Colorectal Cancer

in Arizona

2007 - 2011

Arizona Cancer

PREVENTION & CONTROL

More People Will Live Longer

Colorectal Cancer in Arizona

2007-2011

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This publication is available in electronic format on the FIT at Fifty HealthCheck Program website www.fitatfiftyhealthcheck.org as well as the Arizona Cancer Registry website.

Arizona Department of Health Services

Arizona Cancer PREVENTION & CONTROL
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FIT AT FIFTY HEALTHCHECK
Check on your health.

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Rationale

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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 information 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 recently published and is the second document in this series. Colorectal Cancer in Arizona 2007—2011 is the third document and has the same intent.

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:

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Introduction

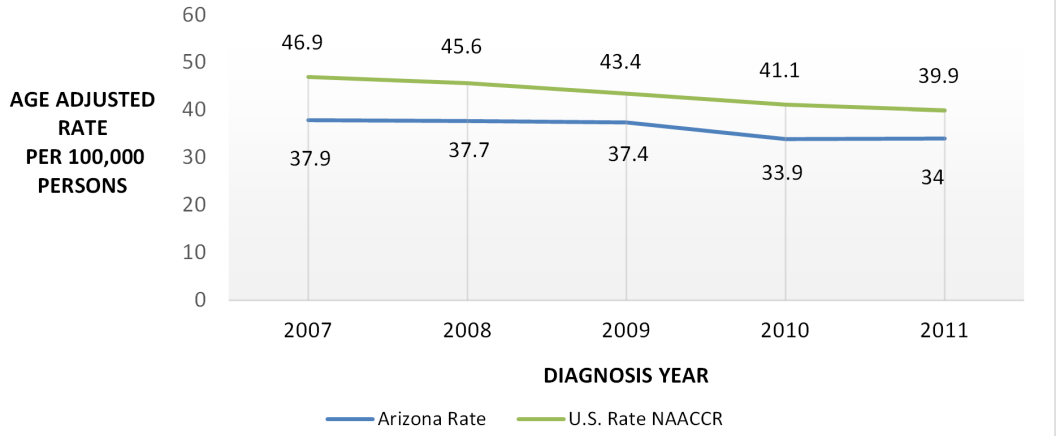
Cancer that starts in either the colon or the rectum is called colorectal cancer (CRC). One in twenty Americans will be diagnosed with colorectal cancer in their lifetime. Colorectal cancer is the third most common cancer in women (after breast and lung cancer) and men (after prostate and lung cancer). In 2014, more than 96,800 people in the United States (U.S.) are estimated to be diagnosed with colorectal cancer, with approximately 50,310 deaths annually.[1]

Colorectal cancer is a preventable disease that is highly treatable when diagnosed in early stages. Colorectal cancer rates have dropped 28 percent among those 50 years and over in the U.S. during the last ten years. However, CRC rates are steadily increasing in younger individuals for whom screening is restricted and crucial symptoms often go unrecognized.[2] Screening and early diagnosis of precancerous polyps has been an essential component of the decrease in colorectal cancer rates.[3] In Arizona, in 2012, it was estimated that 63 percent of persons over age 50 years have had at least one colonoscopy at some stage in their lives.[4]

Risk factors for colorectal cancer include age, male gender, African American race, and personal history of bowel disease. Obesity, a diet high in animal fats, lack of exercise, smoking, and alcohol use has 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. Family history is usually reckoned to be a factor in up to 25 or even 30 percent of those diagnosed with the disease and the remaining estimated 75 percent are sporadic cases with no family history.

An average of 2,443 invasive colorectal cancer cases was reported annually between 2007 and 2011. This report analyzes only Arizona resident in situ and invasive cases reported to the Arizona Cancer Registry. The age adjusted rate for colorectal cancer cases declined 10 percent from 37.9 to 34.0 cases per 100,000 persons between years 2007 and 2011 (Figure 1). The average annual rate for all years combined is 36.1 cases per 100,000 persons (Figure 3, pg. 8). This rate is significantly lower than the U.S. rate of 43.3 cases per 100,000 persons.

Figure 1: Comparison of Arizona and U.S. Age-Adjusted Incidence Rates* of Invasive Colorectal Cancer, 2007-2011



*NAACCR age -adjusted incidence rates: NAACCR Fast Stats 2007-2011. North American Association of Central Cancer Registries ; Based on data submitted December 2013; http://faststats.naaccr.org/selections.php?series=cancer .

[1] Colorectal Cancer Facts & Figures 2014-2016, American Cancer Society Web site. http://www.cancer.org/acs/groups/content/documents/document/acspc-042280.pdf Published 2014. Accessed June 20, 2014.

[2] 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.

[3] What is colon cancer? American Society for Gastrointestinal Endoscopy Web site. http://www.screenforcoloncancer.org/aboutCRC.asp. Accessed June 25, 2014.

[4] Black, J,. Arizona Health Status and Vital Statistics. 2014. Bureau of Public Health Statistics, Arizona Department of Health Services.

FIT at Fifty HealthCheck Program (FFHP) Overview

The FIT at Fifty HealthCheck Program (FFHP) is Arizona's implementation of the national Colorectal Cancer Control Program (CRCCP). The CRCCP is funded by the Centers for Disease Control and Prevention (CDC). The priority population for CRCCP screening services is low income, uninsured men and women between the ages of 50 to 64 years and who are at average risk for colorectal cancer. While the FFHP is not able to cover the cost of screening for patients over the age of 64 or for insured patients of any age, it works with contracted clinics to help identify and promote colorectal cancer screening of all insured and uninsured patients ages 50-74 .

In Arizona, program funding is supported by a collaborative partnership with the local chapter of the Colon Cancer Alliance (CCA) Undy Run/Walk funds. The CCA Undy Run/Walk funds allow the FFHP to screen symptomatic, high risk patients for colorectal cancer and provides treatment for patients diagnosed with colorectal cancer through the FFHP.

FFHP is a colorectal cancer screening program that does much more than screening.

In 2013, the FFHP provided 1,532 Fecal Immunochemical Tests (FITs), 173 colonoscopies, and diagnosed 12 cancer cases. However, the FFHP is a colorectal cancer screening program that does much more than screening. Outside of providing FITs, colonoscopies, and diagnostic services, FFHP contractors are guided to provide complete follow-up on all patients within 90 days. Data is gathered on each patient and maintained in a database. When a report is returned with an abnormal result, immediate follow-up is required. Case managers work with each patient to complete the diagnostic tests within the 90 day time frame. Each diagnostic test is tracked and entered into the database. If the patient is in need of treatment services, immediate attention to treatment is a priority. Treatment services are mandated within 60 days of the diagnosis.

All of these parameters are tracked, recorded, and reported to CDC. CDC evaluates these measures every six months and provides the program with a report card. Below, you will find a sample of the program performance indicator report card with Arizona's results listed and compared with CDC's standards.

