colorectal cancer in arizona 2008-2012

Arizona Cancer
PREVENTION & CONTROL
More People Will Live Longer

Colorectal Cancer in Arizona

2008— 2012

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Arizona Department of Health Services

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PREVENTION & CONTROL
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This report is the result of a coordinated effort by the Arizona Department of Health Services (ADHS) Cancer Prevention and Control Programs (Arizona Cancer Registry, HealthCheck Programs, and Arizona Cancer Control Program). One of the primary functions of the Arizona Cancer Prevention and Control Program is to serve as a leading resource for cancer information in Arizona. The goal is to develop a consistent message on the state of cancer in Arizona by providing current, reliable, and meaningful information on a regular basis. In 2012, Breast Cancer in Arizona 2000-2009 was produced, the first in a series of planned documents to inform stakeholders, providers, and community members about cancer in Arizona. Cervical Cancer in Arizona 2000-2010 was published in 2014 and is the second document in this series. Colorectal Cancer in Arizona 2008—2012 is the second and updated document on colorectal cancer produced by the Arizona Cancer Prevention and Control Program.

Acknowledgements

Producing a document meeting everyone's needs is challenging. It was a pleasure having a broad team of experts provide input and guidance for this document. The following all played a role in this final document:

Cancer starting in either the colon or the rectum is called colorectal cancer. One in twenty Americans will be diagnosed with colorectal cancer in their lifetime.[1] Colorectal cancer is the third most common cancer in women (after breast and lung cancer) and men (after prostate and lung cancer). It is estimated, in 2015, 93,090 cases of colon cancer and 39,610 cases of rectal cancer will be diagnosed in the United States (U.S.). Colorectal cancer will also cause an estimated 49,700 deaths in 2015.[2]

Colorectal cancer is a preventable disease that is highly treatable when diagnosed in early stages. Colorectal screening is one factor that has led to the decrease in colorectal cancer rates.   CDC data shows colorectal cancer rates dropped 26 percent in the U.S. for the latest ten years of data available.[3] In Arizona the number of persons over age 50 years that have had a colonoscopy was estimated at 63 percent in 2012.[4]

Risk factors for colorectal cancer include age, race, and personal history of bowel disease. Obesity, a diet high in animal fats, lack of exercise, smoking, alcohol use, and diabetes have also been linked to colorectal cancer. Family and genetic risk factors play a role in the development of colorectal cancer in persons with a strong family history of colorectal cancer.[5] Although family history can increase risk of colorectal cancer, 85 percent of persons that develop colorectal cancer have no family history.[6]

An average of 2,475 invasive colorectal cancer cases was reported annually between 2008 and 2012. This report analyzes only Arizona resident in situ and invasive cases reported to the Arizona Cancer Registry. The Arizona age adjusted rate for colorectal cancer cases declined 10 percent from 37.9 to 34.0 cases per 100,000 persons between years 2008 and 2012. The Arizona average annual rate for all years combined is 35.6 cases per 100,000 persons (Figure 4). This rate is significantly lower than the combined U.S. rate of 41.9 cases per 100,000 persons.

Figure 1: Comparison of Arizona and U.S. Age-Adjusted Incidence Rates* of Invasive Colorectal Cancer, 2008-2012
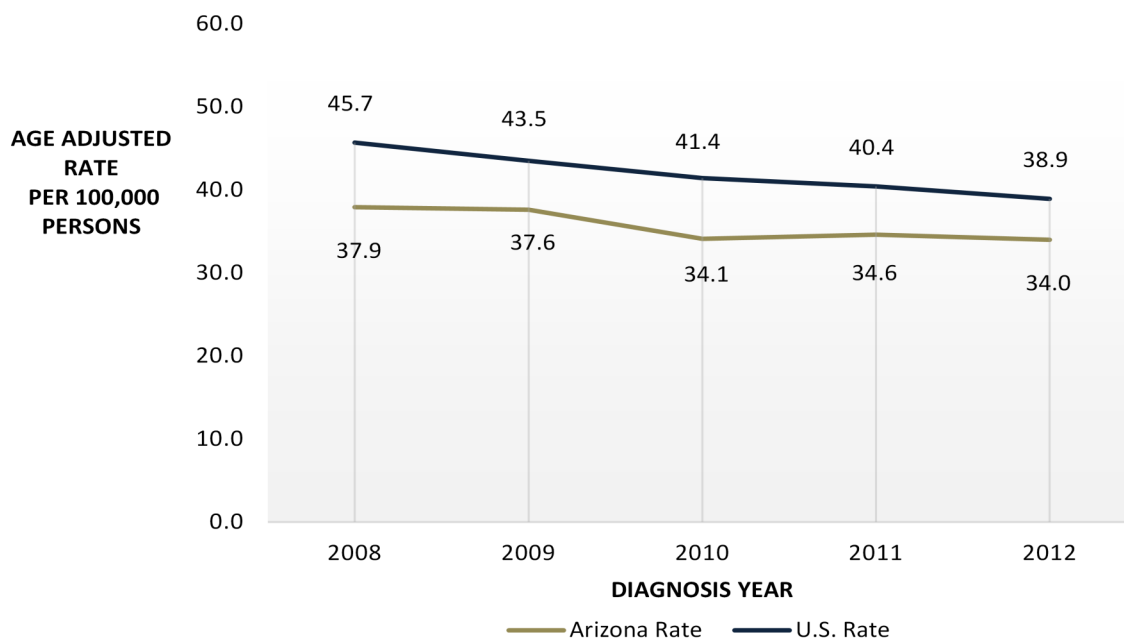
*North American Association of Central Cancer Registries (NAACCR) age adjusted incidence rates: NAACCR Fast Stats 2008-2012. North American Association of Central Cancer Registries; Based on data submitted December, 2014. Accessed at http://faststats.naaccr.org/selections.php?series=cancer on June 16, 2015.

1.American Cancer Society. Colorectal Cancer Facts & Figures 2014-2016. Atlanta: American Cancer Society, 2014. Retrieved from http://www.cancer.org/acs/groups/content/documents/document/acspc-042280.pdf on June 11, 2015. 2.American Cancer Society. Cancer Facts & Figures 2015. Atlanta: American Cancer Society; 2015. Retrieved from http://www.cancer.org/acs/groups/content/@editorial/documents/document/acspc-044552.pdf on June 11,2015. 3. United States Cancer Statistics: 1999 - 2011 Incidence, WONDER Online Database. United States Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; 2014. Accessed at http://wonder.cdc.gov/cancer-v2011.html on June 11, 2015 4. Black, J, ARIZONA HEALTH STATUS AND VITAL STATISTICS, 2014. Bureau of Public Health Statistics, Arizona Department of Health Services. 5. Mayo Clinic, Mayo Clinic Diseases and Conditions Colon Cancer. Mayo Clinic Staff. Retrieved from http://www.mayoclinic.org/diseases-conditions/colon-cancer/basics/risk-factors/con-20031877 on June 10, 2015.
6. American Society for Gastrointestinal Endoscopy. What is colon cancer? Retrieved from: http://www.screenforcoloncancer.org/aboutCRC.asp on June 11, 2015.

Unfortunately, being under 50 years old is not always a protective factor against colorectal cancer. While CRC incidence and mortality rates are slowly decreasing among all age groups 50 years and older, they are increasing in younger individuals for whom screening is restricted and crucial symptoms often go unrecognized.[1] A recent study discovered that from 2001-2011 in the U.S., young onset (under 50 years) CRC rates have increased 2.1 percent annually compared to an annual 2.5 percent decrease among those 50 and over.[1] Nationally, 3 out of 4 young onset colon cancer patients are diagnosed in their forties.[1] Further, current national data shows that 11 percent of colon cancers and 18 percent of rectal cancers occur in individuals under 50.[2]

Compounding the concerns over rising rates in young onset CRC are the late stage diagnoses that are accompanying them. In Arizona in 2012, 55.7 percent of individuals ages 0-39 with colorectal cancer were diagnosed at a late stage and approximately 56 percent of individuals diagnosed with CRC ages 40-49 were diagnosed with late stage.

Colorectal cancer typically does not present with symptoms until the disease is late stage. However, most patients developing CRC under the age of 50 are not diagnosed until they have symptoms, and therefore have late stage disease. For this reason, USPSTF guidelines state that symptomatic individuals under 50 be screened for colorectal cancer.

> "Primary care physicians have an important opportunity to identify high-risk young individuals for screening and to promptly evaluate CRC symptoms. Risk modification, targeted screening, and prophylactic surgery may benefit individuals with a predisposing hereditary syndrome or condition, a family history of CRC or advanced adenomatous polyps. When apparently average-risk young adults present with CRC-like symptoms (i.e., unexplained persistent rectal bleeding, anemia, and abdominal pain), endoscopic work-ups can expedite diagnosis. Early screening in high-risk individuals and thorough diagnostic evaluation in symptomatic young adults may improve young-onset CRC trends."[1]

[1] Ahnen, D. J., Wade, S. W., Jones, W. F., et. al.. The Increasing Incidence of Young-Onset Colorectal Cancer: A Call to Action. *Mayo Clinic Proceedings,* 2014; *89 (2),* 216-224. Available from http://www.mayoclinicproceedings.org/article/S0025-6196(13)00822-7/fulltext. Accessed September 14, 2014.

[2] Facts about Colorectal Cancer. Fight Colorectal Cancer Web site. http://fightcolorectalcancer.org/learn-about-colorectal-cancer/colorectal-cancer-statistics/. Accessed September 14, 2014.

