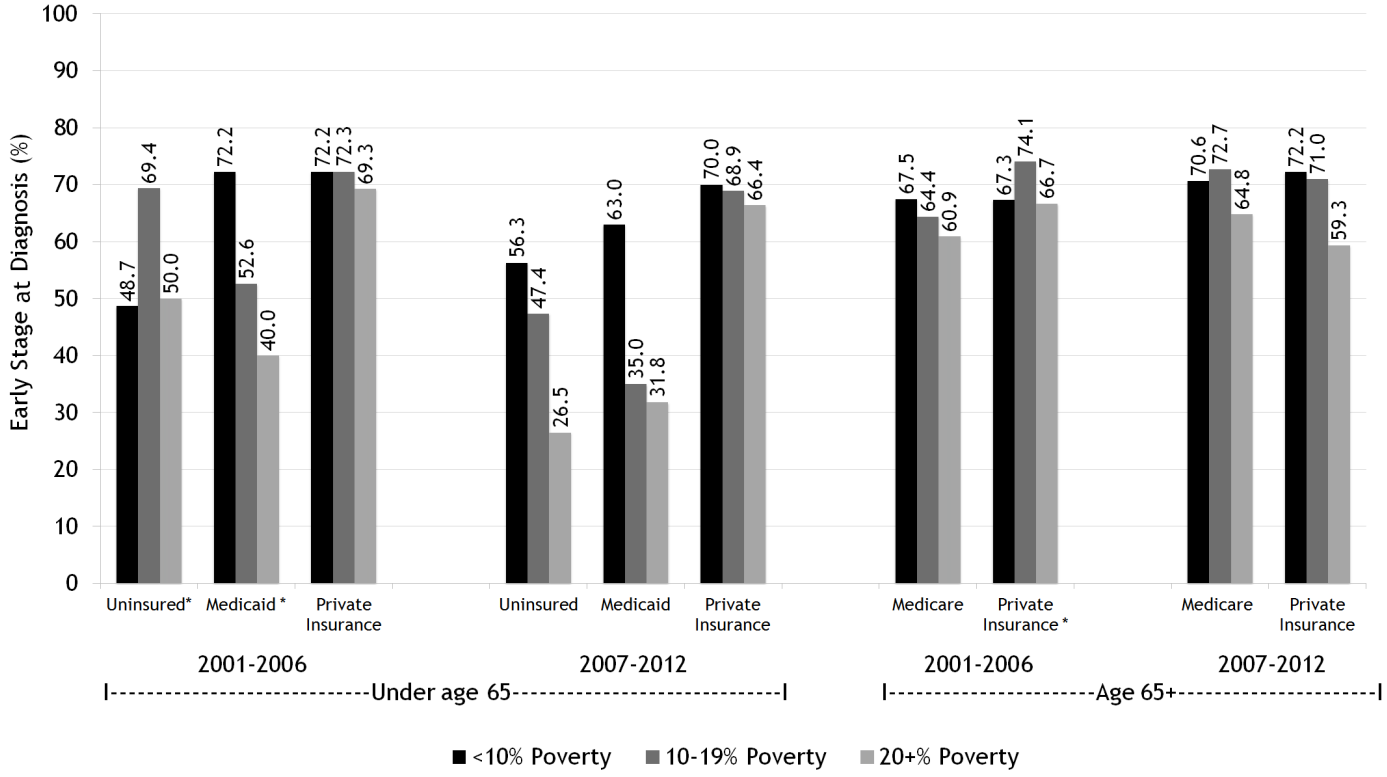
Source: Colorado Central Cancer Registry, Colorado Department of Public Health and Environment

Melanoma

Early Detection and Insurance Status

In general, during both time periods, the percentage of melanomas detected at an early stage was worst among those less than 65 years of age who lived in the poorest areas and had either Medicaid or no insurance (Figure 3). Among those in the same age group with private insurance, differences in early detection rates between poverty groups were minor. Among those 65 years and older with Medicare, early stage diagnosis was higher in each poverty group in 2007-12 compared to 2001-06.

Figure 3: Early Stage at Diagnosis of Melanoma in Non-Hispanic Whites by Area Poverty Level, Age and Insurance Status, 2001-2006 & 2007-2012



** Case counts in one or more of the poverty categories for this group are small (n<20). Use with caution.*

Source: Colorado Central Cancer Registry, Colorado Department of Public Health and Environment

Melanoma

Poverty and Survival

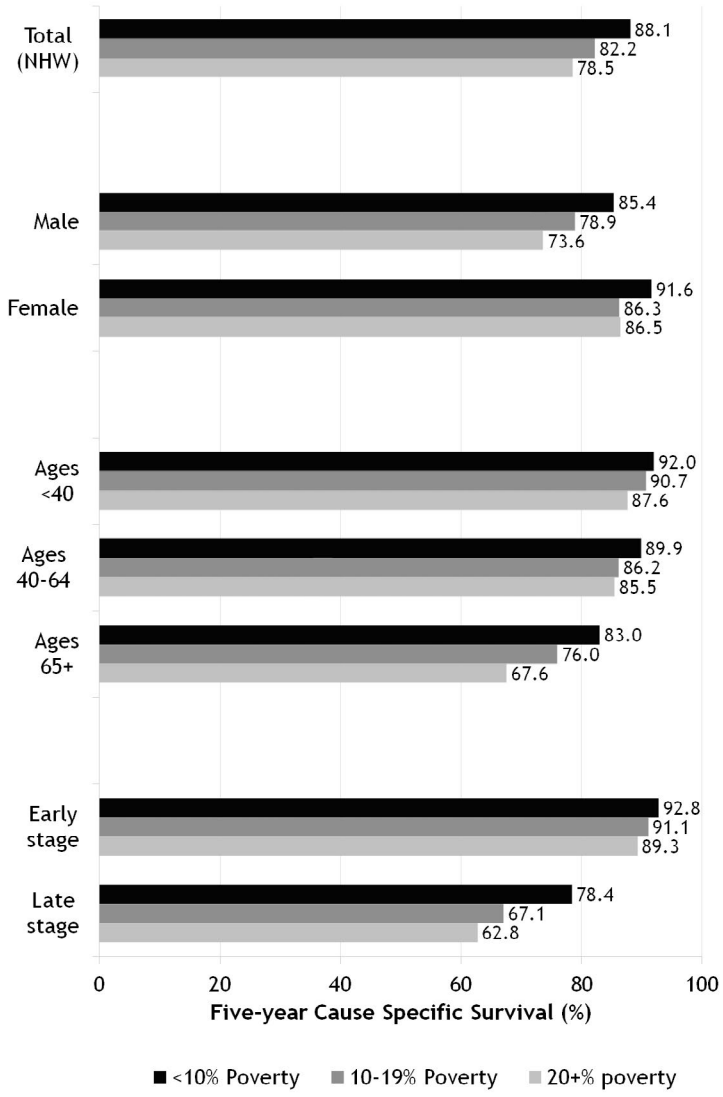
A previous study showed that melanoma patients with low socioeconomic status were more likely to die from melanoma than those from a higher socioeconomic status.[6] Colorado data seem to mirror this finding. For cases diagnosed in 2001-06, overall melanoma survival rates declined as poverty levels increased (Figure 4). Males had lower survival rates than females, which would be expected considering their lower rates of early stage diagnosis. Males also showed greater differences between poverty groups than females.

When survival data is stratified by age, the youngest group (< 40 years) shows the best survival rates while the older age group (age 65 and over) shows the lowest survival rates. While survival rates are similar among poverty groups in the youngest and middle age groups, the older age group shows larger gaps between poverty groups.

Differences in melanoma survival are mainly due to diagnosis at an early stage and access to high quality treatment. Regardless of stage at diagnosis, the survival rate was lowest among the poorest areas of the state. Among those diagnosed at a late stage, survival rates were nearly 16 percentage points lower in the people living in the highest poverty areas compared to those in low poverty areas.

For cases diagnosed in 2001-06, overall melanoma survival rates declined as poverty levels increased.

Figure 4: Five-year Survival of Melanoma by Area Poverty Level, Age, Gender, Race and Stage, 2001-2006



Source: Colorado Central Cancer Registry, Colorado Department of Public Health and Environment

Melanoma
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Cancers of the Oral Cavity & Pharynx

Key Points & Definitions

Oral cavity cancers are cancers of the mouth. Cancers of the pharynx are commonly known as throat cancer.