CORE PROGRAM PERFORMANCE INDICATORS				Arizona Results		All Grantees Combined Results	
Indicator Type	SQIG Item	Program Performance Indicator	CDC Standard	Percentage	Standard Met ? *	Percentage	Standard Met ? *
Screening Priority Population	1.	New Clients: Percentage at Average Risk for CRC	≥ 75%	91.6% (1,113/1,215)	YES	89.8% (11,639/12,954)	YES
	2.	New Clients at Average Risk for CRC: Percentage ≥ 50 Years of Age	≥ 95%	99.8% (1,111/1,113)	YES	99.1% (11,537/11,639)	YES
Diagnostic Follow-up Timeliness and Completeness	3.a	Screenings with Abnormal Results: Percentage with Complete Follow-up	≥ 90%	86.8% (92/106)	YES	95.3% (3,247/3,408)	YES
	4.d.	Initial Tests Requiring a Diagnostic Colonoscopy: Percentage Followed by Diagnostic Colonoscopy within 90 Days	≥ 80%	87.7% (57/65)	YES	78.7% (490/623)	YES
Treatment Initiation Timeliness and Completeness	6.a	Cancers Diagnosed: Percentage with Treatment Started	≥ 90%	100.0% (6/6)	YES	92.1% (35/38)	YES
	7.d.	Cancers Diagnosed: Percentage Starting Treatment within 60 Days	≥ 80%	66.7% (4/6)	Small #	82.9% (29/35)	YES

SQIG: Service Quality Indicator Item

*For percentages with a denominator ‡ 10, a one-sided hypothesis test was used in determining if a program failed to meet an SQIG standard.

"Small #": The denominator is less than 10. The one-sided hypothesis test was not conducted.

Fecal Immunochemical Test (FIT)

Most colorectal cancer cases develop from premalignant adenomas (noncancerous tumors) which are typically asymptomatic. When CRC cases are detected early through screening tools such as the Fecal Immunochemical Test, or FIT test, most patients have a good prognosis when treated (>90 percent cure rate). This underscores the importance of accurate screening tests like the FIT.

The FIT is a simple, non-invasive, and very accurate colorectal cancer screening test exists for patients to use at home. It is a highly sensitive and specific test for detecting early signs of excess blood in the stool – that is, the FIT accurately detects true indications of the presence of disease and correctly provides negative test results when disease is absent.

The FIT includes several items in the kit for patients to use. Instructions are very clear and straightforward. After a bowel movement, a patient swishes a long-handled "paintbrush" in the toilet bowl. The patient "paints" a sample card, closes the card, and repeats this process the next day. Once two samples are completed, the card is mailed by the patient directly to a laboratory for processing and results. Patients must complete a FIT once a year according to U.S. Preventive Services Task Force (USPSTF) guidelines.

The FIT presents a powerful alternative option for patients to get screened for colon cancer. Research has shown that patients are more likely to utilize the FIT over scheduling a colonoscopy. When adults get screened for colorectal cancer, it can be detected early at a stage when treatment is most likely to be successful, and in some cases, can be prevented through the removal of precancerous polyps. For any patient, the best test for colorectal cancer is the test that gets done.

For any patient, the best test for colorectal cancer is the test that gets done.

Young Onset Colorectal Cancer

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] Since 2001 in the U.S., young onset (under 50 years) CRC rates have increased of 2.1. percent annually compared to an annual 2.5 percent decrease among those 50 and over.[1] Nationally, 3 out of 4 of 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 2010, 58 percent of individuals ages 0-39 with colorectal cancer were diagnosed at a late stage and approximately 52 percent of individuals diagnosed with CRC ages 40-49 were diagnosed with late stage.[3]

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.

> *"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.

[3] Yee, G., Newton, C., Warren, V., et.al.. AZ Cancer Registry Data 2001-2010. *Arizona Department of Health Services.* Available from http://azdhs.gov/hsd/healthcheck/documents/az-cancer-registry-data-2001-10.pdf. Published July 11, 2013. Accessed September 14, 2014.

Lynch Syndrome and Colorectal Cancer

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 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]

"80% by 2018"

The 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 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 http://nccrt.org/about/80-percent-by-2018/.

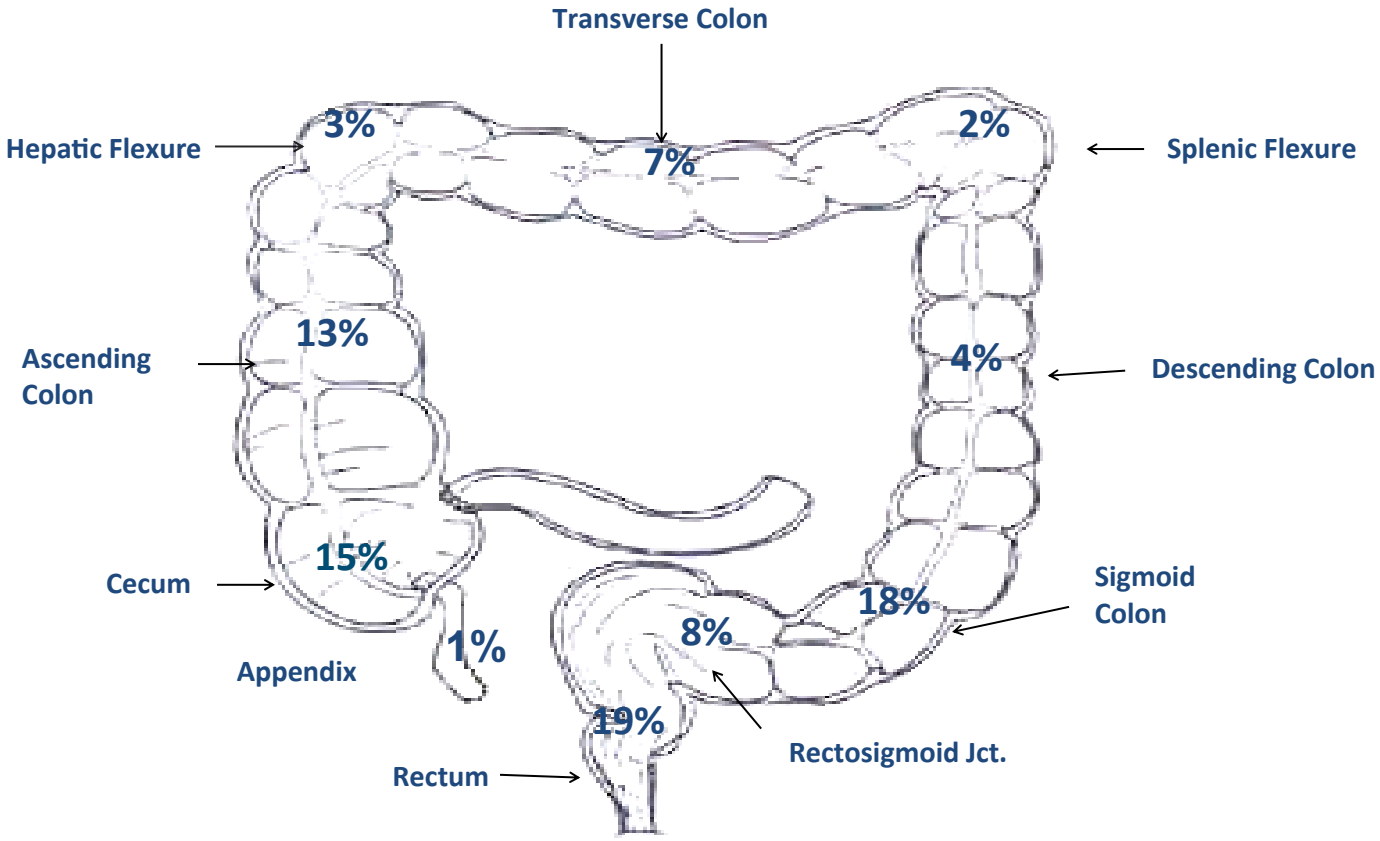
[1]Lynch Syndrome. Diseases and Conditions. Mayo Clinic Web site. http://www.mayoclinic.org/diseases-conditions/lynch-syndrome/basics/definition/con-20025651. Published March 10, 2012. Accessed September 16, 2014.