Approximately three out of every 100 colon cancers are caused by Lynch syndrome.[1] People with Lynch syndrome, also known as hereditary nonpolyposis colorectal cancer (HNPCC), may occasionally have noncancerous (benign) growths (polyps) in the colon, called colon polyps.[2] Persons with this disorder often have colon polyps occur earlier but not in greater numbers than they do in the general population.[2]

Lynch syndrome and other syndromes that are inherited in autosomal dominant fashion account for <5 percent of all CRC cases. The majority of CRC cases with a familial component are in this category by virtue of having a first degree relative who was previously diagnosed. This category accounts for as many as 20-25 percent of CRC cases. With Lynch syndrome or familial adenomatous polyposis (FAP), 50% of the children in every generation of an affected relative are diagnosed with CRC.

"People with Lynch syndrome may experience:
- ⇒ *Colon cancer that occurs at a younger age, especially before age 50*
- ⇒ *A family history of colon cancer that occurs at a young age*
- ⇒ *A family history of endometrial cancer*
- ⇒ *A family history of other related cancers, including:*
  - ∗ *Ovarian cancer*
  - ∗ *Kidney cancer*
  - ∗ *Stomach cancer*
  - ∗ *Small intestine cancer*
  - ∗ *Liver cancer and other cancers"[1]*

"The very first line of defense in the survival of Lynch Syndrome is knowing one's family history."
Lynch Syndrome International

1. Lynch Syndrome. Diseases and Conditions. Mayo Clinic Web site. http://www.mayoclinic.org/diseases-conditions/lynch-syndrome/basics/definition/con-20025651. Published March 10, 2012. Accessed September 16, 2014.

2. Lynch Syndrome. Genetics Home Reference. National Library of Medicine Web site. http://ghr.nlm.nih.gov/condition/lynch-syndrome. Reviewed May 2013. Accessed September 16, 2014.

Reducing Colorectal Cancer in Arizona:
The Statewide Role and Involvement of Arizona Department of Health Services

The Office of Cancer Prevention and Control with the Bureau of Health Systems Development at the Arizona Department of Health Services (ADHS) supports colorectal cancer awareness, prevention, and early detection through collaborative partnerships with the Colon Cancer Alliance, Arizona Alliance for Community Health Centers, American Cancer Society, and federally qualified health centers (FQHCs) across the state. Through this work, ADHS is committed to achieving the national goal of "80% by 2018".

ADHS and the Undy Run/Walk

In 2008, ADHS and the Colon Cancer Alliance (CCA) struck a public-private partnership with a singular goal in mind: to raise awareness of colorectal cancer and reduce the burden of the disease among Arizonans.

Arizona is fortunate to have a passionate and dedicated network of volunteers who belong to one of only two local CCA chapter affiliates in the country. ADHS supports the CCA Voices of Central Arizona Chapter by promoting the annual Undy Run/Walk, an annual 5k run/walk and awareness event held by the Colon Cancer Alliance. Proceeds generated from the Undy Run/Walk are split between the national organization and the local chapter. Through this special public-private partnership, half of the local funds are in turn awarded to the Arizona Department of Health Services.

With these funds, ADHS is able to partner with several clinics across the state to help serve patients: Mountain Park Health Center in Phoenix, El Rio Community Health Center in Tucson, North Country HealthCare in Flagstaff, and Hopi Cancer Support Services on the Hopi Tribe reservation. These organizations submitted project proposals and were selected through the state procurement process in 2014.

The Undy Run/Walk funds are specifically designated for uninsured patients entering these clinic locations who present with symptoms indicative of colorectal cancer. These patients are eligible to receive a colonoscopy covered by the Undy Run/Walk funds. If an uninsured patient is diagnosed with colorectal cancer, the funds are available to pay insurance premiums while the patient receives treatment.

Quality Improvement to Increase Colorectal Cancer Screening Rates

In addition to this work, the Office of Cancer Prevention and Control at ADHS continues to support all community clinics across the state assess their colorectal cancer screening rates and provide technical assistance and training to improve their rates. The office partners with the Arizona Alliance for Community Health Centers (AACHC), the state's primary care association, to work with quality improvement managers from federally qualified health centers (FQHCs) and FQHC Look Alike clinics. In 2015, members of the AACHC Quality Improvement Committee (QIC) selected colorectal cancer screening as their focused project. Through the establishment of evidence-based interventions (EBIs) and systems change strategies, clinic quality improvement managers can directly impact their clinic's colorectal cancer screening rates.

Facts surrounding the status of colorectal cancer screening nationwide are clear: not enough Americans are up-to-date on their screenings, and too many are being diagnosed with colorectal cancer at late stages.

As a result of these statistics, the Centers for Disease Control and Prevention (CDC), the American Cancer Society, National Colorectal Cancer Roundtable, and Health Resources Services Administration (HRSA) kicked off the "80% by 2018" initiative in March 2014 to prioritize colorectal cancer screenings nationwide. This movement aims to get 80% of Americans 50 and older screened for colorectal cancer by the year 2018.

The National Colorectal Cancer Roundtable has compiled resources and materials to support the movement on their website, NCCRT.org, including tools specifically tailored for provider education, public education, policy action, and addressing disparities.

Dozens of organizations across the U.S. have already committed to the fight against colorectal cancer and have taken the 80% by 2018 Pledge. By signing the pledge, organizations confirm their support for the shared goal to eliminate colorectal cancer as a major public health problem.

To view the community resources and to take the pledge, visit the NCCRT's website.

The large intestine is comprised of the colon, rectosigmoid junction, and the rectum. The colon has four sections. The first section of the colon is the ascending colon; it starts with the cecum, a pouch where food is received from the small intestine, and continues upward along the right side of the abdomen. The hepatic flexure connects the ascending colon with the second section, the transverse colon. The transverse colon crosses the body from the right to the left side. It is connected to the third section, the descending colon, by the splenic flexure. The descending colon moves down the left side of the body. The fourth section, the sigmoid colon, joins the rectosigmoid junction.[7] The rectosigmoid junction joins the colon to the rectum. The rectum has more cases (20%) than any of the sites analyzed in colorectal cancer. The sigmoid colon and the cecum follow with 17 and 15 percent of the colorectal cancer cases (Figure 2).

Figure 2: Colorectal Sites* of Invasive Cancer, 2008-2012
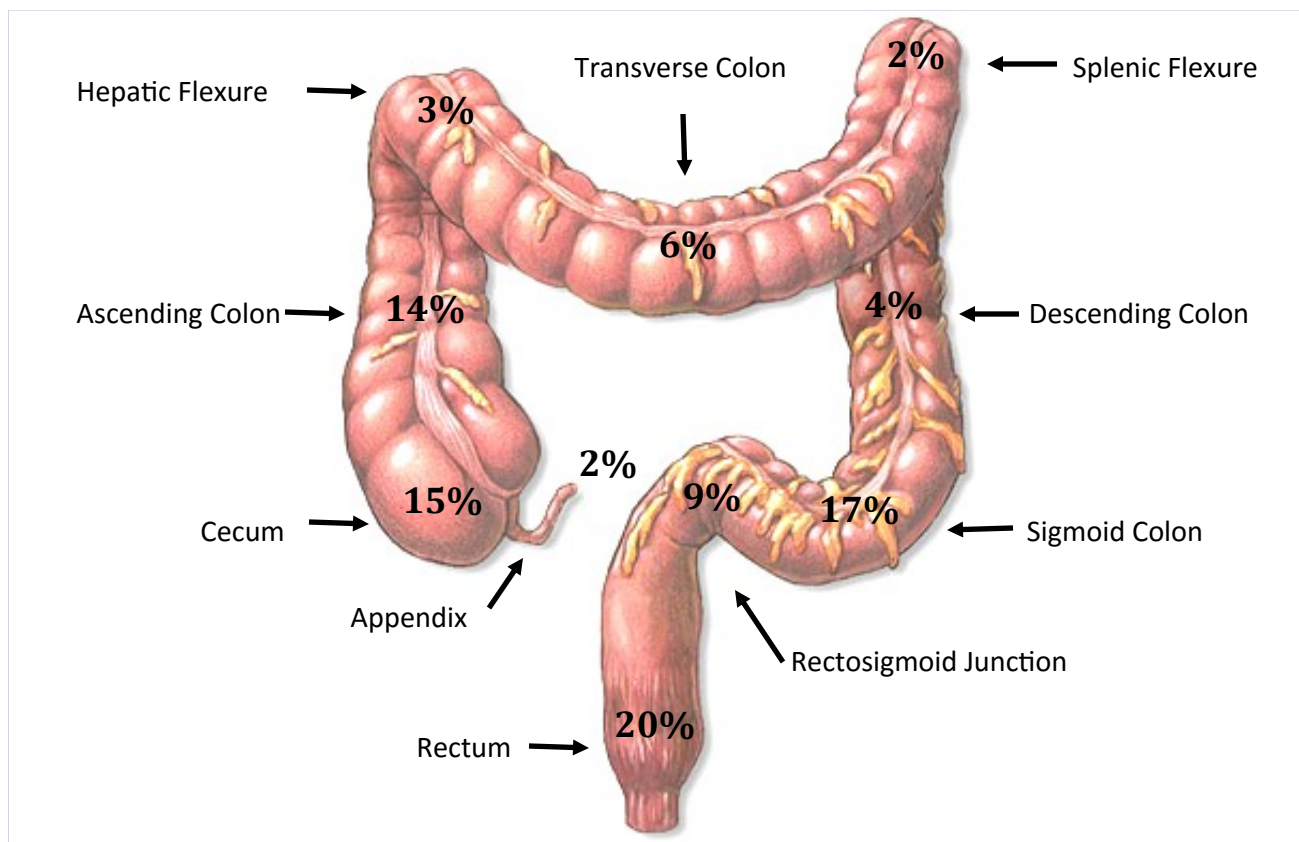
Note: 10% of colorectal cancer cases had no specific colorectal site.
Due to rounding the total percent equals more than 100 percent.