Data Sources:

The **Behavioral Risk Factor Surveillance System (BRFSS)** provides screening data and self-reported income used to assess poverty for screening rate comparisons. Poverty groups for BRFSS data are divided as follows:

1. In Poverty - Income less than 100% of the Federal Poverty Level (FPL)
2. At or Near Poverty- Income between 100% and 199% of FPL
3. Not in Poverty- Income is at or above 200% of the FPL

The **Colorado Central Cancer Registry (CCCR)** provides data on cancer incidence, stage at diagnosis, payer and survival.

U.S. Census Bureau data was used to determine area poverty level for all non-BRFSS related comparisons. Census tracts were divided into one of three groups:

1. Less than 10% of households in the census tract living below the FPL
2. 10-19% of households in the area are living below the FPL
3. 20% or more of households in the area living below the FPL

See Data, Methods and Definitions for more information

Cancers of the oral cavity and pharynx occur nearly 2.5 times more often in males than in females. In Colorado, the lifetime risk of being diagnosed with oral or pharyngeal cancer is approximately one in 56 for males, and one in 136 for females.[1] Treatment of oral cavity cancers (surgery, radiation, chemotherapy) can be disfiguring and expensive. Avoiding high-risk behaviors, such as tobacco use, is crucial in preventing these types of cancers.

Oral & Pharyngeal Cancer Prevention and Risk Factors

The strongest known risk factors for cancers located in the oral cavity are tobacco use (smoked and smokeless) and excessive alcohol consumption. Many studies also report a synergistic relationship between the two, such that people who both smoke and drink heavily have a greatly increased risk of developing these cancers compared to those who only participate in one or neither of these activities.[2] In the U.S., up to 75 percent of oral cancer cases (not pharyngeal cases) may be attributable to tobacco and alcohol use.[3]

Infection with the human papilloma virus (HPV), which has long been known to cause most cervical cancers, is now also known to cause cancers of the oropharynx (i.e. the back of the throat). The number of HPV-related oropharyngeal cancers has risen dramatically in recent years, and it is estimated that between 66 percent and 95 percent of oropharyngeal cancers can be linked to HPV.[4,5]

Other risk factors include male gender, older age, poor nutrition, overexposure to ultraviolet radiation from sunlight (for lip cancer), a weakened immune system, graft-versus-host disease (GVHD) and certain genetic syndromes.[6]

Cancers of the Oral Cavity & Pharynx

Those who live in poorer areas are more likely to use tobacco than those in wealthier areas. However, the opposite is true for heavy alcohol use. Tobacco cessation and limiting alcohol can reduce the risk of developing oral cancer. See the Cancer Prevention chapter for more information on those topics.

Screening

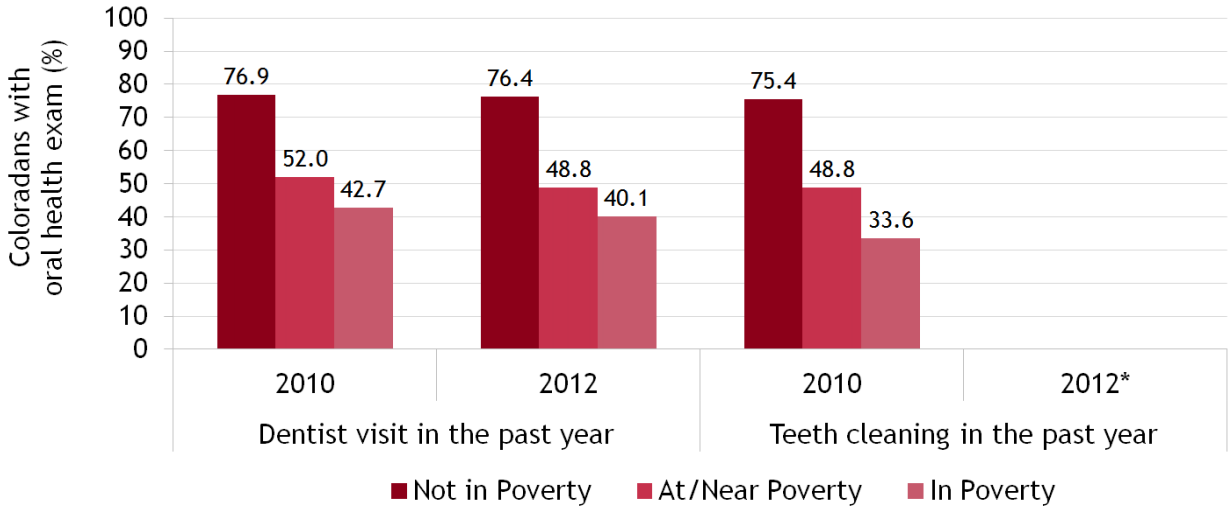
The U.S. Preventive Services Task Force has concluded there is insufficient evidence to recommend for or against routine screening for oral cancer in asymptomatic adults *by primary care providers*.[7] The recommendations specify that they do not apply to dental providers or otolaryngologists. The standard of care for dental providers and otolaryngologists is to conduct routine oral cancer screening.

The majority of early signs and symptoms of oral cavity and pharyngeal cancers are often painless and therefore difficult to detect without a thorough head and neck examination by a dental or medical professional.[4] However, Colorado data show that poverty is strongly linked to lower rates of both dental visits and dental cleanings (Figure 1).

What We're Doing in Colorado

The Cancer, Cardiovascular and Pulmonary Disease grants program and the Immunization program at the Colorado Department of Public Health and Environment fund strategies to increase HPV vaccination rates. Preventing the incidence of future cervical and oral cancers by reducing rates of HPV infection is a key benefit of the HPV vaccine.

Figure 1: Percent of Colorado Residents, Ages 18+, who Reported a Dental Visit or Teeth Cleaning, by Poverty Level, 2010 and 2012



* No data available for teeth cleaning in 2012.
Source: Colorado Behavioral Risk Factor Surveillance System; Health Statistics, Colorado Department of Public Health and Environment.

Cancers of the Oral Cavity & Pharynx

Poverty and Incidence

An average of 550 cancers of the oral cavity and pharynx are diagnosed annually in Colorado. In 2007-12, the poorest areas of the state showed the highest incidence rates at 10.7 per 100,000 persons per year. The middle poverty level areas had a rate of 8.8, and the rate for the wealthiest areas of the state was 9.2 per 100,000 persons per year.[1]

An average of 550 cancers of the oral cavity and pharynx are diagnosed annually in Colorado.