[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.

Colorectal Sites

The colorectal area is comprised of four sections in the digestive tract. 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.[1] The rectosigmoid junction joins colon to the rectum. The rectum has more cases (19%) than any of the sites analyzed in colorectal cancer. The sigmoid colon and the cecum follow with 18 and 15 percent of the colorectal cancer cases (Figure 2). Ten percent of colorectal cancer cases had no reported site.

Figure 2: Colorectal Sites* of Invasive Cancer
2007-2011



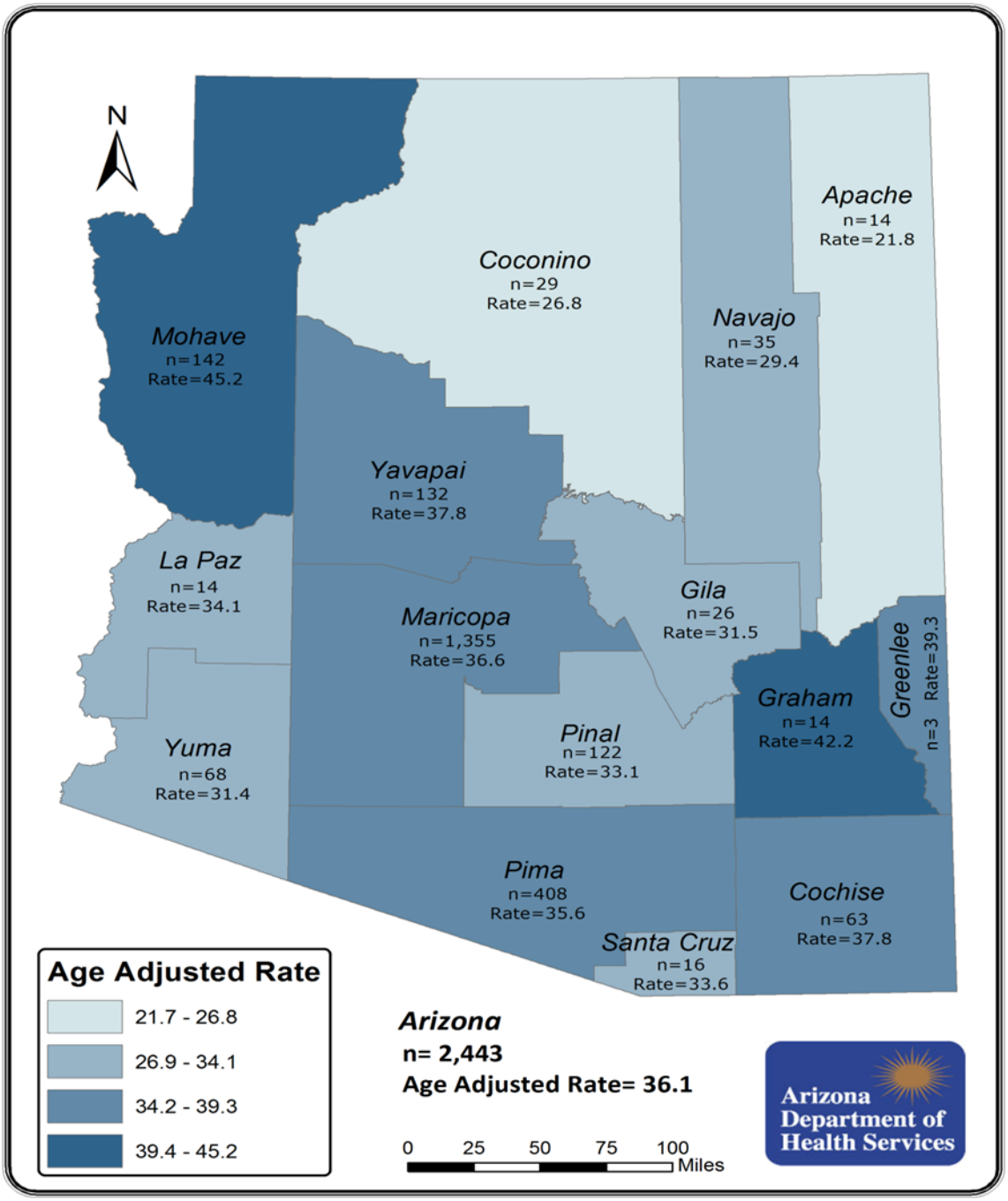
*Colorectal diagram adapted from: Young JL Jr, Roffers SD, Ries LAG, Fritz AG, Hurlbut AA (eds). *SEER Summary Staging Manual - 2000: Codes and Coding Instructions*, National Cancer Institute, NIH Pub. No. 01-4969, Bethesda, MD, 2001.

[1]Young JL Jr, Roffers SD, Ries LAG, Fritz AG, Hurlbut AA (eds). *SEER Summary Staging Manual - 2000: Codes and Coding Instructions*, National Cancer Institute, NIH Pub. No. 01-4969, Bethesda, MD, 2001.

County of Residence

In the years 2007 to 2011, Mohave and Graham counties had the highest significant incidence rate of colorectal cancer (45.2 and 42.2 cases per 100,000 persons respectively). Apache and Coconino counties had the lowest rate of colorectal cancer (21.8 and 26.8 cases per 100,000 persons) (Figure 3).

Figure 3: Invasive Colorectal Cancer in Arizona
Average Annual Counts* and Age Adjusted Rates by County** 2007-2011



*Case counts (n) represent the average number of cases reported per year for the years 2007-2011. Due to rounding, the total rounded value does not equal the state total.