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*Colorectal diagram adapted from: U.S. National Library of Medicine. MedlinePlus. Large intestine anatomy. http://www.nlm.nih.gov/medlineplus/ency/imagepages/9206.htm. Accessed June 6, 2015.
7. Colorectal Cancer Facts & Figures 2014-2016.

In the years 2008 to 2012, Mohave and Graham counties had the highest incidence rate of colorectal cancer (47.2 and 45.8 cases per 100,000 persons). Apache and Coconino counties had the lowest rate colorectal cancer (23.4 and 26.4 cases per 100,000 persons) (Figure 3).

Figure 3: Invasive Colorectal Cancer in Arizona Average Annual Counts* and Age Adjusted Rates by County** 2008-2012
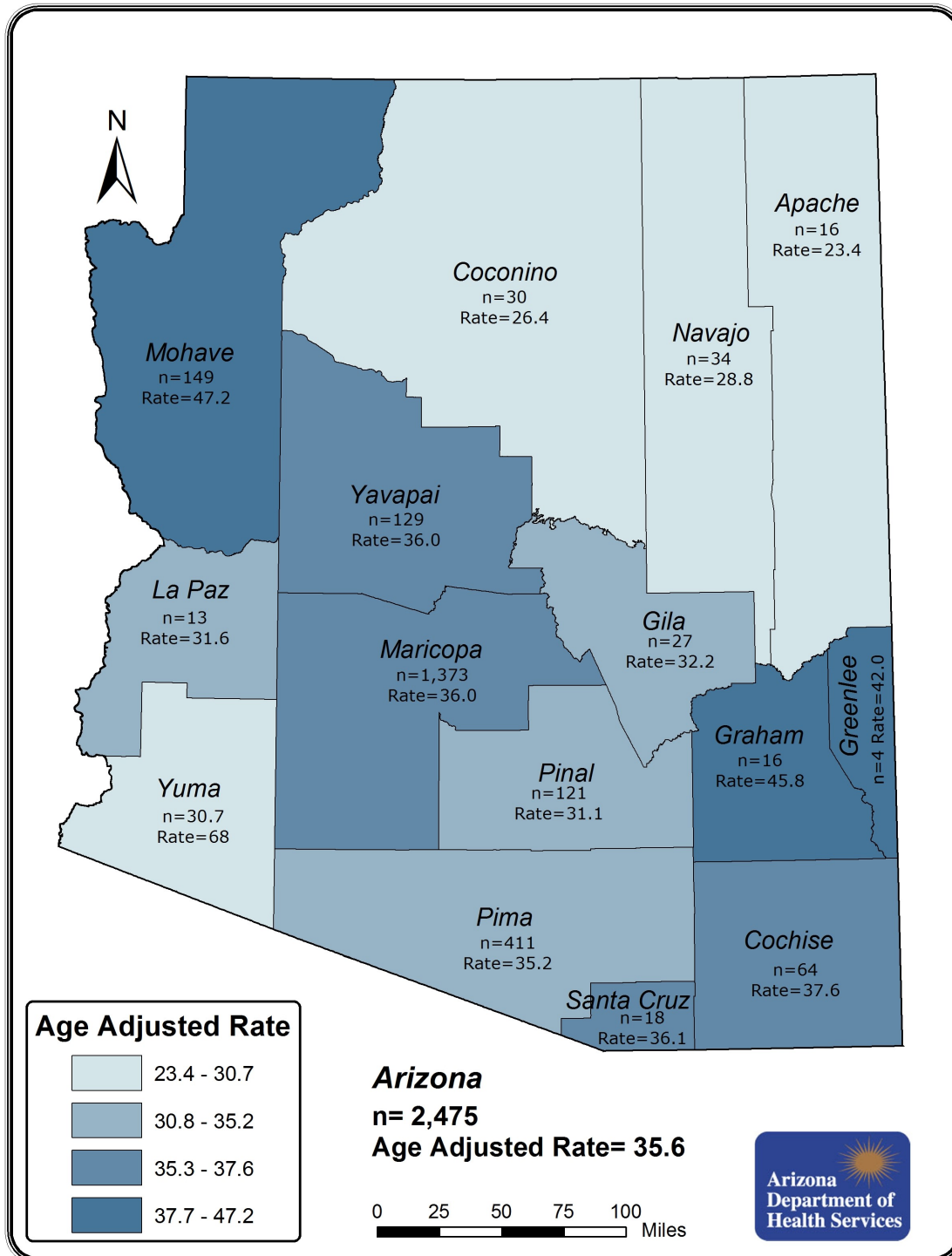
*Case counts (n) represent the average number of cases reported per year for the years 2008-2012.

**An average of 2 cases per year had an unknown county.

Age Specific Rate and Age Group

The risk of developing colorectal cancer grows as a person ages. Beginning at age 50 years a person's risk for developing colorectal cancer dramatically increases and is greatest among persons 60 years and older (Figures 4 and 5). The median age for Arizonans being diagnosed with invasive colorectal cancer is 70 years.

Figure 4: Age Specific Rate of Invasive Colorectal Cancer Incidence and Average Annual Case Count by Age Group for Diagnosis, 2008–2012, Arizona

AGE SPECIFIC INCIDENCE RATE PER 100,000 PERSONS

146.1

1,817 cases per year

52.0

413 cases per year

(72 cases per year)

20.7

173 cases per year

2.0

| 0-39 yrs | 40-49 yrs | 50-59 yrs | 60 yrs and older |
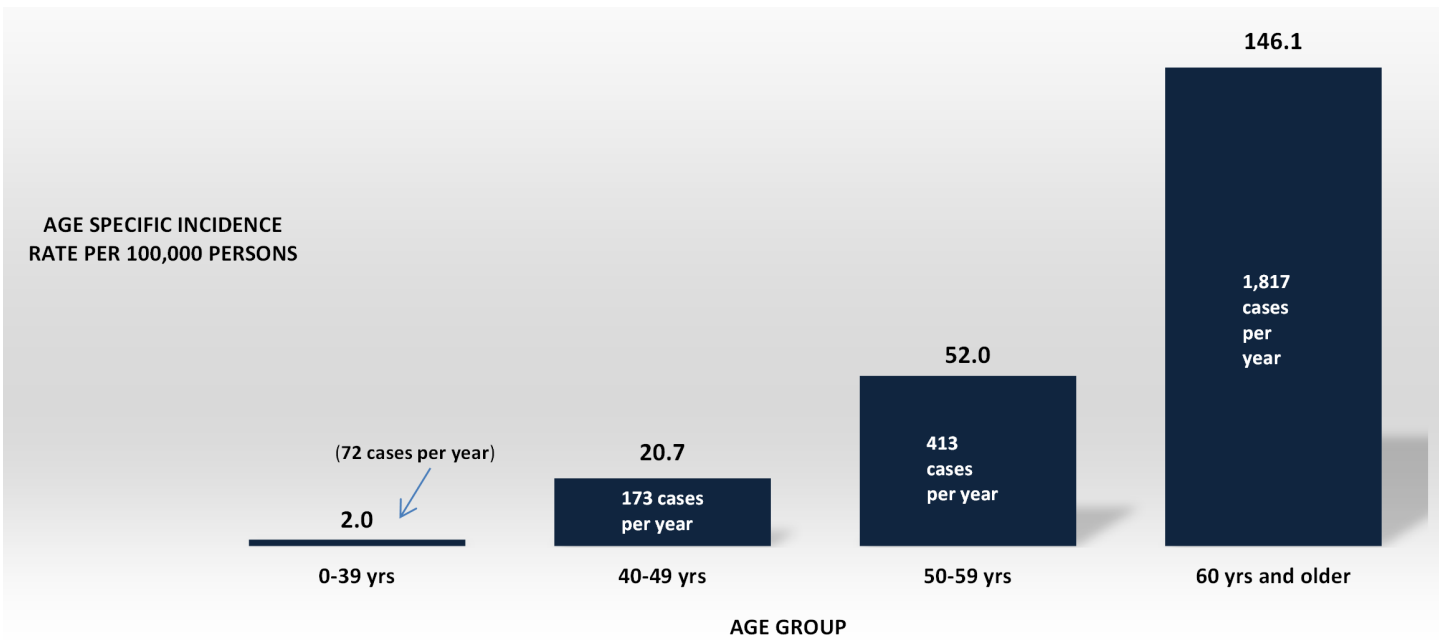
AGE GROUP

Figure 5: Colorectal Cancer Case Count* by Age Group and Diagnosis Year, 2008–2012, Arizona

CASE COUNTS

	2008	2009	2010	2011	2012
0-39 yrs	73	76	69	77	70
40-49 yrs	193	165	162	168	184
50-59 yrs	421	433	405	417	437
60 yrs and older	1831	1918	1784	1845	1877
Total	2518	2592	2420	2507	2568