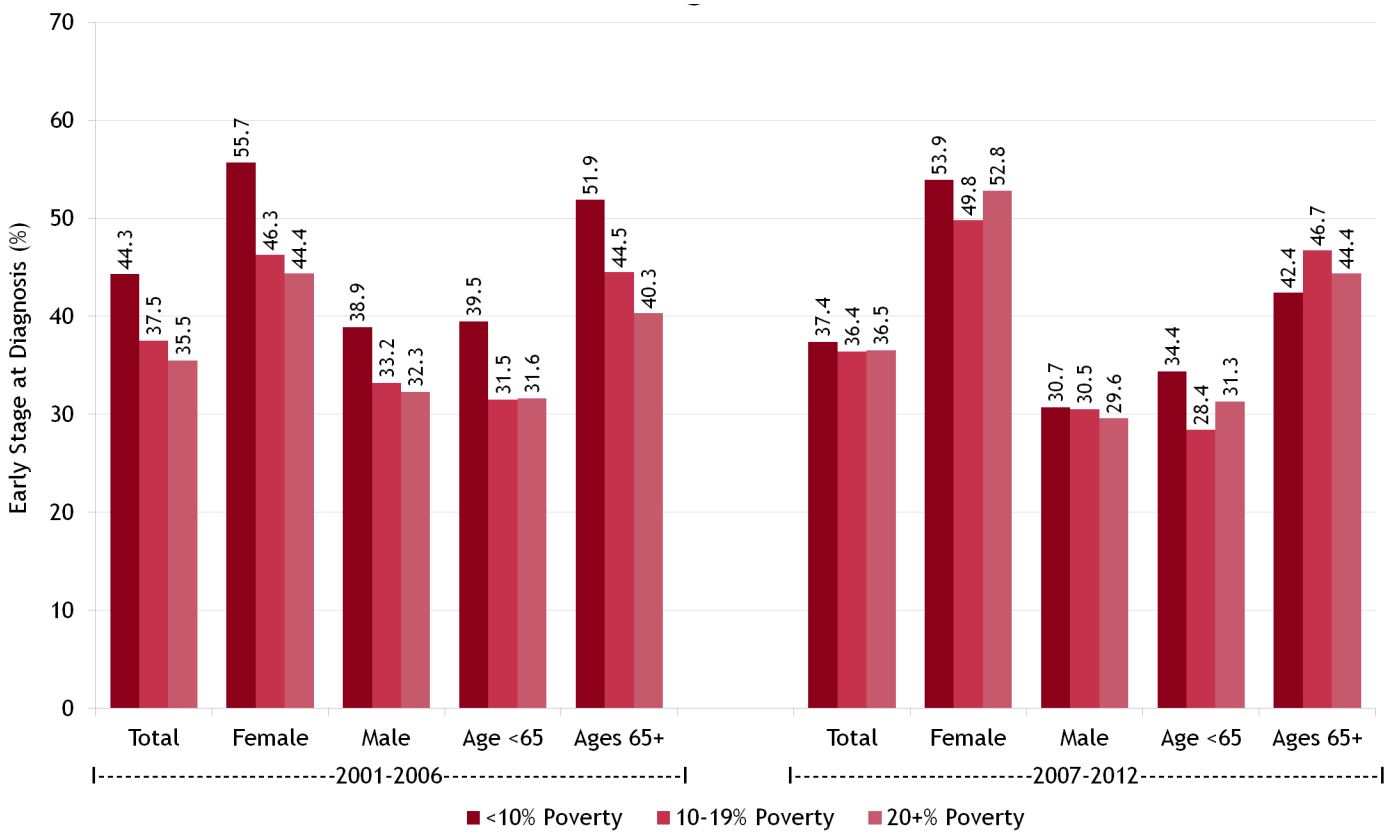
Cancers of the Oral Cavity & Pharynx

Early Detection by Poverty, Age and Gender

In 2001-06, less than 45 percent of oral cavity and pharyngeal cancers in the state were diagnosed at an early, more curable stage of disease (Figure 2). In this time period, as poverty level went up, early stage diagnosis went down among both age groups and both sexes. Early detection was better in females compared to males, overall, and for the older age group compared to the younger age group.

Between 2001-06 and 2007-12, early detection rates remained fairly consistent in the middle and high poverty areas, but they decreased in the group from low poverty areas. Early diagnosis rates remained higher in females and the older age group compared to males and the younger age group, respectively. Interestingly, while the low poverty group had the highest early detection rates in all subcategories in 2001-06, this trend dissipates somewhat in 2007-12.

Figure 2: Early Stage at Diagnosis for Cancers of the Oral Cavity & Pharynx, by Area Poverty Level, Gender and Age: 2001-2006 & 2007-2012



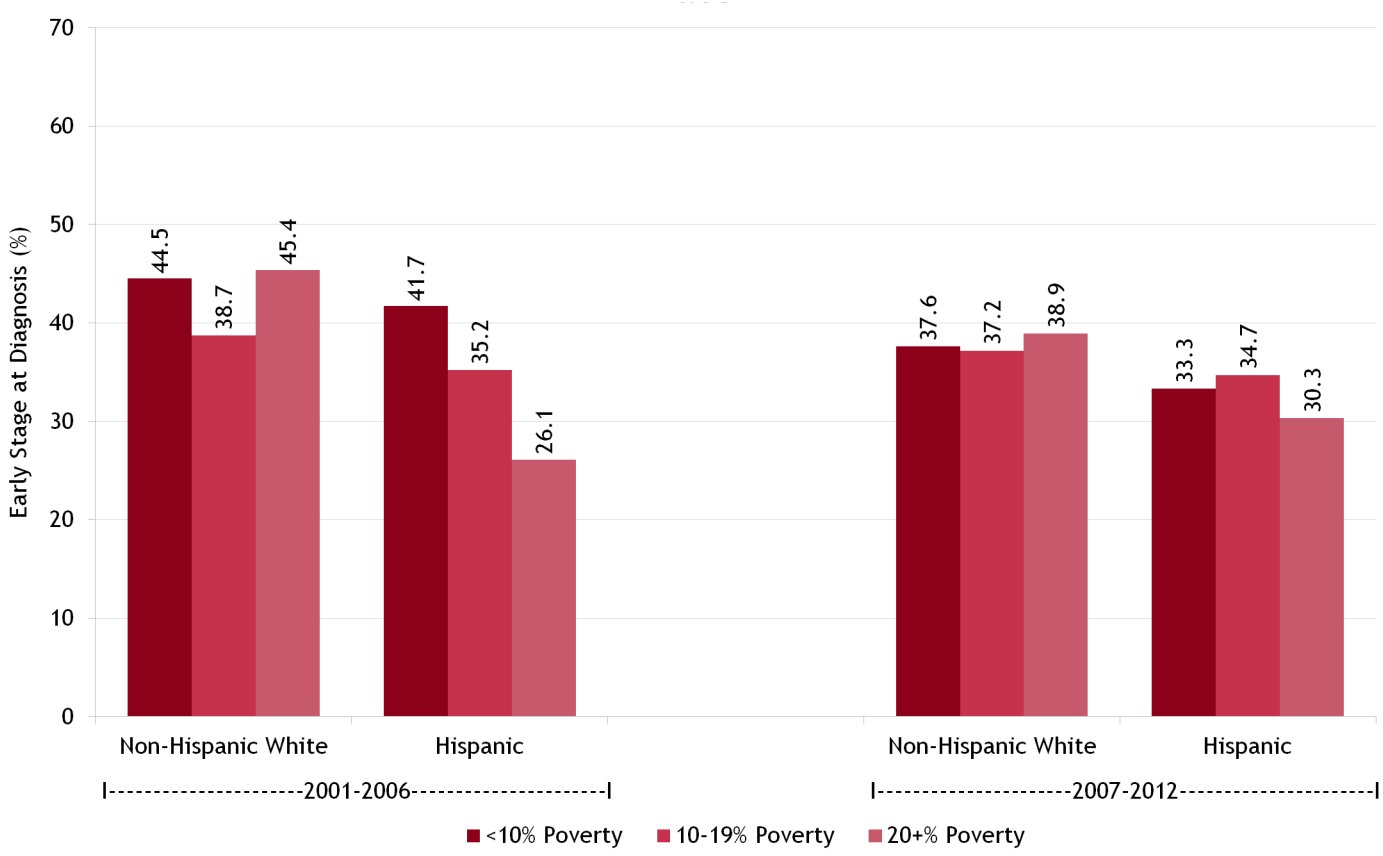
Source: Colorado Central Cancer Registry, Colorado Department of Public Health and Environment

Cancers of the Oral Cavity & Pharynx

Early Detection by Poverty and Race

In both 2001-06 and 2007-12, Non-Hispanic Whites tended to have slightly higher early stage detection of oral and pharyngeal cancers than Hispanics (Figure 3). Distinct gaps between poverty groups were seen in Hispanics in 2001-06, but not in 2007-12. Data are not shown for Blacks, American Indian/Alaskan Native or Asian/Pacific Islander populations due to the small number of cases in those groups

Figure 3: Early Stage at Diagnosis of the Oral Cavity & Pharynx by Area Poverty Level and Race, 2001-2006 & 2007-2012



Source: Colorado Central Cancer Registry, Colorado Department of Public Health and Environment