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

Incidence by Age

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, 2007–2011

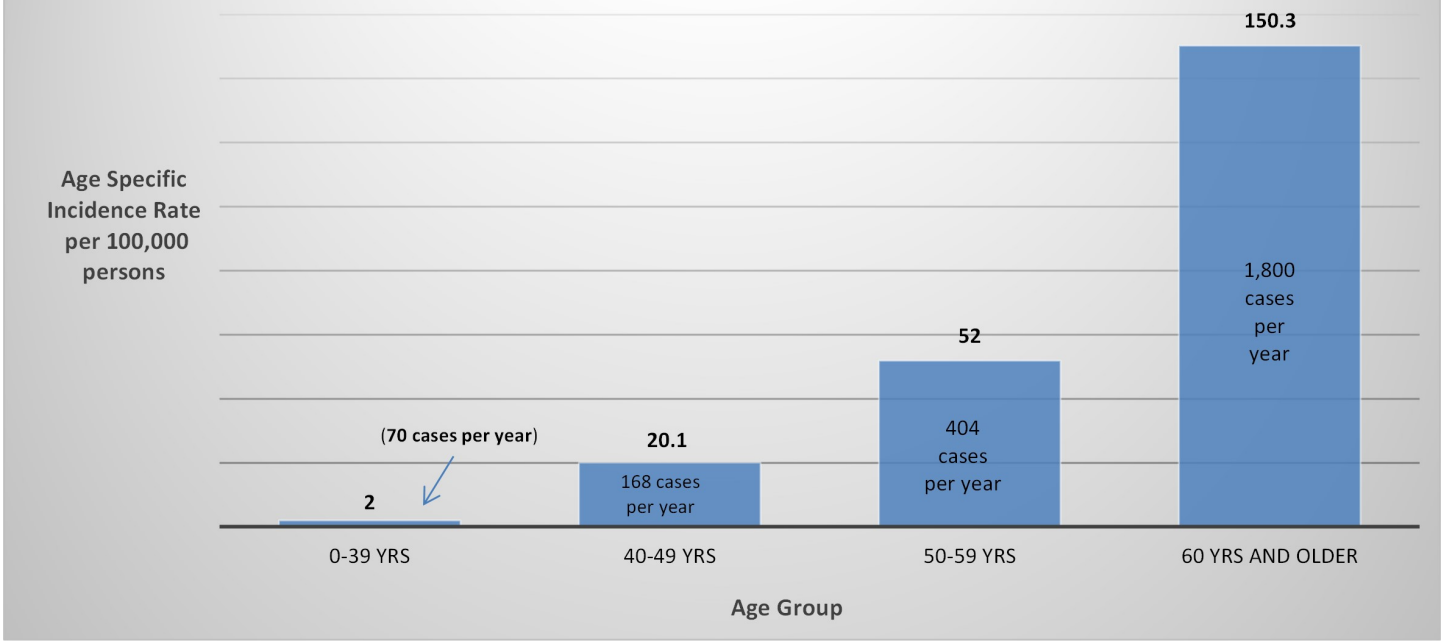
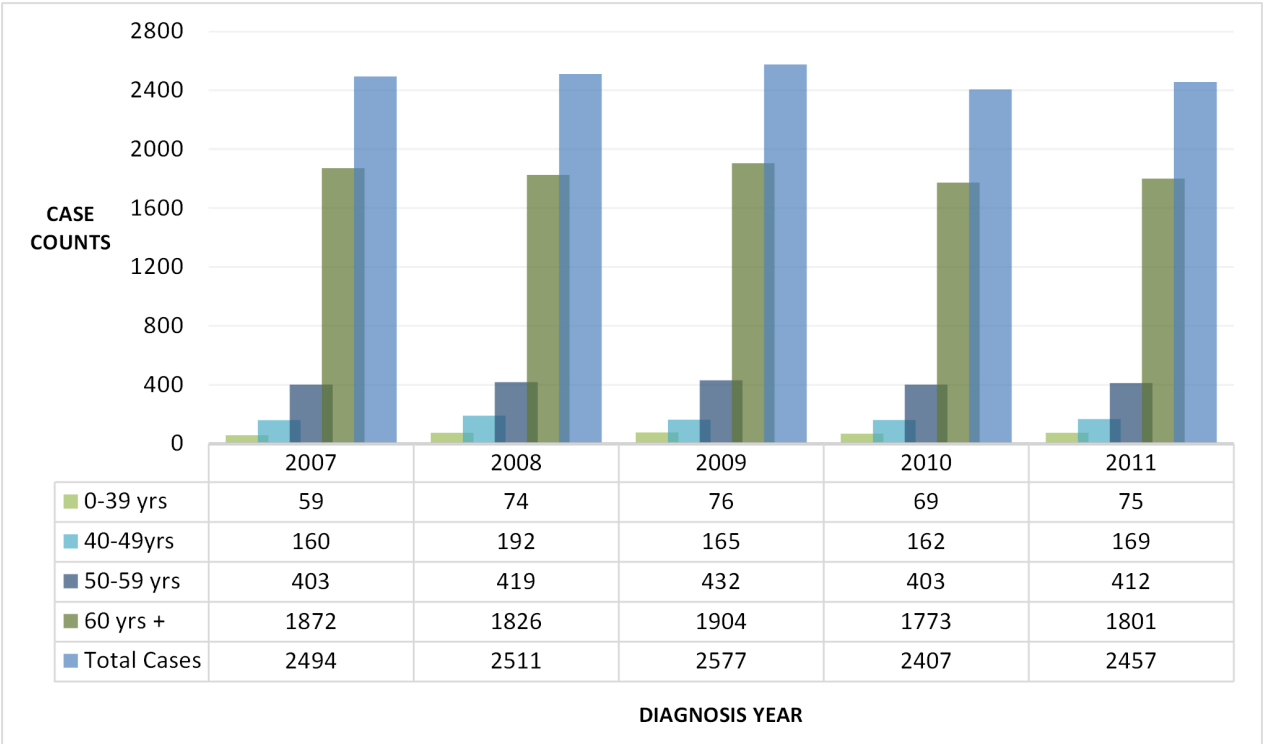


Figure 5: Colorectal Cancer Case Count* by Age Group and Diagnosis Year, 2007–2011



	2007	2008	2009	2010	2011
0-39 yrs	59	74	76	69	75
40-49yrs	160	192	165	162	169
50-59 yrs	403	419	432	403	412
60 yrs +	1872	1826	1904	1773	1801
Total Cases	2494	2511	2577	2407	2457

* Case count includes in situ and invasive cases.

Incidence by Race/Ethnicity

White Non-Hispanic persons comprise the greatest proportion of colorectal cancer cases statewide (79.6%). White Hispanics (11.8%) make up the next largest race/ethnicity group (Figure 6). However, Blacks had the highest age adjusted incidence rate in Arizona in 2011 at 38.3 cases per 100,000 persons. They were followed by White Non-Hispanics at 34.7 cases per 100,000 persons (Figure 7).