* Case count includes in situ and invasive cases.　　DIAGNOSIS YEAR
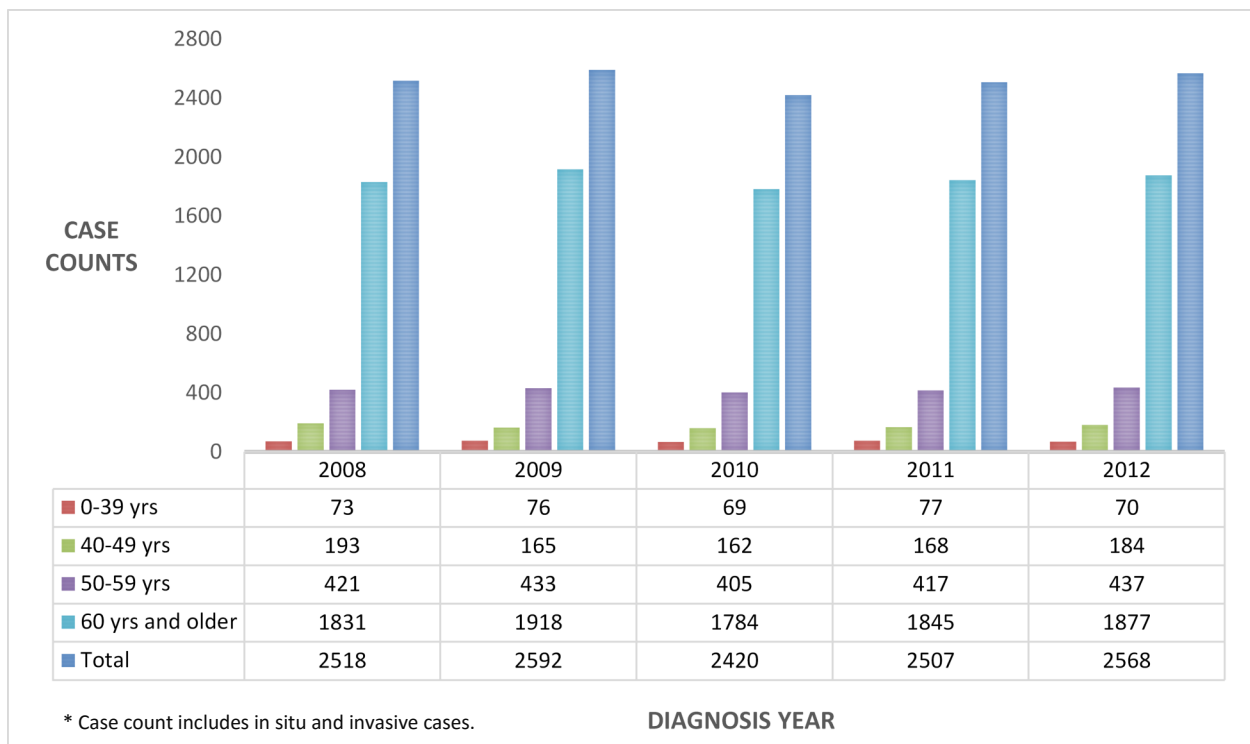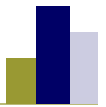
White Non-Hispanic persons comprise greatest proportion of colorectal cancer cases (79.6%). White Hispanics (11.7) make up the next largest race/ethnicity group (Figure 6). White Non-Hispanics also had the highest age adjusted incidence rate in Arizona in 2012 at 35.7 cases per 100,000 persons. They were followed by Blacks at 31.0 cases per 100,000 persons (Figure 7).

Figure 6: Percent of Invasive Colorectal Cancer by Race/Ethnicity, 2008—2012

RACE/ETHNICITY

■ White Non-Hispanic ■ White Hispanic ■ Other Race Groups ■ Unknown
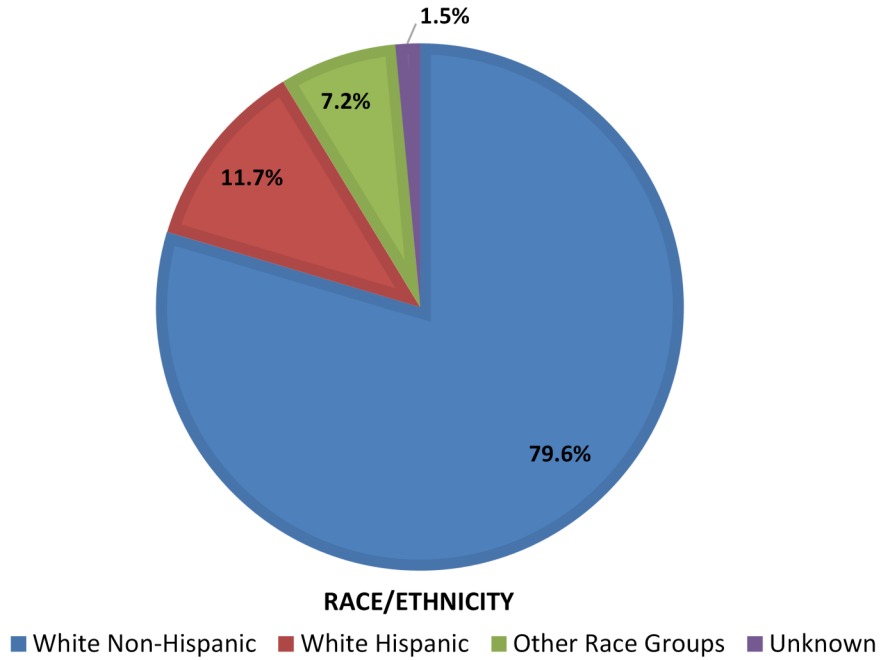
Figure 7: Age-Adjusted Colorectal Cancer Incidence Rates Race/Ethnicity and Sex by Diagnosis Year, 2008—2012

AGE ADJUSTED RATE PER 100,000 PERSONS

	2008	2009	2010	2011	2012
White Non-Hispanic	38.4	37.4	34.3	35.2	35.7
White Hispanic	29.6	35.6	29.6	32.5	27.1
Black	44.5	38.5	40.7	39.5	31.0
American Indian*	33.0	29.2	29.2	17.6	29.3
Asian & PI*	29.7	27.4	20.8	33.9	18.8
Male	44.3	42.3	37.8	39.8	39.7
Female	32.2	33.4	30.8	30.2	29.1

DIAGNOSIS YEAR
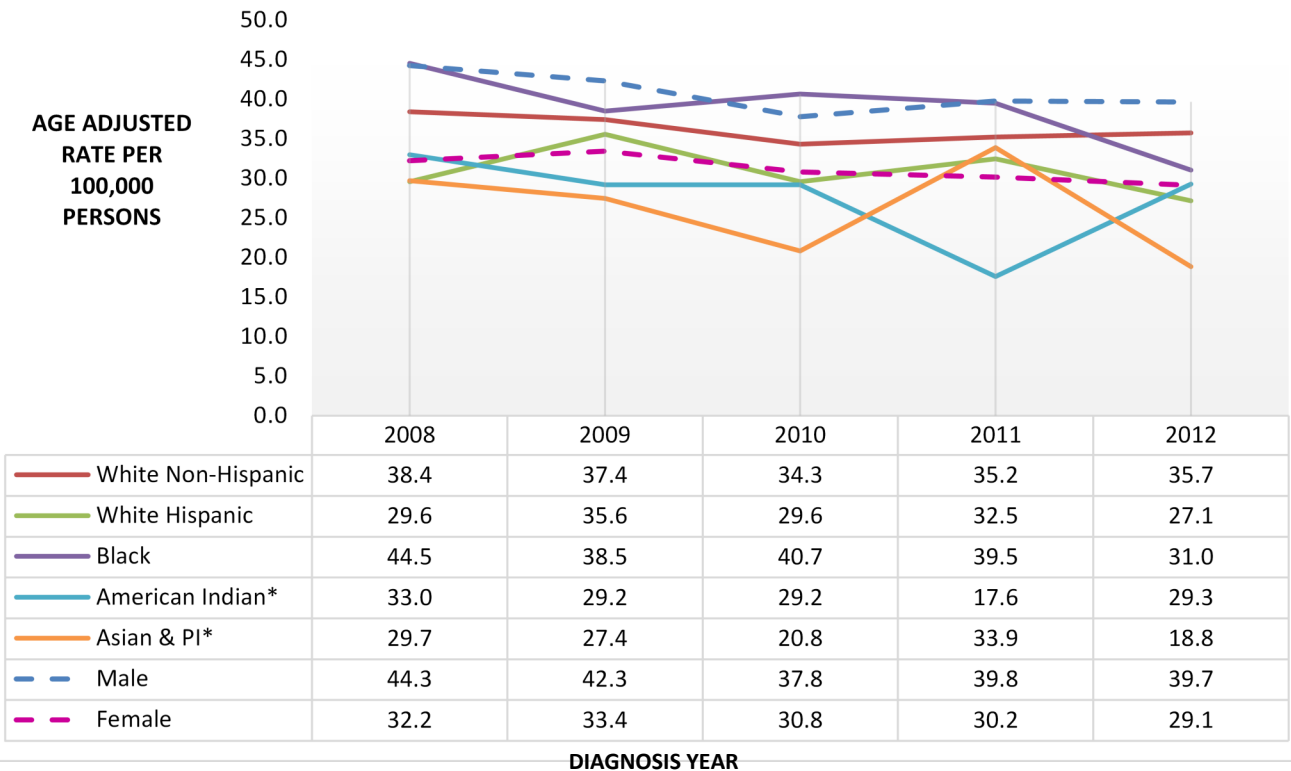
* Year to year case count variability was identified in reported cases of American Indians as well as Asian & Pacific Islanders.
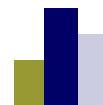
Adenocarcinoma Not Otherwise Specified (NOS) made up two thirds of all colorectal cancer cases. Another 9.4 percent are composed of polyps/adenomas (e.g., adenocarcinoma in a polyp). Other adenocarcinoma subtypes add another 11.3 percent of the colorectal cancer cases. The remaining 12.4 percent of cases are composed of: 1) carcinoid tumors, 2) malignant neoplasms, NOS 3) epithelial, basal and squamous cell histological types, and 4) all other histology subtypes (Figure 8).