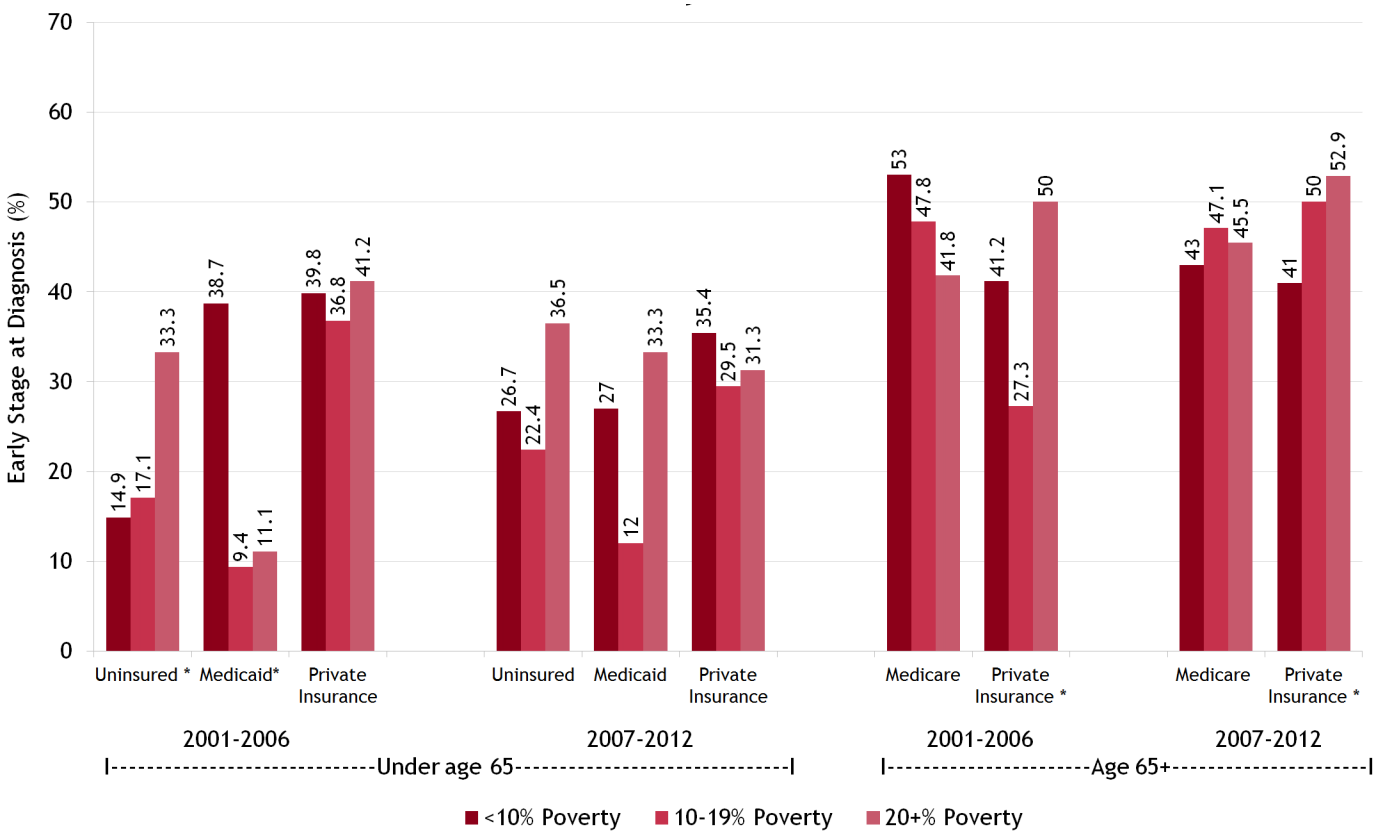
Cancers of the Oral Cavity & Pharynx

Early Detection and Insurance Status

In 2001-06, cancers of the oral cavity and pharynx were generally diagnosed earlier in Coloradans aged 65 years and older than those younger than 65 (Figure 4). Among those younger than 65, early detection rates were generally higher among the privately insured compared to those on Medicaid or those who were uninsured. Among those aged 65 years and older with Medicare, early stage detection was worst in those from the poorest areas.

In 2007-12, cancers of the oral cavity and pharynx were also generally diagnosed earlier in Coloradans aged 65 years and older than those younger than 65. Among those younger than 65, the percentage of cases diagnosed at an early stage was the lowest among those on Medicaid in the middle poverty group.

Figure 4: Early Stage at Diagnosis of Cancers of the Oral Cavity & Pharynx, by Area Poverty Level, Age and Insurance Status, 2001-2006 & 2007-2012



** Case counts in one or more of the poverty categories for this group are small (n<20). Use with caution.*

Source: Colorado Central Cancer Registry, Colorado Department of Public Health and Environment

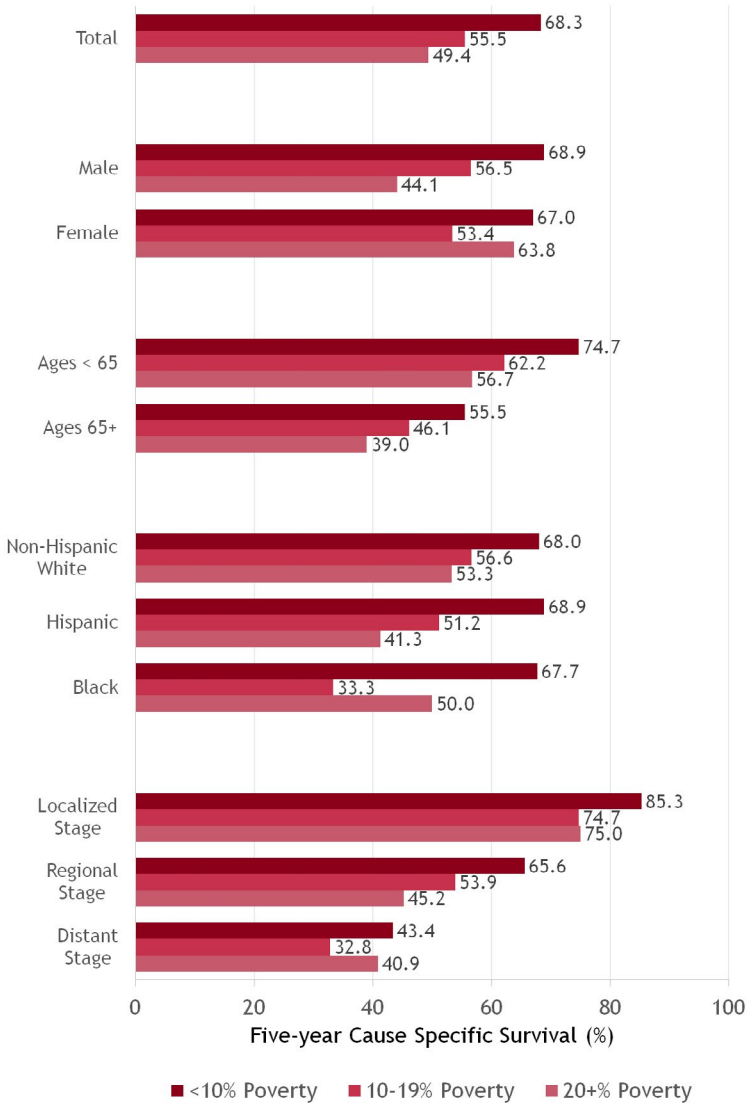
Cancers of the Oral Cavity & Pharynx

Poverty and Survival

The survival rate for Coloradans with cancers of the oral cavity and pharynx was highest in the wealthier areas regardless of gender, age or race/ethnicity (Figure 5). Survival rates also tended to be lowest in the poorest areas of the state, with the exception of women and Blacks. The greatest disparity among poverty levels was seen among Blacks in the middle poverty and wealthiest groups, with survival rates differing by nearly 35 percentage points. Those less than 65 years old in the wealthiest areas of the state had higher survival rates for cancers of the oral cavity and pharynx compared to those in the older age group. Also, a large disparity was seen between high poverty areas and low poverty areas for cases diagnosed at the regional stage, a stage in which completeness of chemotherapy and other treatments could improve survival.

The survival rate for Coloradans with cancers of the oral cavity and pharynx was highest in the wealthier areas regardless of gender, age or race/ethnicity.

Figure 5: Five-year Survival for Cancers of the Oral Cavity & Pharynx by Area Poverty Level and Age, Gender, Race and Stage: 2001-2006



Source: Colorado Central Cancer Registry, Colorado Department of Public Health and Environment

Cancers of the Oral Cavity & Pharynx
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Prostate Cancer

Key Points & Definitions

The prostate is a male reproductive gland that surrounds the urethra in men. Prostate cancer develops when cells in the prostate grow and divide in an uncontrolled way.

Data Sources:

The **Behavioral Risk Factor Surveillance System (BRFSS)** provides screening data and self-reported income used to assess poverty for screening rate comparisons. Poverty groups for BRFSS data are divided as follows:

1. In Poverty - Income less than 100% of the Federal Poverty Level (FPL)
2. At or Near Poverty- Income between 100% and 199% of FPL
3. Not in Poverty- Income is at or above 200% of the FPL

The **Colorado Central Cancer Registry (CCCR)** provides data on cancer incidence, stage at diagnosis, payer and survival.

U.S. Census Bureau data was used to determine area poverty level for all non-BRFSS related comparisons. Census tracts were divided into one of three groups:

1. Less than 10% of households in the census tract living below the FPL
2. 10-19% of households in the area are living below the FPL
3. 20% or more of households in the area living below the FPL

See Data, Methods and Definitions for more information.