Figure 6: Percent of Invasive Colorectal Cancer by Race/Ethnicity, 2007–2011

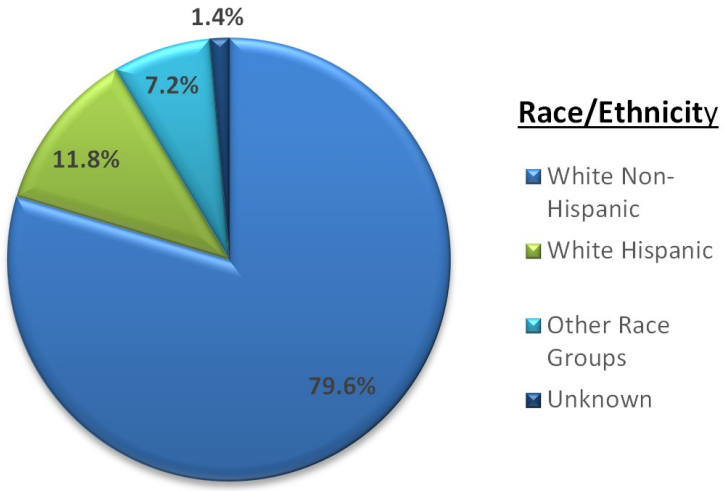
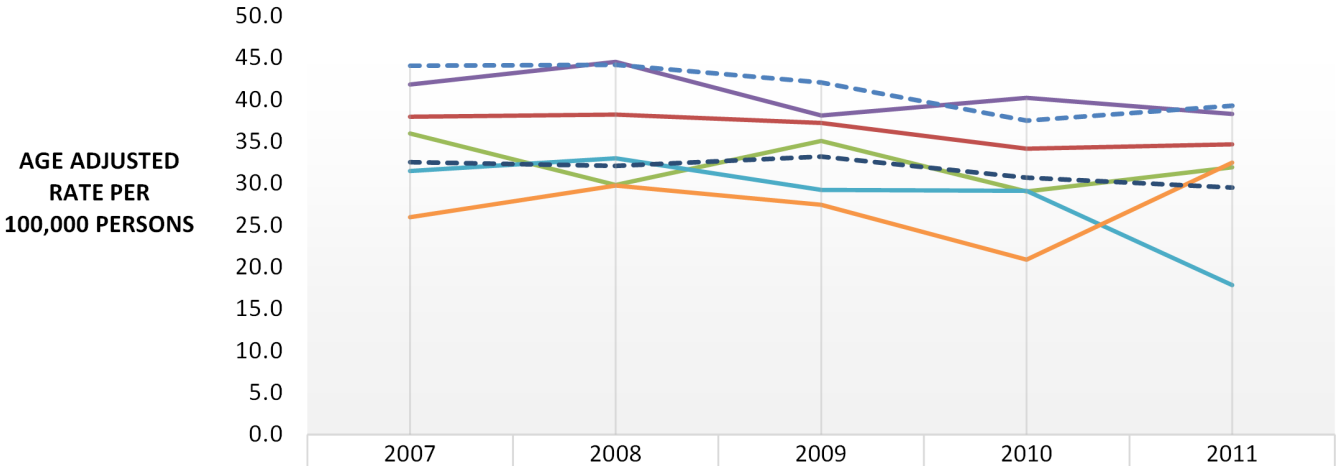


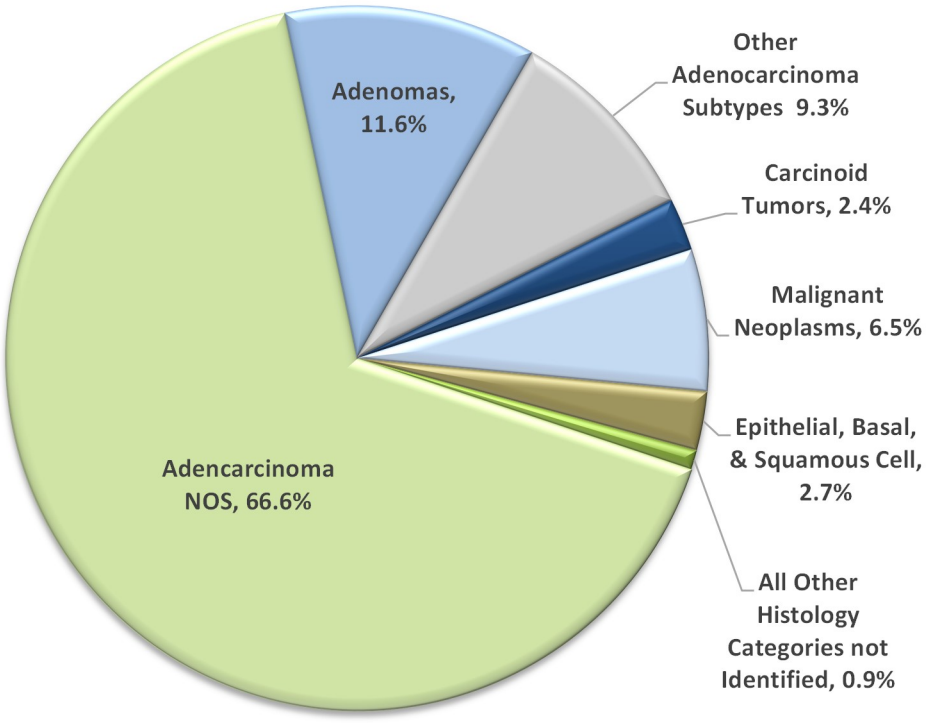
Figure 7: Age-Adjusted Colorectal Cancer Incidence Rates Race/Ethnicity and Sex by Diagnosis Year, 2007–2011



	2007	2008	2009	2010	2011
White Non-Hispanic	38.0	38.2	37.2	34.2	34.7
White Hispanic	36.0	29.8	35.1	29.0	31.9
Black	41.8	44.5	38.1	40.2	38.3
American Indian	31.5	33.0	29.2	29.1	17.9
Asian & PI	25.9	29.7	27.4	20.9	32.5
Male	44.1	44.2	42.1	37.5	39.3
Female	32.5	32.1	33.2	30.7	29.5

DIAGNOSIS YEAR

Figure 8: Histology Percent of Invasive Colorectal Cancer Cases, 2007-2011

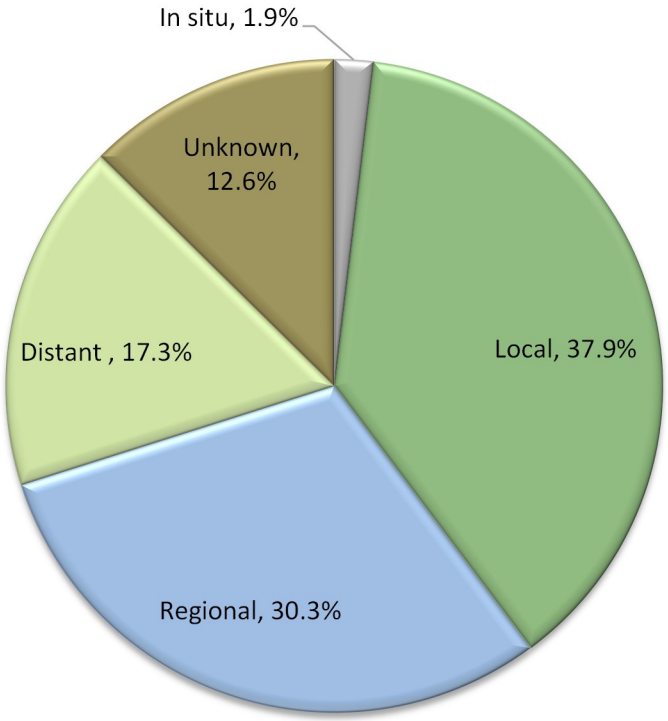


Adenocarcinoma Not Otherwise Specified (NOS) made up two thirds of all colorectal cancer cases. Another 11.6 percent are composed of adenomas (adenocarcinoma in a polyp). Other adenocarcinoma subtypes add another 9.3 percent of the colorectal cancer cases. The remaining 12.5 percent of cases are composed of: 1) epithelial, basal, and squamous cell histological types, 2) carcinoid tumors, 3) malignant neoplasms NOS and 4) all other histology subtypes (Figure 8).