Figure 8: Histology Percent of Invasive Colorectal Cancer Cases, 2008-2012
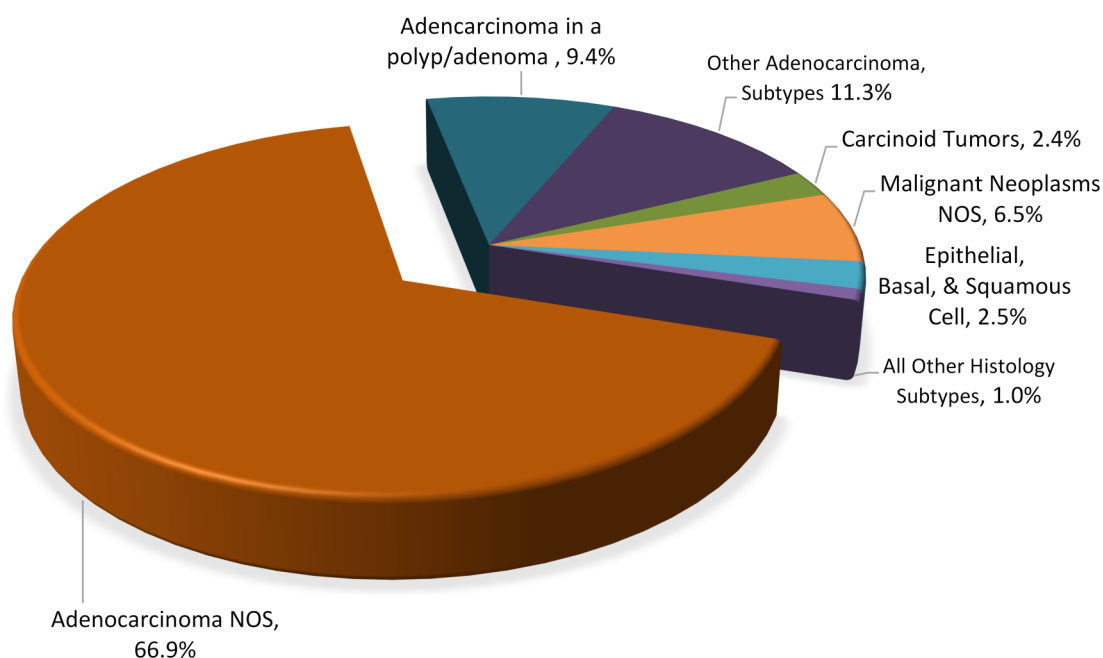
Figure 9: Percentage of Colorectal Cancer Cases by SEER Summary Stage,* 2008-2012

Colorectal Cancer Staging

Almost half (47.5%) of all colorectal cancer cases are staged in a regional or distant stage (late stage). These cases have a poorer chance of survival than do cases staged in a local or in situ stage (Figure 9).
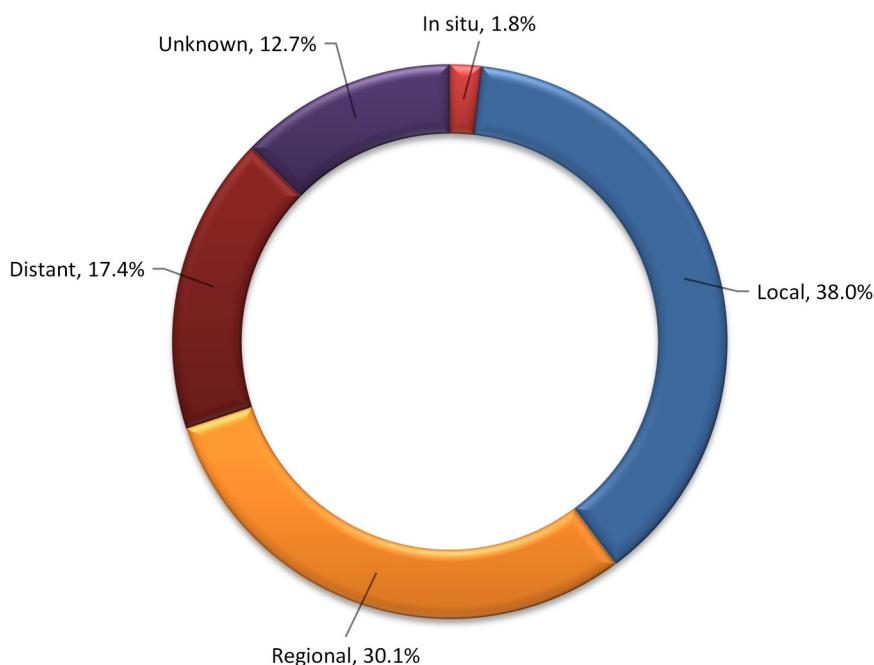
*Summary Stage is the Surveillance Epidemiology and End Results (SEER) Summary Stage 2000

Cases with a White Hispanic race/ethnicity have the greatest proportion of cases diagnosed in late stage. Fifty two percent of their cases were diagnosed in late stage in 2012. They were followed by cases with a White Non-Hispanic (49%) and Asian and Pacific Islander (48%) race/ethnicity in 2012 with a late stage diagnosis. For all years combined Asian and Pacific Islander race/ethnicity has the highest percent of cases with a late stage diagnosis (57%) while American Indians and White Non-Hispanics have the lowest percent of cases (47%) with a late stage diagnosis (Figure 10).

Figure 10: Early/Late Stage* by Race Ethnicity and Diagnosis Year Colorectal Cancer, 2008-2012
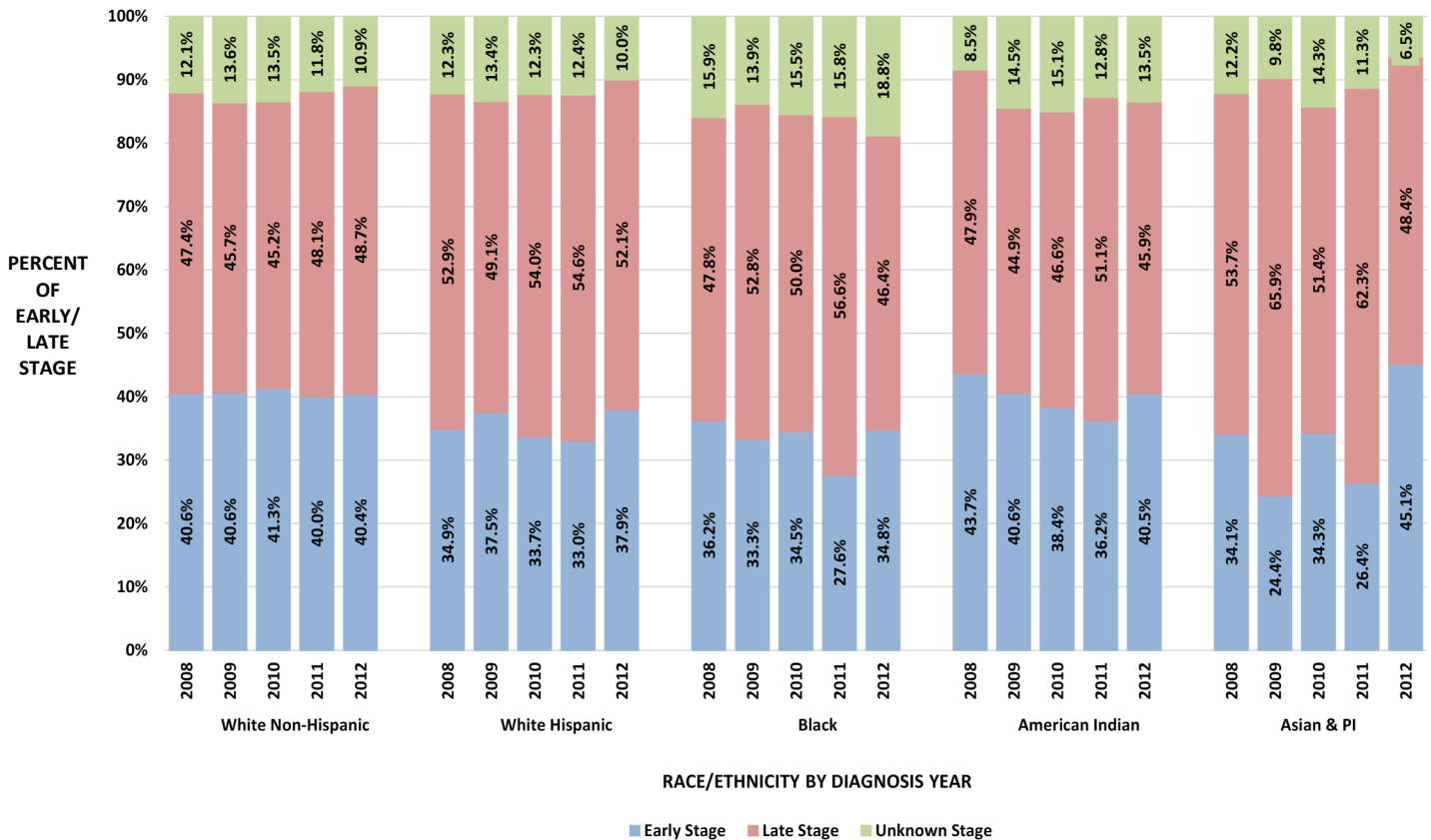
* Early Stage = In Situ and Local Stage; Late Stage = Regional and Distant using SEER Summary

The youngest age groups (0-39 yrs. and 40-49 yrs.) had the highest percentage of cases with a late stage diagnosis (56% for both age groups) in 2012. Persons age 60 years and older had the lowest percent of late stage cases (47%) in 2012. For all years combined the youngest groups (0-39 yrs. and 40-49 yrs.) had the highest percentage of late stage cases (58% and 56%) in late stage (Figure 11).