Prostate cancer is the most common cancer diagnosed in Colorado men and the second most common cause of cancer death among males (after lung cancer).[1] In Colorado, the lifetime risk of being diagnosed with prostate cancer is about one in six, although the chance of dying from prostate cancer is much smaller.

Prostate Cancer Prevention and Risk Factors

The most important risk factor for prostate cancer is age. Risk typically begins to increase around the age of 50, and 60 percent of cases occur after the age of 65.[2] Race is also an important factor. Black men and Caribbean men of African descent are more likely to develop prostate cancer than White men. Black men are also twice as likely to die of prostate cancer compared to White men. A family history of prostate cancer and certain genetic mutations also may increase a man's risk of developing this disease.

Screening

In 2012, the United States Preventive Task Force recommended against using the PSA test for prostate cancer screenings because of insufficient evidence that the PSA test provides health benefits to men who get screened.[3] The American Cancer Society (ACS) emphasizes informed decision making for prostate cancer screening. According to ACS, men at average risk should receive information beginning at age 50 years, and Black men or men with a family history of prostate cancer should receive information at age 45 years.[4] Men should discuss all the potential risks and benefits of prostate cancer screening with their primary care provider prior to getting tested.

Prostate Cancer

Poverty and Incidence

In Colorado, an average of 3,300 malignant prostate cancers are diagnosed annually. For the wealthier areas of the state, the incidence rate was 129.5 per 100,000 men per year, compared to 116.9 for the middle poverty areas and 108.4 for the highest poverty areas.[1]

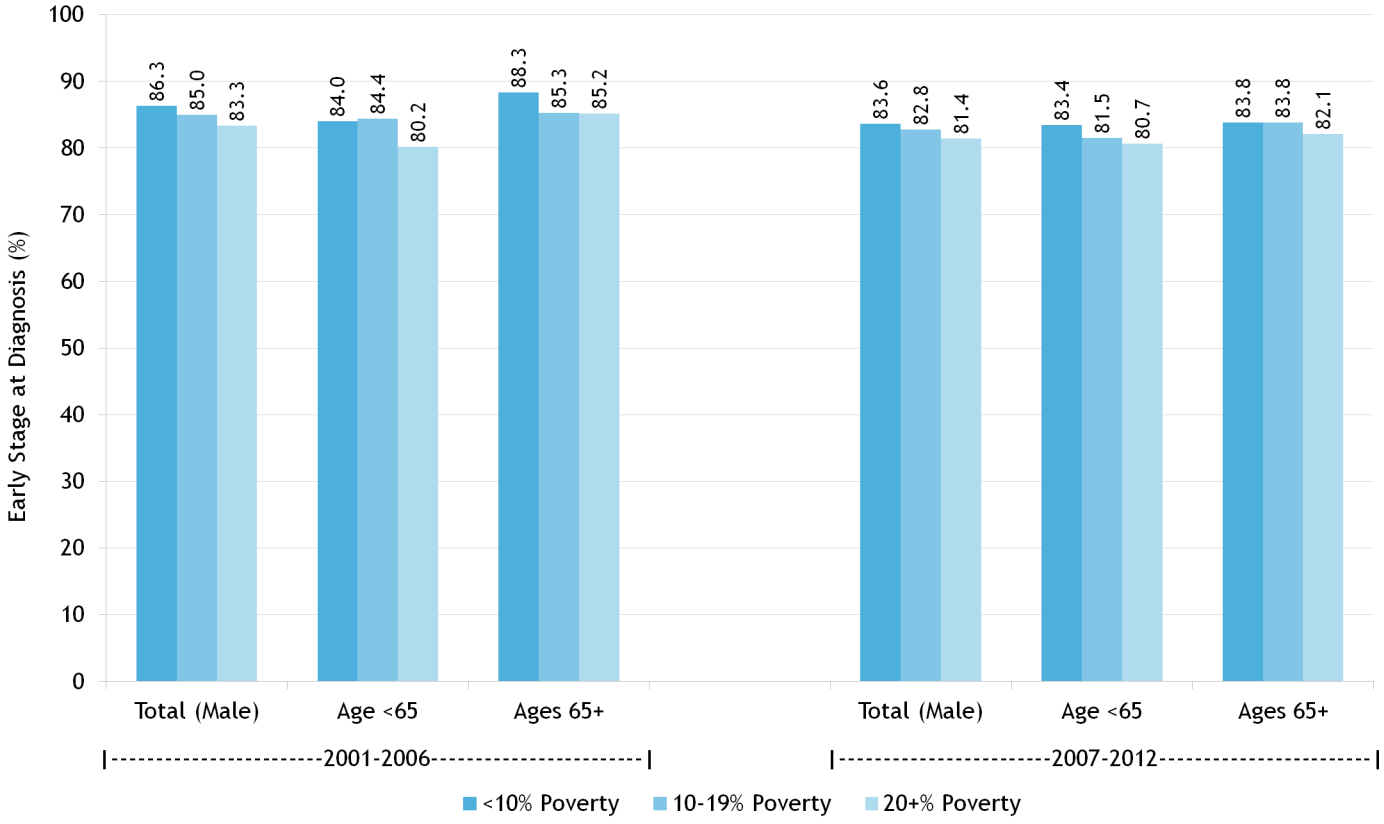
Prostate cancer is the most common cancer diagnosed in Colorado men and the second most common cause of cancer death among males.

Prostate Cancer

Early Detection, Poverty and Age

In both time periods (2001-06 and 2007-12), among all age groups of men in Colorado, about eighty percent of prostate cancers were diagnosed at an early stage (Figure 1). There was little variation by poverty level. There is also little variation between the younger and older age groups. Early diagnosis rates decreased slightly in all groups between the 2001-06 and 2007-12 time periods.

Figure 1: Early Stage at Diagnosis for Prostate Cancer by Area Poverty Level and Age, 2001-2006 & 2007-2012



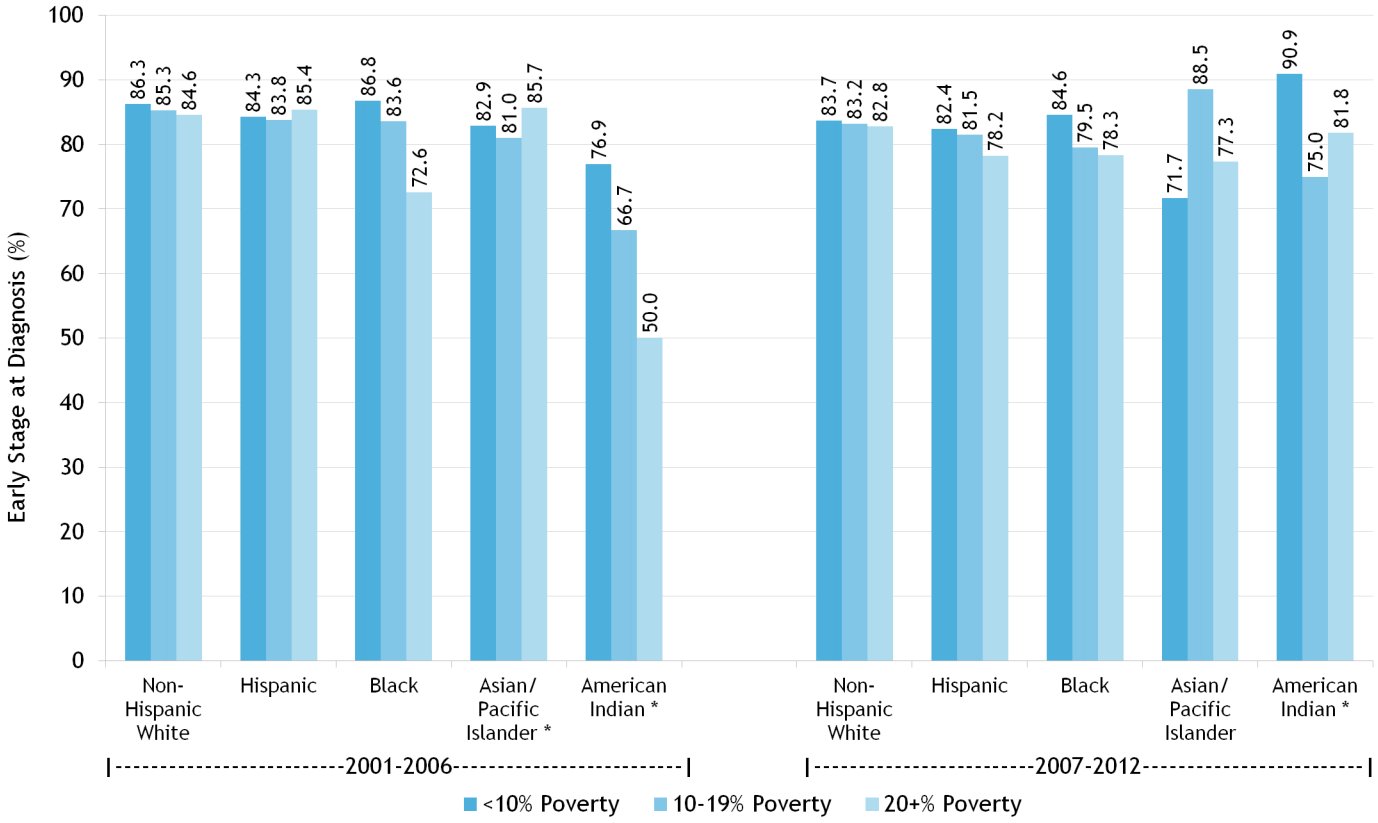
Source: Colorado Central Cancer Registry, Colorado Department of Public Health and Environment