Figure 9: Percentage of Colorectal Cancer Cases by SEER Summary Stage,* 2007-2011

Colorectal Cancer Staging

Almost half (47.6%) 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).

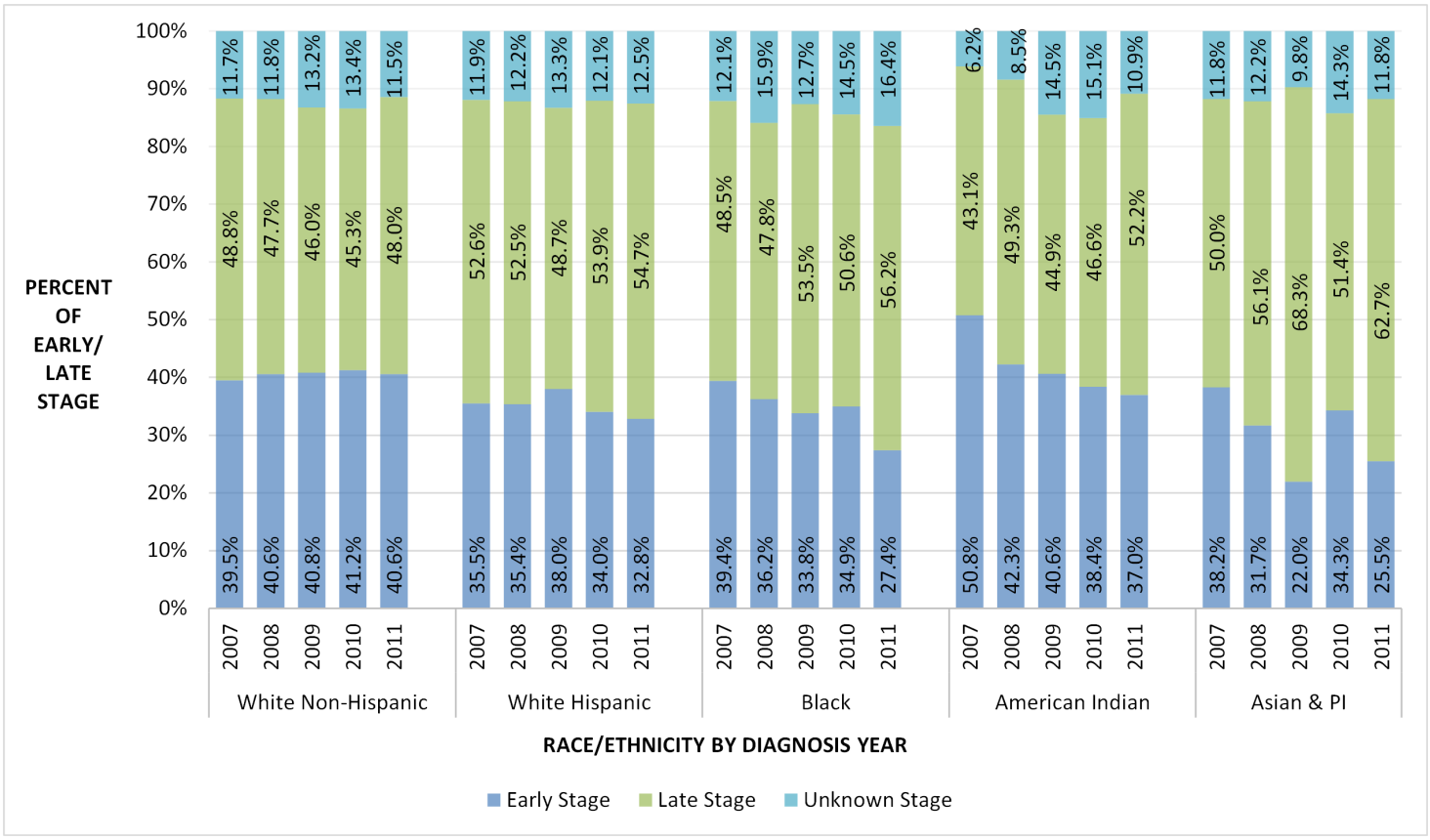


*Summary Stage is the Surveillance Epidemiology and End Results (SEER) Summary Stage 2000

Colorectal Cancer Staging by Race/Ethnicity

Asian and Pacific Islander race/ethnicity have the greatest proportion of cases diagnosed in late stage. Sixty-three percent of their cases were diagnosed in late stage in 2011. They were followed by cases with a Black race/ethnicity (56%) in 2011 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 (58%) 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, 2007-2011