Figure 11: Early/Late Stage* by Age Group and Diagnosis Year, Colorectal Cancer, 2008-2012

PERCENT OF EARLY/LATE STAGE

AGE GROUP BY DIAGNOSIS YEAR

Early   Late   Unknown
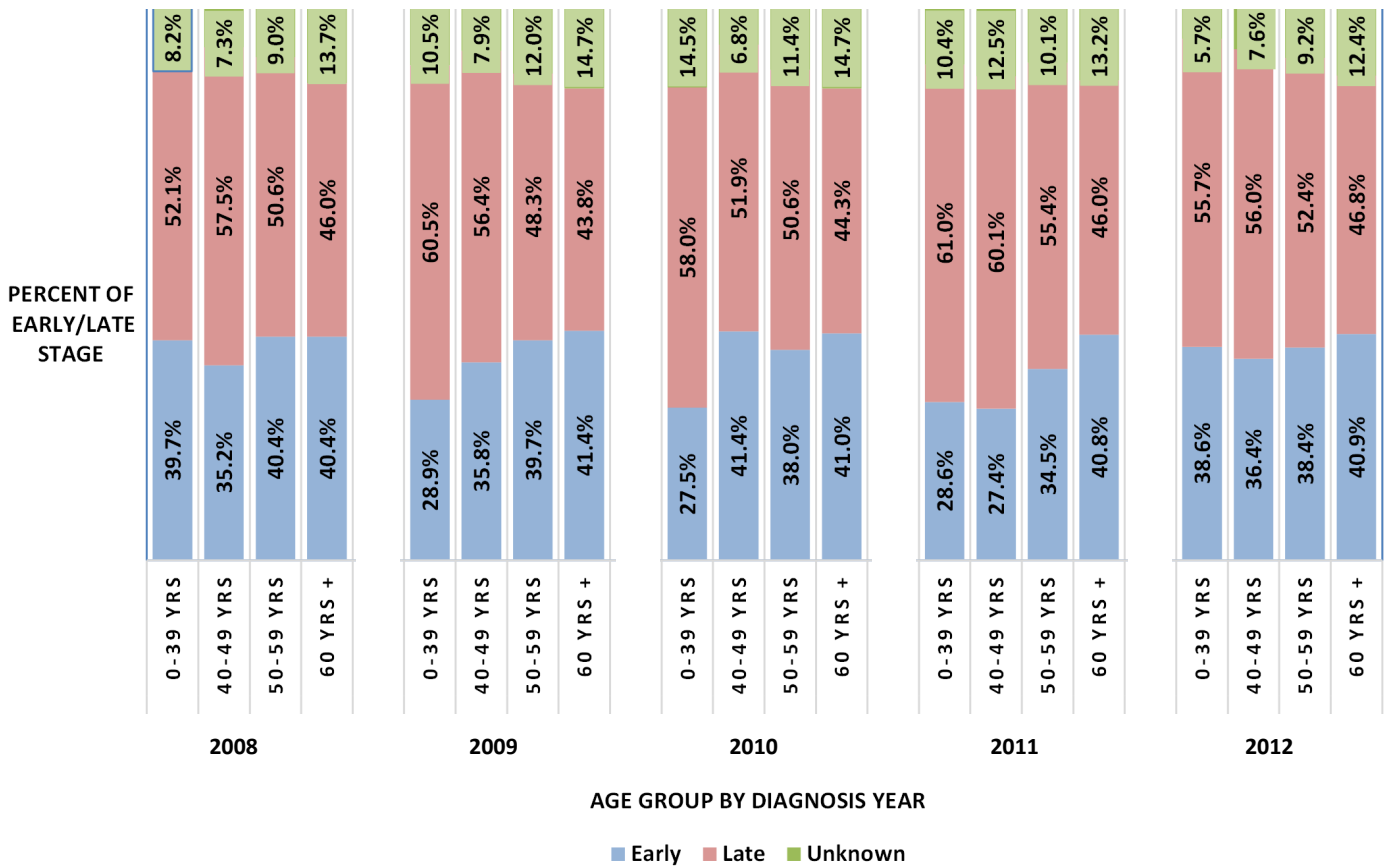
* Early Stage = In Situ and Local Stage; Late Stage = Regional and Distant using SEER Summary Stage

Stage of disease at diagnosis impacts the length of survival of a person with colorectal cancer. Persons diagnosed with a local stage had an 86.2 percent relative five year survival rate. Persons diagnosed with a distant stage had a five year relative survival rate of 9.9 percent (Figure 12).

Figure 12: Five Year Relative Survival of Invasive Colorectal Cancer by Stage, 1995-2009

PERCENT RELATIVE SURVIVAL

	1 yr	2 yrs	3 yrs	4 yrs	5 yrs
Local	95.8	94.7	92.8	89.6	86.2
Regional	88.6	80.8	73.4	67.0	62.2
Distant	47.0	28.1	18.1	12.6	9.9
Total	80.8	73.0	66.9	61.8	58.0

YEARS SURVIVED AFTER YEAR OF DIAGNOSIS
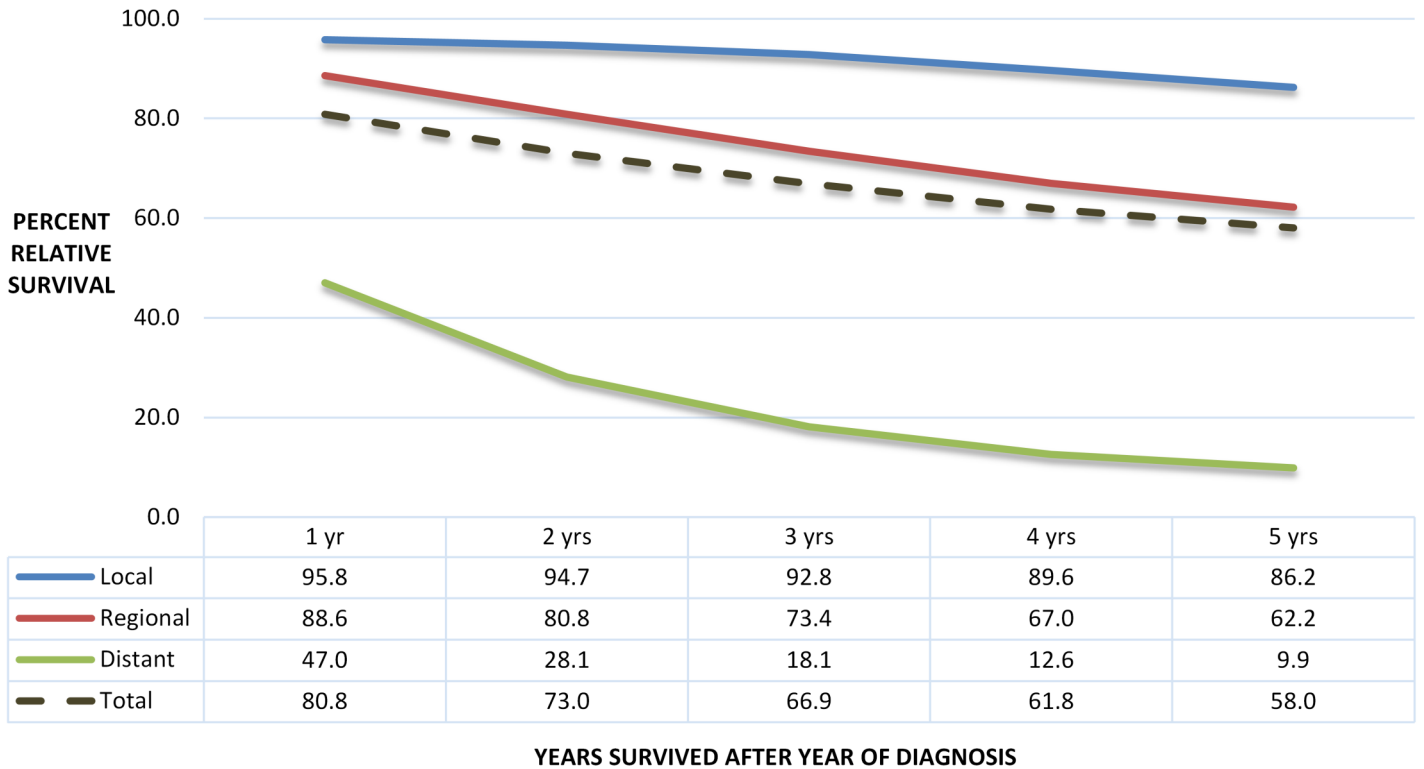
The race and ethnicity of persons diagnosed with colorectal cancer (in years 1995-2009) also impacted colorectal cancer survival. White Non-Hispanics had the greatest percent of persons surviving five years (59%) while Blacks and American Indians had the lowest survival rate (49% and 47% respectively) (Figure 13).