Prostate Cancer

Early Detection by Poverty and Race

The percent of prostate cancers diagnosed early among non-Hispanic Whites and Hispanics was very similar regardless of poverty level (Figure 2). Among Black men, early detection was lower in the poorest areas of the state in both time periods.

Figure 2: Early Stage at Diagnosis for Prostate Cancer by area Poverty Level and Race, 2001-2006 & 2007-2012



** Case counts in one or more of the poverty categories for this group are small (n<20). Use with caution.*

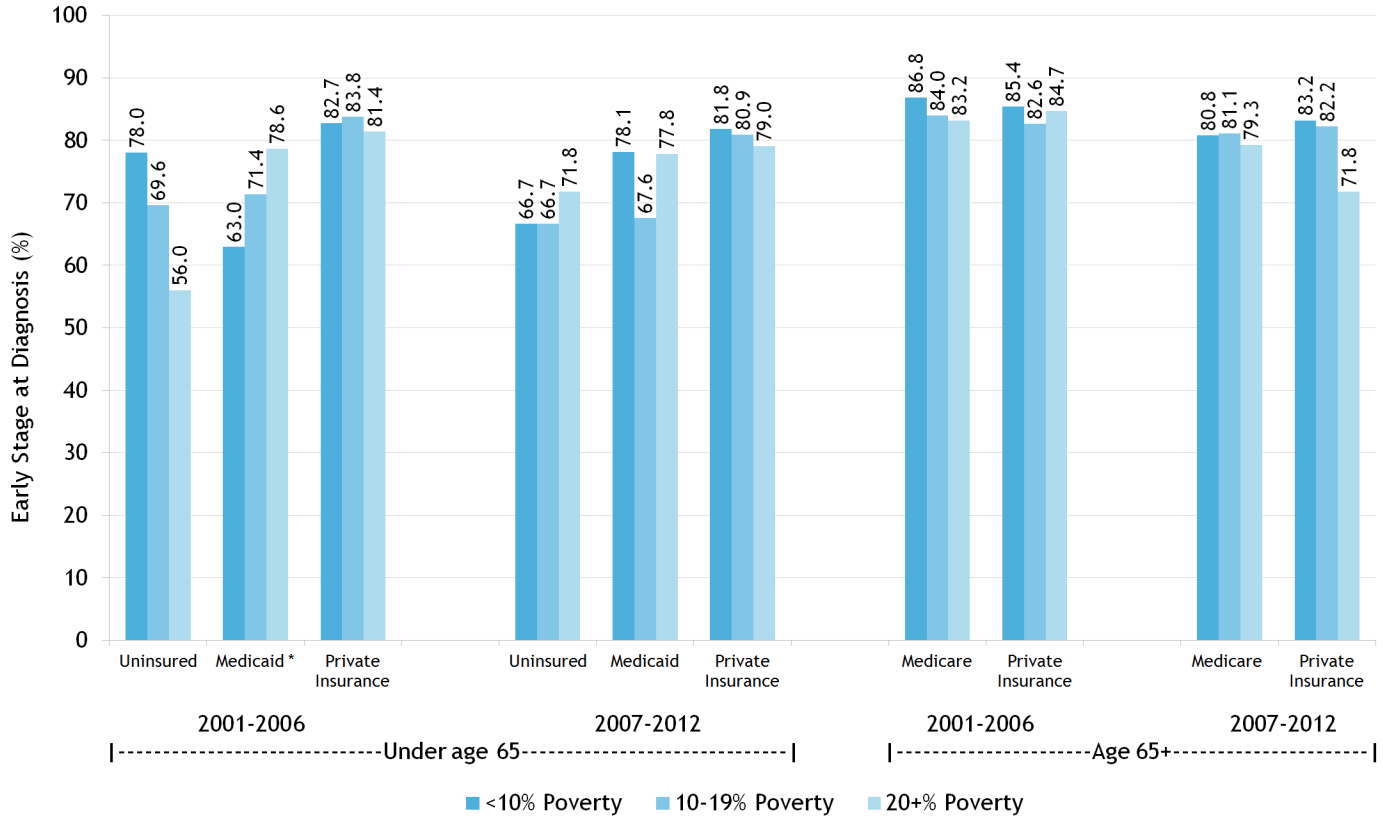
Source: Colorado Central Cancer Registry, Colorado Department of Public Health and Environment

Prostate Cancer

Early Detection and Insurance Status

During 2001-06 and 2007-12, prostate cancers were diagnosed at an earlier stage in men with Medicare or private insurance compared to those with Medicaid or those who were uninsured (Figure 3). Among those 65 years and older, early stage detection rates were similar across poverty groups in 2001-06. In 2007-12, the lowest early stage detection of prostate cancer was seen among the poorest Coloradans with private insurance. Among those younger than 65, 2001-06 data show large differences between poverty groups. However, this trend is not present in the most recent time period.

Figure 3: Early Stage at Diagnosis for Prostate Cancer by Area Poverty Level, Age and Insurance Status, 2001-2006 & 2007-2012



** Case counts in one or more of the poverty categories for this group are small (n<20). Use with caution.*

Source: Colorado Central Cancer Registry, Colorado Department of Public Health and Environment