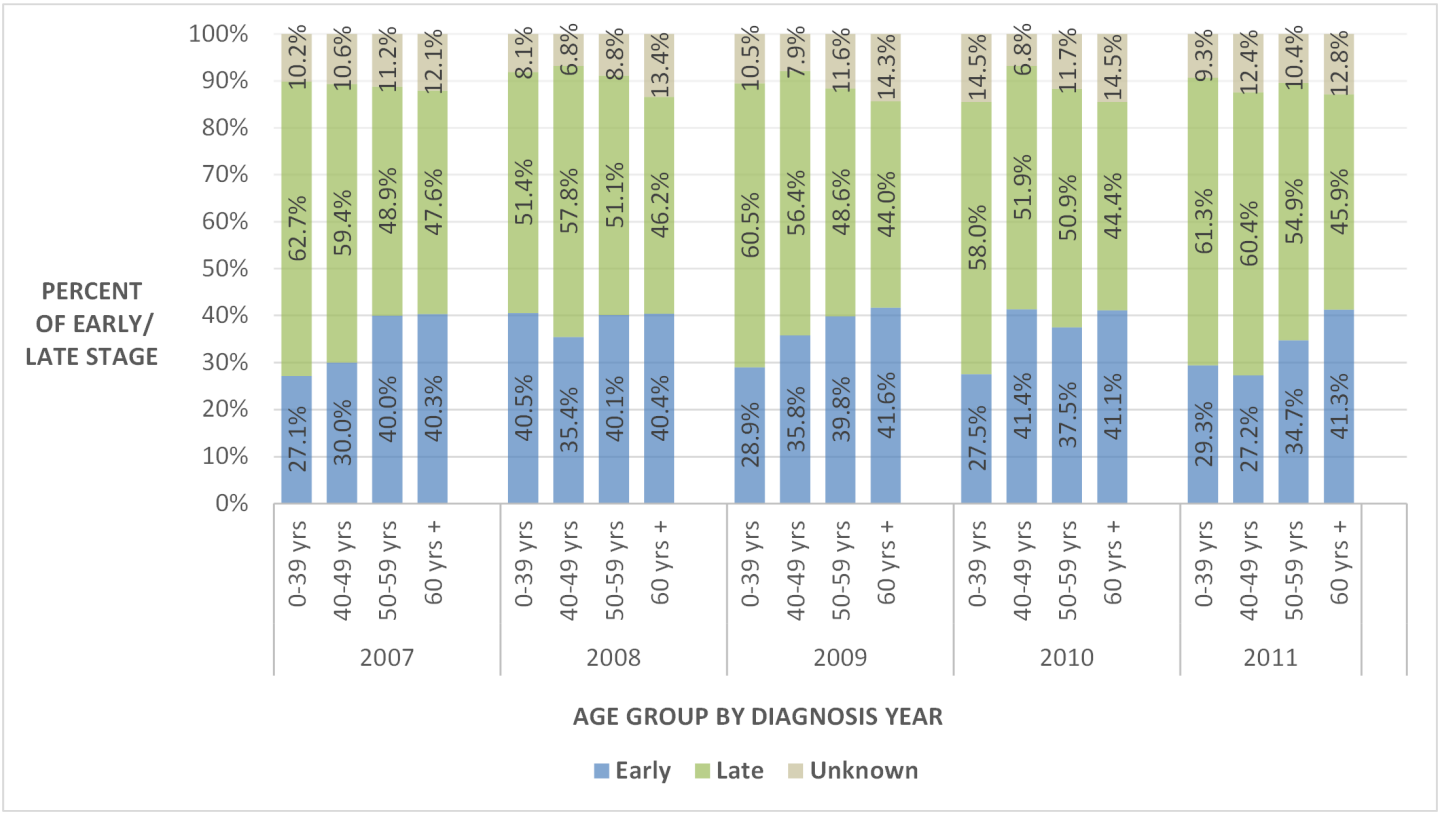


* Early Stage = In Situ and Local Stage; Late Stage = Regional and Distant using SEER Summary Stage

Colorectal Cancer Staging by Age Group

The youngest age groups (0-39 yrs. and 40-49 yrs.) had the highest percentage of cases with a late stage diagnosis (61% and 60%) in 2011. Persons age 60 years and older had the lowest percent of late stage cases (46%) in 2011. For all years combined the youngest groups (0-39 yrs. and 40-49 yrs.) had the highest percentage of late stage cases (59% and 57%) (Figure 11).

Figure 11: Early/Late Stage* by Age Group and Diagnosis Year, Colorectal Cancer, 2007-2011

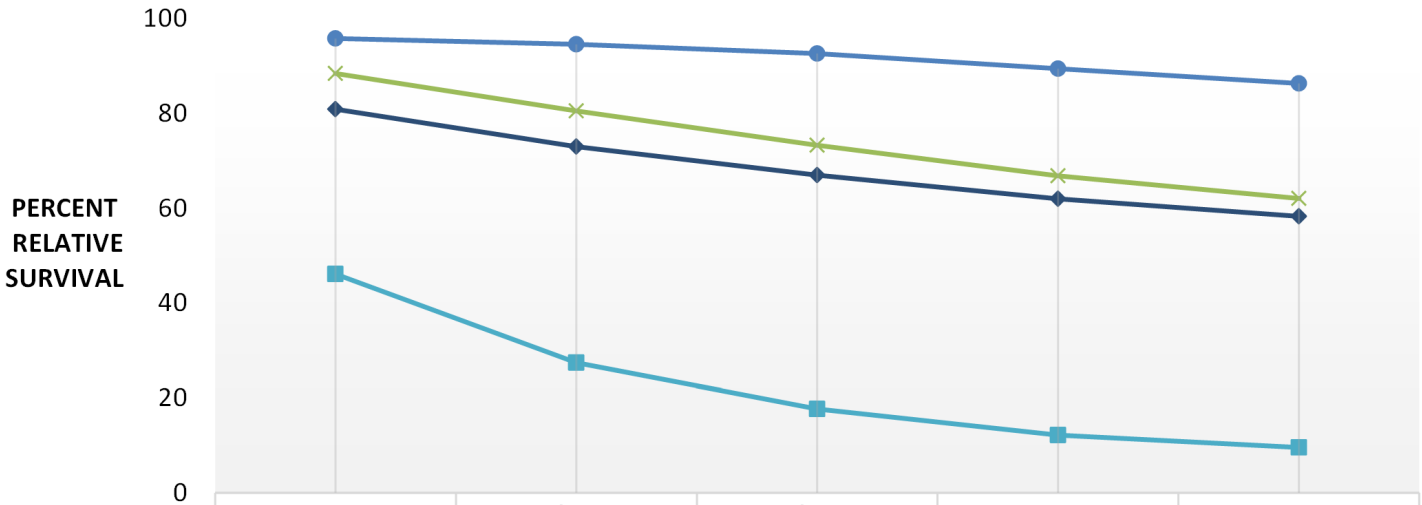


* Early Stage = In Situ and Local Stage; Late Stage = Regional and Distant using SEER Summary Stage

Colorectal Cancer Survival by 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 86.4 percent relative five year survival rate. Persons diagnosed with a distant stage had a five year relative survival rate of 9.6 percent (Figure 12).

Figure 12: Five Year Relative Survival of Invasive Colorectal Cancer by Stage, 1995-2008



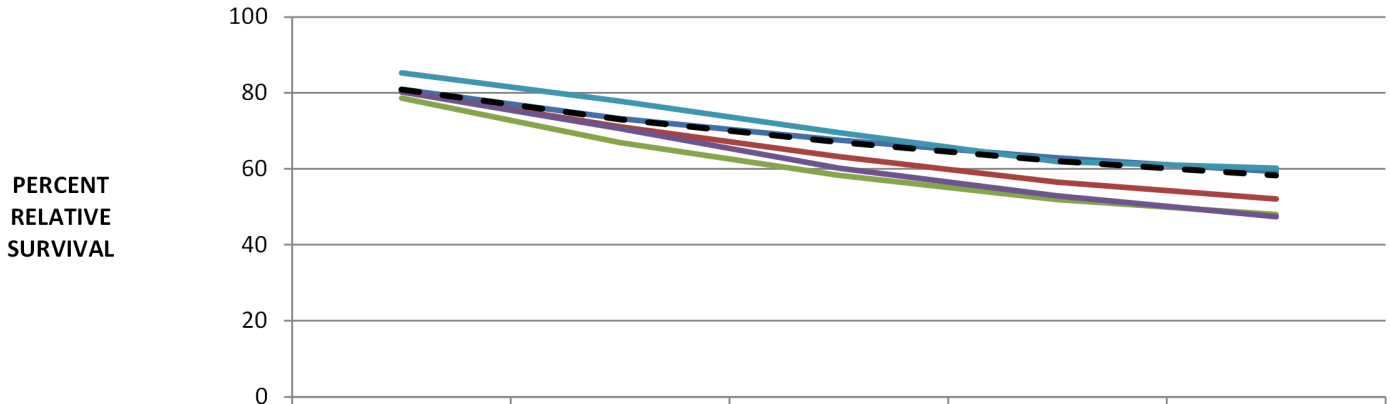
	1 yr	2 yr	3 yr	4 yr	5 yr
Local	95.9	94.6	92.7	89.5	86.4
Regional	88.5	80.6	73.3	66.9	62.1
Distant	46.1	27.4	17.7	12.2	9.6
All Stages	80.9	73	67	62	58.3

YEARS SURVIVED AFTER YEAR OF DIAGNOSIS

Colorectal Cancer Relative Survival by Race/Ethnicity

The race and ethnicity of persons diagnosed with colorectal cancer (in years 1995-2008) also impacted colorectal cancer survival. Asians and Pacific Islanders had the greatest percent of persons surviving five years (60%) while American Indians and Blacks had the lowest survival rate (47% and 48% respectively) (Figure 13). Although Asian and Pacific Islanders had the highest late stage diagnosis, they also had the highest survival rate. Factors other than stage at diagnosis appear to be affecting the survival rates of different race/ethnic groups.