Figure 13: Five Year Relative Survival of Invasive Colorectal Cancer by Race for Diagnosis, 1995-2009

	1 yr	2 yr	3 yr	4 yr	5 yr
White Non-Hispanic	80.8	73.2	67.5	62.7	59.0
White Hispanic	80.7	71.6	63.4	56.5	52.0
Black	78.8	67.1	58.7	52.3	48.9
American Indian	79.1	69.1	58.9	51.7	46.5
Asian & PI	83.8	75.8	68.0	59.1	56.8
All Races	80.8	73.0	66.9	61.8	58.0

YEARS SURVIVED AFTER YEAR OF DIAGNOSIS
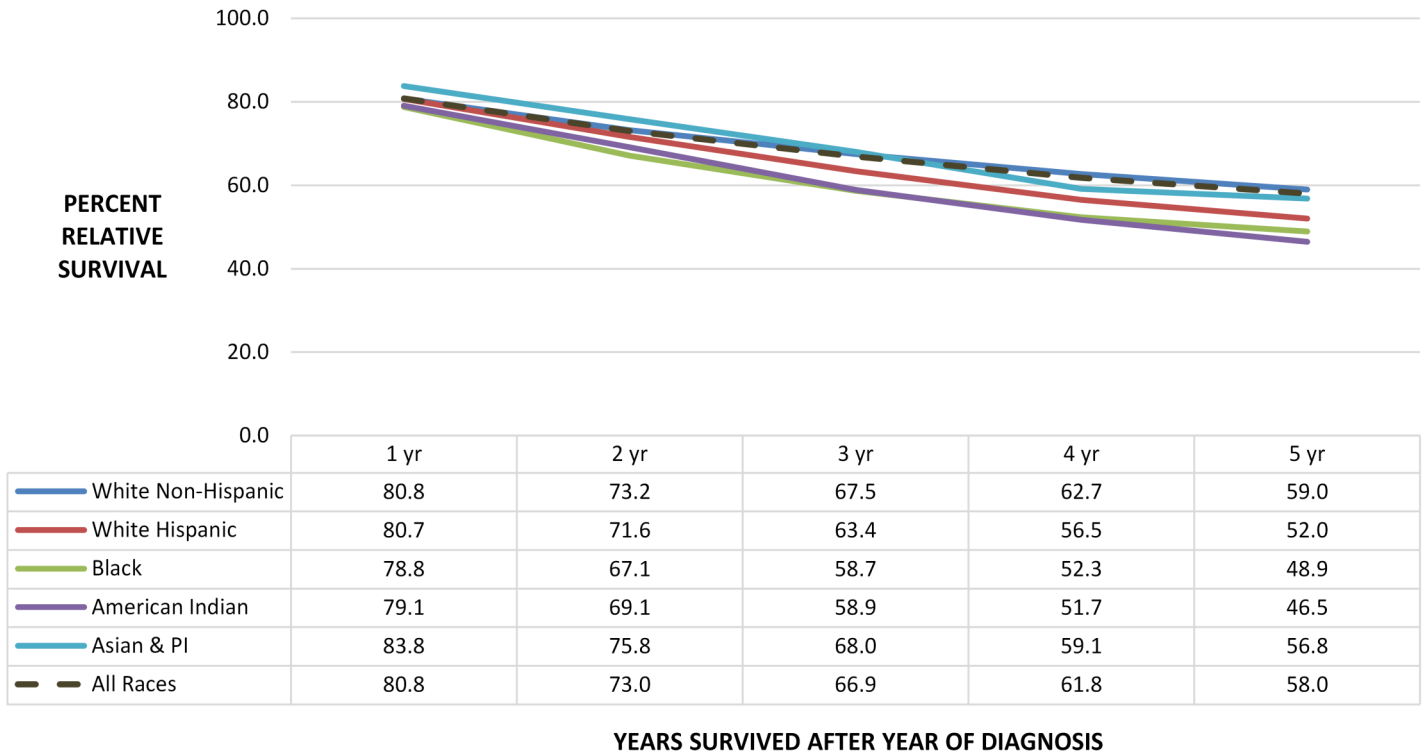
In the five combined years from 2008 to 2012, Mohave, Graham and Apache counties had the highest mortality rate of colorectal cancer (16.5, 16.1, and 15.7 cases per 100,000 persons). Greenlee**, Coconino, and La Paz counties had the lowest colorectal cancer mortality (7.7, 9.9, and 9.9 cases per 100,000 persons) (Figure 14).

Figure 14: Colorectal Cancer Mortality in Arizona
Average Annual Counts* and Age Adjusted Rates by County*** 2008-2012
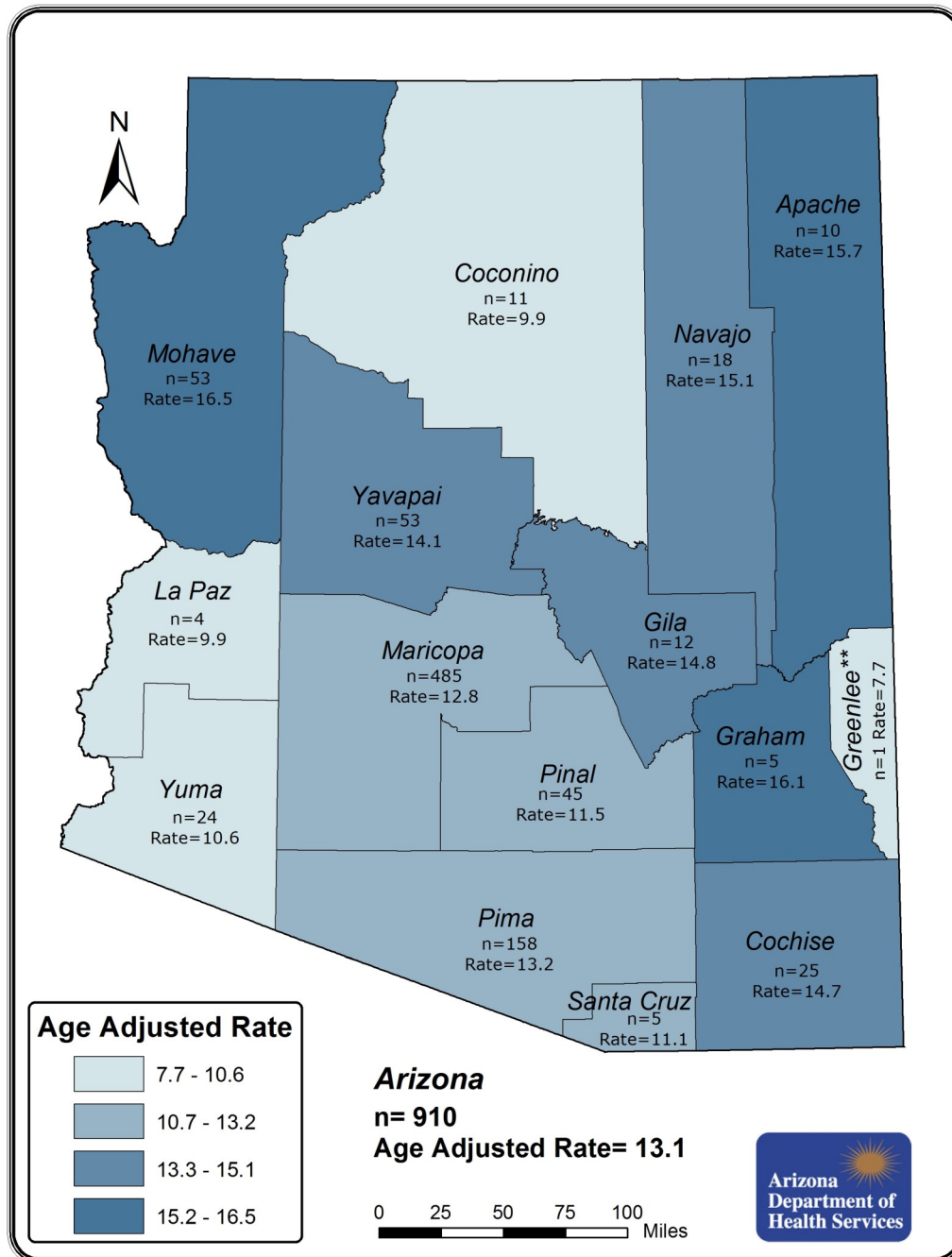
N