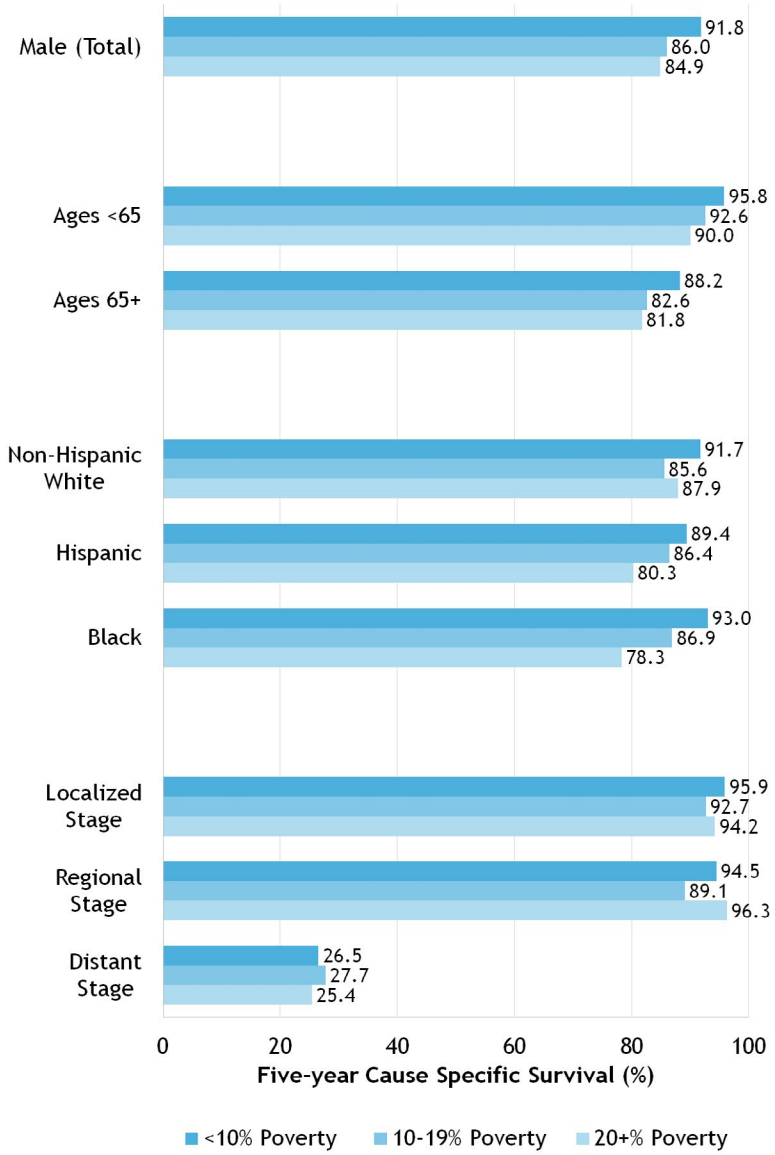
Prostate Cancer

Poverty and Survival

Overall, men who lived in poorer areas of Colorado had lower survival rates than men in wealthier areas (Figure 4). Slight variations in survival rates were seen among men younger than 65 years. Men over 65 years in the two poorer areas of the state had lower survival rates compared to the wealthiest area. When data was stratified by race, survival rates were worst among Black men from the poorest areas. This group had survival rates nearly 15 percentage points lower than those for Black men from wealthier areas of the state. Furthermore, Black men from the poorest areas had worse survival rates than Hispanic and non-Hispanic men from the poorest areas. However, when data were stratified by stage at diagnosis, survival rates for prostate cancer were similar regardless of poverty group.

Men who lived in poorer areas of Colorado had lower survival rates than men in wealthier areas.

Figure 4: Five-year Survival for Prostate Cancer by Area Poverty Level and Age, Gender, Race and Stage: 2001-2006



*Source: Colorado Central Cancer Registry, Colorado Department of Public Health and Environment

Prostate Cancer
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Data, Methods & Definitions

Data Sources

The Colorado Central Cancer Registry (CCCR) of the Colorado Department of Public Health and Environment (CDPHE) provided data on cancer incidence, staging and survival. The Department's Health Statistics Section provided mortality and Behavioral Risk Factor Surveillance System (BRFSS) data. The U.S. Census Bureau was the data source for federal poverty levels, the proportion of census tract populations living in poverty, poverty thresholds and 2010 population figures for Colorado. Because individual income data are not reported to state cancer registries, this report uses the poverty level of the area in which each cancer case resided as an indicator of socioeconomic status. This is the same method used in earlier CDPHE reports [1] and in reports on poverty and cancer from the National Cancer Institute (NCI) and Centers for Disease Control and Prevention (CDC).[2]

Race/ethnicity varied significantly within poverty groups. Based on the 2007-11 American Community Survey, the poorest areas in Colorado were the most racially/ethnically diverse (8 percent Black, 40 percent Hispanic, 47 percent non-Hispanic White), compared to the wealthier areas, which were 81 percent non-Hispanic White.[3]

This report used age-adjusted incidence rates, age-adjusted mortality rates, the proportion of cancers diagnosed at an early stage and cause-specific five-year survival rates as cancer outcome measures. Where appropriate, outcome measures by poverty level are also described within specific groups categorized by race/ethnicity, age, sex or health insurance status.

Cancer screening recommendations in this report are based on U.S. Preventive Services Task Force (USPSTF) recommendations. The U.S. Public Health Service organized the USPSTF to make evidence-based recommendations on preventive measures such as screening tests, counseling, immunizations and preventive medications.

The Colorado Central Cancer Registry

Cancer cases for this report were drawn from the Colorado Central Cancer Registry for the years 2001 - 2012. Seven cancer sites were selected for this report: female breast, cervix, colon/rectum, lung, melanoma, oral cavity/ pharynx and prostate. These cancers were included because they represent some of the most commonly diagnosed reportable cancers in Colorado. Invasive cervical cancer was also studied because it is a highly preventable cancer. From the 2001-06 cancer cases, 123,737 were included in stage analyses, while 139,146 were included from the 2007-12 cancer cases. Incidence rates were reported using cases from 2007 to 2011, with 2010 Colorado census figures by age, sex and race/ethnicity providing the average population for this time period. A cohort of 92,935 cases diagnosed during 2001-06 was used to calculate five-year, cause-specific survival rates.

The Behavioral Risk Factor Surveillance System

The Behavioral Risk Factor Surveillance System (BRFSS) surveys Colorado adults 18 years or older randomly by telephone each year. Approximately 1,800 Coloradans completed the 1996 survey. Sample sizes have increased every year, with over 6,100 people surveyed in 2006 and nearly 12,300 respondents in 2012. Data on characteristics such as household income and education are collected, as well as participation in cancer screening, engagement in risk behaviors and preventive health practices associated with leading causes of death in the state. In this report, the following indicators were analyzed:[4]

1. Pap tests, mammograms and colorectal cancer screening tests
2. Current smoking
3. Sunburn
4. Sun protection behavior
5. Heavy drinking or heavy alcohol use
6. Tobacco use
7. Obesity
8. Physical inactivity
9. Dental visits
10. Teeth cleaning

It is important to note that in 2011, the BRFSS introduced two changes to the survey methodology in order to reduce bias and more accurately reflect population data. The two survey improvements were

the addition of cell phone interviews and a weighting method called raking. Given the changes in methods for weighting and sampling in 2011, estimates from the 2011 BRFSS may not be comparable to estimates created in previous years. Therefore in this report, BRFSS data were grouped accordingly to similar sampling and weighting methods (2006- 2010 and 2011-2012).

Methods

Measuring Socioeconomic Status

Because socioeconomic data (e.g. income, education) are not available for individual patients in most state cancer registries, a neighborhood or area indicator of socioeconomic status was used in this analysis. Although the U.S. Census Bureau reports many different socioeconomic measures by census tract, poverty rate (the percentage of the population living below the defined federal poverty line) was chosen as the area measure for this study. Poverty lines, the income below which an individual or family is considered to be living in poverty, are updated each year by the U.S. Census Bureau. In 2012, for example, the poverty threshold for one person was $11,720 while a family of four had a poverty threshold of $23,492. Poverty rates (percentage of persons or households in poverty in an area) correlate highly with other measures of socioeconomic status, such as educational attainment, unemployment rate and occupational composition. For example, increases in the unemployment rate are highly correlated with increases in the county poverty rate, while decreases in median family income are highly correlated with increases in the poverty rate.[2]

The BRFSS asks respondents about their annual household income using the following categories:

- Less than $10K
- $10K to less than $15K
- $15K to less than $20K
- $20K to less than $25K
- $25K to less than $35K
- $35K to less than $50K
- $50K to less than $75K
- Greater than or equal to $75K

Determining Poverty Levels

For the cancer registry data, a poverty level was assigned to each cancer case using the patient's address at diagnosis. This address was linked to its respective census tract as defined by the 2000 or 2010 U.S. census designated boundaries. Cancer cases were then categorized into three poverty levels by the proportion of residents in a census tract who were living in poverty: less than 10 percent, 10-19 percent, or greater than or equal to 20 percent. This was determined using the 2000 SF-3 U.S. Census for the 2001-06 cases and the 2007-2011 American Community Survey for the 2007-12 cases. Areas with a less than 10 percent poverty rate are referred to as "wealthier" areas or "low poverty" areas in this report. Areas with a poverty rate of greater than or equal to 20 percent have high poverty and are considered federal poverty areas; these areas are referred to as the "poorest" areas, or "high poverty" areas in this report. Areas with poverty rates of 10-19 percent are considered to have a middle level of poverty. In this report, areas of Colorado having middle level poverty rates are called "poorer" areas, or "medium poverty" areas. For the 2001-06 time period, the low poverty areas of Colorado accounted for 67 percent of the cancer cases; the middle level poverty areas had 26 percent of the cancer cases; and the high poverty areas had 7 percent of the cancer cases. For the 2007-12 time period, the low poverty areas of Colorado accounted for 54 percent of the cancer cases; the middle level poverty areas had 28 percent of the cancer cases; and the high poverty areas had 18 percent of the cancer cases. Approximately 96 percent of the cases in the Cancer Registry could be assigned an area poverty level via their address at time of diagnosis. The remaining cases were excluded from this analysis.