Figure 13: Five Year Relative Survival of Invasive Colorectal Cancer by Race for Diagnosis, 1995-2008



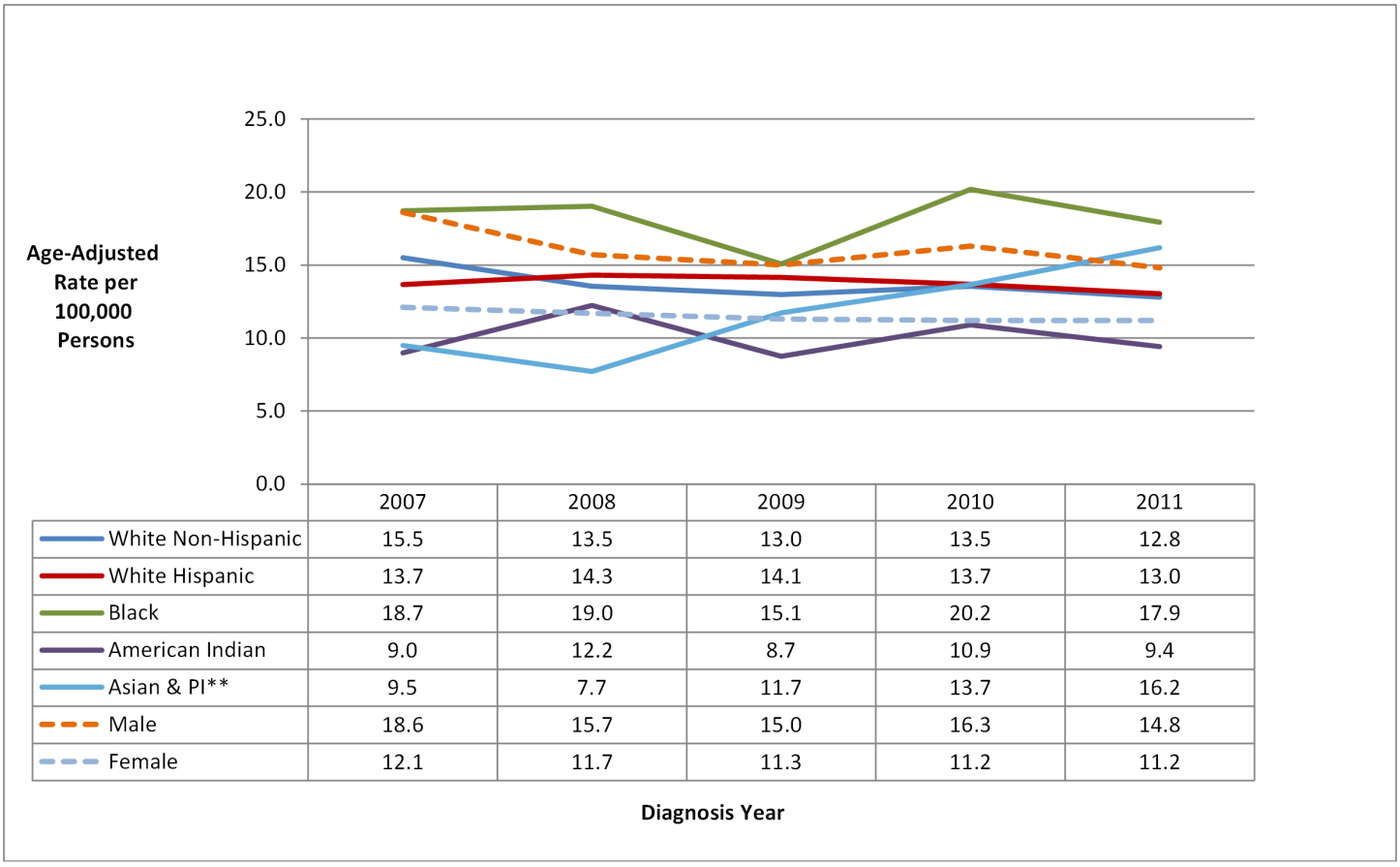
	1 yr	2 yr	3 yr	4 yr	5 yr
White Non-Hispanic	80.9	73.2	67.6	62.9	59.3
White Hispanic	80.3	71.1	63.2	56.5	52.1
Black	78.6	66.9	58.3	51.9	48
American Indian	80.3	70.6	60.2	52.9	47.4
Asian & PI	85.3	77.8	69.5	61.9	60.2
All Races	80.9	73	67	62	58.3

YEARS SURVIVED AFTER YEAR OF DIAGNOSIS

Mortality Age Adjusted Rate by Race/Ethnicity

The White Non-Hispanic colorectal mortality rate has declined 17 percent over the last five years. However, the Asian and Pacific Islander rate has increased more than 100 percent from 7.7 to 16.2 cases per 100,000 persons. Low case counts play a role as there were only eight colorectal cancer deaths in 2008 (the year of the lowest age adjusted rate) and 23 colorectal cancer deaths in 2011. White Hispanic, Black, and American Indian age adjusted mortality rates have been up and down over the last five years. Comparing the 2007 and 2011 mortality rates finds the White Hispanic rate decreasing five percent; the Black rate decreasing four percent; and the American Indian rate increasing four percent. The colorectal cancer age adjusted mortality rate among males has decreased 20 percent and seven percent among females (Figure 14).

Figure 14: Age-Adjusted Colorectal Cancer Mortality Rates by Race/Ethnicity and Sex, 2007-2011



	2007	2008	2009	2010	2011
White Non-Hispanic	15.5	13.5	13.0	13.5	12.8
White Hispanic	13.7	14.3	14.1	13.7	13.0
Black	18.7	19.0	15.1	20.2	17.9
American Indian	9.0	12.2	8.7	10.9	9.4
Asian & PI**	9.5	7.7	11.7	13.7	16.2
Male	18.6	15.7	15.0	16.3	14.8
Female	12.1	11.7	11.3	11.2	11.2

** Counts for these races are <10 for some or all of the years. Therefore, rates are highly unstable and should be used with caution.

Methods and Technical Notes

This colorectal cancer report includes cases diagnosed from years 2007 through 2011. Survival analysis data uses cases diagnosed from 1995 through 2008. The data for this report were retrieved from the Arizona Cancer Registry database on May 27, 2014. This report includes both invasive and in situ 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).

Incidence Counts

Incidence counts were the number of cases diagnosed with colorectal cancer from years 2007 through 2011. 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.

Analysis Criteria (cont.)

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. In situ 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.

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-I0 (International Statistical Classification of Diseases and Health Related Problems)
- 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 survive as compared to the cancer free population. It is adjusted for age group, as the percent of the population that is expected 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.

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