Apache
n=10
Rate=15.7

Coconino
n=11
Rate=9.9

Navajo
n=18
Rate=15.1

Mohave
n=53
Rate=16.5

Yavapai
n=53
Rate=14.1

La Paz
n=4
Rate=9.9

Gila
n=12
Rate=14.8

Maricopa
n=485
Rate=12.8

Greenlee**
n=1 Rate=7.7

Graham
n=5
Rate=16.1

Pinal
n=45
Rate=11.5

Yuma
n=24
Rate=10.6

Pima
n=158
Rate=13.2

Cochise
n=25
Rate=14.7

Santa Cruz
n=5
Rate=11.1

Age Adjusted Rate

	7.7 - 10.6
	10.7 - 13.2
	13.3 - 15.1
	15.2 - 16.5

Arizona
n= 910
Age Adjusted Rate= 13.1

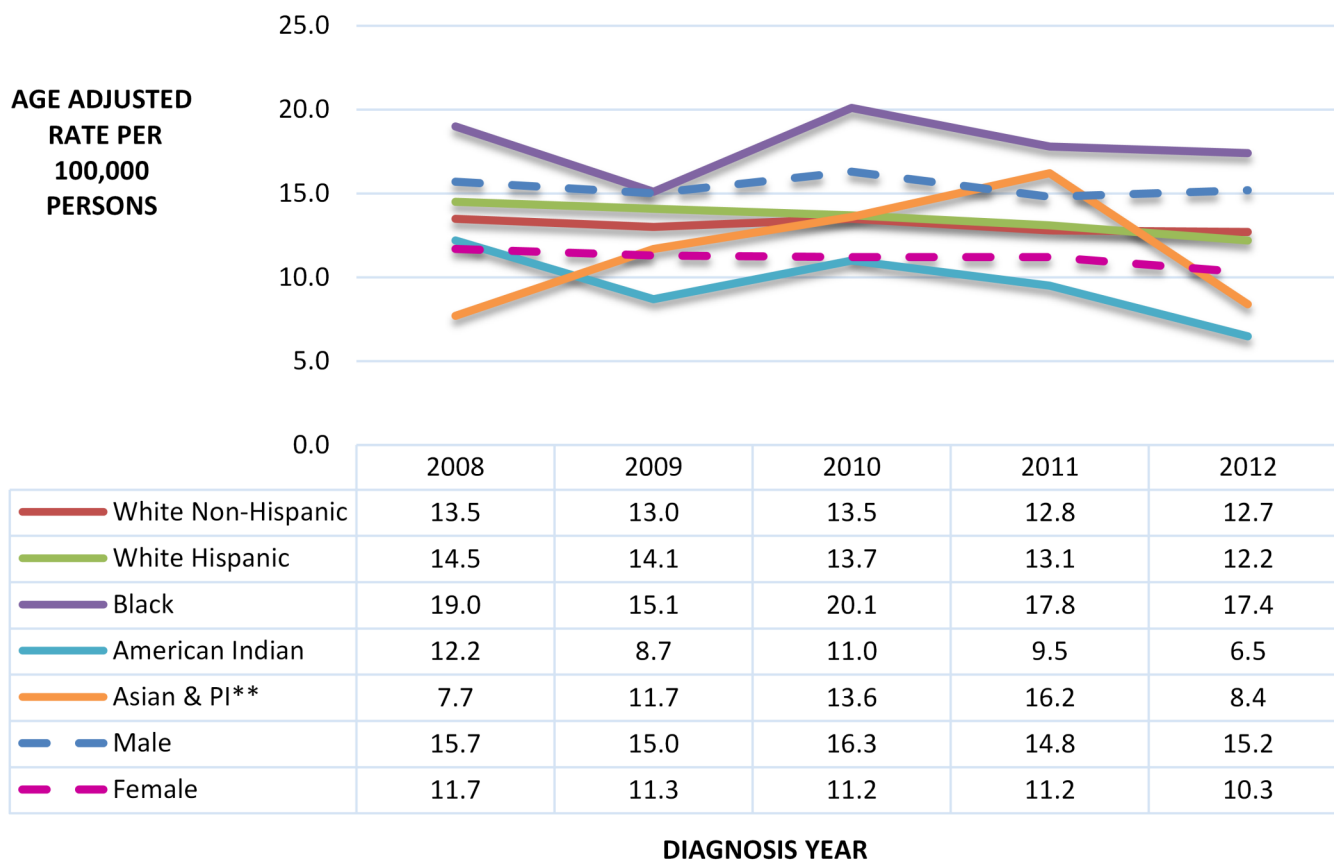0   25   50   75   100
Miles

Arizona
Department of
Health Services

*Case counts (n) represent the average number of cases reported per year for the years 2008-2012.

** Total counts for this county <10. Therefore, rates are highly unstable and should be used with caution.

 ***An average of 1 case per year had an unknown county.

The White Hispanic colorectal mortality has declined 15.9 percent over the last five years. Low case counts occurred among American Indians and Asian & Pacific Islanders that caused the rate to vary from year to year. As an example, among Asian Pacific Islanders there were only 8 colorectal cancer deaths in 2008 (the year of the lowest age adjusted rate) and 23 colorectal cancer deaths in 2011. Comparing the age adjusted mortality rates of 2008 to those from 2012 found that the mortality rate of White Non-Hispanics has declined 5.9 percent; the Black rate fell 8.4 percent; the American Indian rate dropped 46.7 percent, and the Asian Pacific Islander rate increased 9.1 percent. The colorectal cancer age adjusted mortality rate among males has decreased 3.2 percent and 12 percent among females when comparing 2008 to 2012 (Figure 15).

Figure 15: Age-Adjusted Colorectal Cancer Mortality Rates by Race/Ethnicity* and Sex, 2008-2012

	2008	2009	2010	2011	2012
White Non-Hispanic	13.5	13.0	13.5	12.8	12.7
White Hispanic	14.5	14.1	13.7	13.1	12.2
Black	19.0	15.1	20.1	17.8	17.4
American Indian	12.2	8.7	11.0	9.5	6.5
Asian & PI**	7.7	11.7	13.6	16.2	8.4
Male	15.7	15.0	16.3	14.8	15.2
Female	11.7	11.3	11.2	11.2	10.3

DIAGNOSIS YEAR

* Total of 11 cases had an unknown race.
** Counts for these races are <10 for some or all of the years. Therefore, rates are highly unstable and should be used with caution.

This colorectal cancer report includes cases diagnosed from years 2008 through 2012. Survival analysis data uses cases diagnosed from 1995 through 2009. The data for this report were retrieved from the Arizona Cancer Registry database on May 15, 2015. This report includes both invasive and insitu colorectal cancer cases for staging percent rates and age group counts. Analysis of age adjusted rates and age specific rates only include invasive cases. This approach was used to create data comparable to the Surveillance, Epidemiology, and End Results (SEER) program reports. This report used the SEER definitions of the cases by cancer type. Cases were classified by primary site and/or histologic type, behavior, race and ethnicity, age at diagnosis, sex and county of residence at diagnosis.

Data Sources

The data for this report is from the Arizona Cancer Registry (ACR). The ACR is a population based surveillance system that is designed to collect, manage and analyze information on incidence, survival, and mortality of Arizona residents diagnosed with cancer. Cancer is mandated to be reported to the ACR according to Arizona Revised Statute §36-133. Cancer cases are received from hospitals, clinics, pathology labs, and physicians.

Analysis Criteria

Residence at Diagnosis

The residency of cases at the time of diagnosis was grouped by county and by Arizona versus non-Arizona resident. Non-Arizona residents were excluded in the analysis.

Age at Diagnosis

Age groups were divided into four age groups for incidence counts. These age groups were 0-39 years, 40-49 years, 50-59 years, and 60 years and older.

Race/Ethnicity

Race/Ethnicity is identified from the physician's notations and the medical record that generally contains information concerning a person's race and ethnicity. Death Records are another source used to identify race. American Indian race is also identified through linkage with Indian Health Service (IHS) data. The linkage identifies cases that may be misclassified as another race. Race/Ethnicity definitions used in this report are; White non-Hispanic, White Hispanic, Black, American Indian, and Asian & Pacific Islander. Incidence rates were divided into two ethnicity categories: Hispanic and non-Hispanic. For this report, all cases with an unknown ethnicity were considered non-Hispanic.

Primary Site and Histologic Type

Primary site and histologic type were classified according to the International Classification of Diseases for Oncology, Third Edition (a.k.a. ICD-O-3).

Behavior

Behavior code: The fifth digit of the morphology code that indicates the growth pattern of a tumor, and whether or not it is invasive. Insitu definition is as follows: No penetration of the basement membrane of the tissue of origin. Invasive definition is as follows: A malignant tumor that has invaded the basement membrane of the tissue of origin.

Incidence Counts

Incidence counts were the number of cases diagnosed with colorectal cancer from years 2008 through 2012. More than one cancer case may be reported for an individual. This "one-to-many" relationship results in a higher number of cancer cases than individual persons recorded in the registry. Certain demographic variables may be unknown for some cases. Therefore comparing total numbers between different figures and tables may not yield equal numbers. Additionally, the totals for all categories within a figure or table may not equal the state total.

Average Counts and Rates

This report contains a figure that averages five years of data to produce an average annual count. When doing so, each averaged number is calculated separately, and rounded to a whole number. Due to rounding the *total* rounded value may not equal the total of two individually calculated numbers in that category.

Age-Adjusted Incidence and Mortality

Age-adjustment is a process used to compare incidence and mortality rates over time or among geographic areas or populations that have different age distributions. Because most disease rates increase with increasing age, age-adjustment eliminates the confounding effect of age when comparing rates. Beginning with the 1999 data year, federal agencies and the Arizona Cancer Registry have adopted the year 2000 projected U.S. population as the new standard for age-adjusting incidence. All incidence rates were adjusted using the 2000 U.S. standard population by the direct method, and were presented as number of cancers per 100,000 persons.

Mortality Data Criteria

Cancer mortality rates were calculated on counts of cancer deaths that meet all of the following criteria:
- The cancer death occurs to an Arizona resident
- The primary cause of death is coded C00 to C97 using ICD-l0*
- The case is reported to the Arizona Office of Vital Records
- The primary cause of death is classified according to the International Classification of Diseases, Injuries and Causes of Death, Tenth Revision, 1992.

Age Specific Incidence Rate

Age specific rate is total number of cases diagnosed in a specific age group conveyed as a proportion of the total age group population. It is expressed as the number of cases that would occur in a population of 100,000 persons.

Relative Survival Rate

Relative survival is the proportion of a population that has colorectal cancer that is expected to survive as compared to the cancer free population. It is adjusted for age group, as the percent of the population that is expected to survive decreases with age.

Population Denominators

The population numbers used for analysis in this report were taken from United States Census Bureau and modified by SEER. The SEER program applied a race/ethnicity bridge to the population numbers previous to the year 2000 to more accurately estimate the number of minorities in years previous to the 2000 census. New intercensal estimates were developed to reflect the actual yearly changes in populations based on the 2010 census. These changes lowered the expected population for Arizona in each year as population projections used in the past had over-estimated the state and county populations. These new populations slightly increase the rate of cancer. The ACR chose to use these population numbers for calculating age-adjusted rates in order to be comparable with other state and national cancer data.

Arizona Cancer

PREVENTION & CONTROL
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Arizona Cancer Prevention and Control Programs

150 N. 18th Avenue, Suite 300 Phoenix, AZ 85007

(602) 542-2808

Related Web sites: www.azdhs.gov/hsd/healthcheck

http://azdhs.gov/phs/phstats/cancer-registry/index.htm