For the BRFSS survey data, weighted average poverty thresholds, which are published each year by the U.S. Census Bureau, and household income data from the BRFSS, were used to define three poverty categories. Using the BRFSS data, the size of a family unit was determined by summing the number of children and adults living in the household. The size of the family unit determined which of the weighted average thresholds applied.

Data, Methods, and Definitions

In 2012, for example, the poverty threshold for one person was $11,720 while a family of four had a poverty threshold of $23,492. An average of each BRFSS annual household income category was used because income ranges are collected rather than specific amounts of income. For example, a value of $12,500 was used as the average of the income category "$10K to less than $15K." To analyze cancer screening, risk behaviors and preventive health practices by poverty level, respondents were coded as "In Poverty" (less than 100% of threshold), "At/Near Poverty" (100% to 199% of threshold), or "Not in Poverty" (200% or above the threshold) as determined by poverty thresholds, family size and the average household income reported in the BRFSS.

Insurance Status of Coloradans with Cancer

Individual insurance information was available for almost all cancer cases reported to the CCCR (about 96 percent), and insurance categories are displayed in the early detection figures. The data item for insurance status (called primary payer at diagnosis) is included with case information reported to the Cancer Registry by each facility in the state. For this report, categories of insurance coverage evaluated were: uninsured, private insurance (including TRICARE and Military coverage), Medicaid, Medicare, and federal (including Veteran's Affairs and Indian/ Public Health Service). Cancer case counts were insufficient to display the federal category by poverty level. Cancer cases with unknown insurance or insurance reported from multiple facilities that did not match were excluded from analyses.

Cancer Outcomes

The cancer outcomes studied for this report include age-adjusted incidence rates, age-adjusted mortality rates, the proportion of cancers detected at an early stage and five-year cause-specific survival rates. Incidence rates measure the number of newly diagnosed primary, malignant cancers for a given period of time per 100,000 persons. Mortality rates measure the number of new deaths caused by cancer for a given period of time per 100,000 persons. Early stage detection was defined as the percent of all cancers diagnosed at early stages (in-situ or localized stage for most cancers). Five-year cause-specific survival rates measure the proportion of patients surviving at least five years with a specific cancer (calculated using the National Cancer Institute's (NCI) SEER*STAT software package). In the survival analyses, cases lost to follow-up, those alive at the end of the five-year follow-up period, and those dying of causes other than the underlying cancers, were treated as censored observations. Those dying of unknown causes were excluded from the analysis. Additional details regarding cause specific survival are available.[6]

All cancer outcomes were analyzed by poverty level, race/ethnicity, sex, age and/or insurance status. Race/ethnicity groups used for this analysis include Non-Hispanic Whites, Blacks and Hispanics. For specific cancer sites where adequate numbers of cases allowed, data for both Asian/Pacific Islander and American Indian groups were also displayed. For melanoma of the skin, only cases among non-Hispanic Whites were analyzed due to the rare occurrence of melanoma among other races/ethnicities. Age was classified as less than 65 years or greater than or equal to 65 years for four of the seven cancer sites because most persons aged 65 and older, regardless of income, are eligible for screening and treatment through Medicare. Breast cancer analyses included three categories so that cancers diagnosed in the pre-menopausal years (age less than 50) could be analyzed separately, while the post-menopausal age groups consisted of women aged 50-64 years, and greater than or equal to 65 years. Colorectal cancer analyses included three categories, age less than 50, 50 to 64, and 65 years or greater to better align with screening guidelines. Melanoma analyses included three age categories so that melanoma diagnosed at an earlier age (younger than 40) could be analyzed separately from the older non-Medicare (age 50-64) and Medicare (age greater than or equal to 65 years) age groups.

Data, Methods, and Definitions

Data Limitations

The number of cancer cases were not equal in each of the three poverty levels and each racial/ethnic group. Some subgroups were small, such that the differences between groups could have occurred by chance alone. Due to small case counts for some cancer sites, data for Blacks, Asian/Pacific Islander and/or American Indian groups could not be separately displayed. Consensus does not currently exist on the best measure(s) of socioeconomic status for an individual or population. Individual socioeconomic measures such as income or education were not available for each cancer case in the Cancer Registry. However, the use of area poverty level to characterize individual socioeconomic status has been validated in previous research and used by the National Cancer Institute.[6]

While the BRFSS survey provides reliable estimates of cancer-related behaviors for the state as a whole, it is not a survey of Coloradans in the Cancer Registry. The BRFSS survey used household income to represent poverty status, which is different than the area poverty level used in reporting cancer outcomes with registry data. Self-reported estimates of income may be less dependable due to the sensitive nature of questions on income. Surveys cannot reach persons living in households without telephone service, and households without telephones generally have lower incomes. The following information was gathered from BRFSS 2007-10, 2011, 2012 survey data (averaged or single year data) according to years of data available:

- Current smoking (all years 2007-10, 2011-12)
- Heavy alcohol use (all years 2007-10, 2011-12)
- Obesity (all years 2007-10, 2011-12)
- No physical activity (all years 2007-10, 2011-12)
- Endoscopy (2008 and 2010 combined, 2012)
- FOBT in past year (2008 and 2010 combined, 2012)
- Mammogram in past two years (2008 and 2010 combined, 2012)
- Pap smear in past three years (2008 and 2010 combined, 2012)
- Sun protection (2012)
- Sun burns (2012)

Definitions

Age adjustment allows rates from one geographic area to be compared with rates from another geographic area that may have differences in age distribution. This adjustment is important because cancer rates vary with age, and age structure differs across geographic areas. The age-adjusted incidence rate for cancer is the number of new cancer cases per year per 100,000 persons, adjusted to the 2000 U.S. standard population.

The ***Behavioral Risk Factor Surveillance System*** (BRFSS) is an ongoing statewide telephone survey conducted by the Colorado Department of Public Health and Environment's Health Statistics Section. The survey is designed to monitor the prevalence of health behaviors and preventive health practices associated with the leading causes of death in Colorado.

BRFSS poverty levels are determined by the size of the family unit, the average household income, and poverty thresholds determined every year by the U.S. Census Bureau. For this report, BRFSS poverty levels are categorized as "In Poverty" (<100% of threshold), "At/Near Poverty" (100% to 199% of threshold), or "Not in Poverty" (>=200% of threshold).

Cause-specific survival, also known as disease-specific survival, is the percentage of patients who have survived a specific disease for a certain period of time. This report uses five-year cause specific cancer survival.

Census tracts are relatively permanent statistical subdivisions of a county, designed to be fairly homogeneous in terms of population characteristics, economic position and living conditions. Census tracts average around 4,000 residents.

Health disparities are differences or inequalities in health between different populations. Health disparities have often been reported for different races or ethnicities.

Data, Methods, and Definitions

Poverty level or ***poverty rate*** refers to the percentage of families or individuals in a neighborhood area living below the designated official poverty line. The federal poverty line for one adult in 2012 was $11,720 while a family of four had a poverty threshold of $23,492.

Poverty areas that have 20 percent or more of the population living below the federal poverty line, and are thought of as poor. For this report, poverty rates were categorized into three poverty groups: less than 10 percent living in poverty, 10-19 percent living in poverty, or greater than or equal to 20 percent living in poverty. Areas with the lowest poverty rate (less than 10 percent) are not considered to be poor, and are referred to as "wealthier areas" in this report. Areas with middle (10-19 percent) to high (greater than or equal to 20 percent) poverty are called "poorer" areas in this report, while areas with high poverty are referred to as the "poorest" areas.

Sample size is the number of persons in a study group. In general, a larger sample size yields a more reliable estimate than does a smaller sample size.

Socioeconomic status is a term used to classify an individual or population based on one or more indicators, such as income, assets, employment, occupation and education.

Staging is the process of determining how far a cancer has spread at the time of diagnosis. Knowing the stage is important to determine treatment options and predict survival. The National Cancer Institute and the Colorado Central Cancer Registry often report cancers according to four stages: in-situ, localized, regional and distant. In the in-situ stage, cancer cells have not yet invaded tissues; localized stage means that cancer cells remain confined to the organ of origin; regional stage means that cancer cells have spread to nearby organs or lymph nodes; and distant stage means that cancer cells have spread to distant organs or lymph nodes.

For More Information

The cancer data tables used in the preparation of this report are available upon request. Contact the Colorado Central Cancer Registry at 303-692-2540 or cdphe.pscaregistry@state.co.us for more information.

Data, Methods, and Definitions
References

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