COLORECTAL CANCER IN CALIFORNIA: 1988-2012

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California Cancer Registry

Colorectal Cancer in California: 1988-2012

CALIFORNIA CANCER REGISTRY

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COLORECTAL CANCER

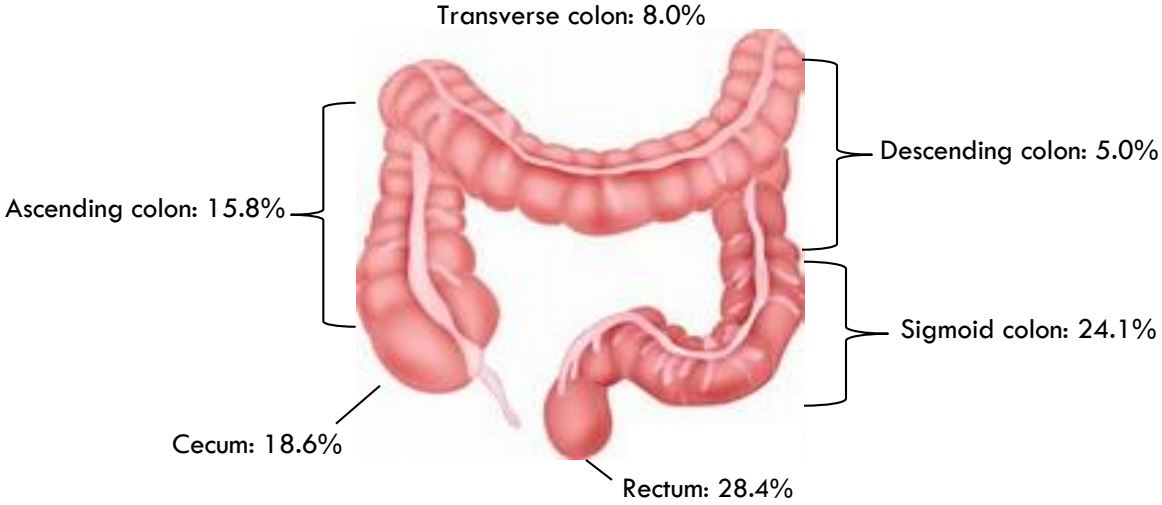
Overview

Colorectal cancer is the fourth leading cause of cancer and second cause of cancer related death in California among both men and women. In 2012, there were 14,114 cases of colorectal cancer diagnosed and 5,189 deaths as a result of the disease. Colorectal cancer incidence rates in California have declined significantly from 1988 through 2012. Colorectal cancer incidence is higher in men than women; however, the rate of decline has been more dramatic among men. Mortality (death) rates have significantly declined over the past 25 years. Decreases in incidence and mortality are multifactorial but can be partially attributed to increased colorectal cancer screening.

What is colorectal cancer?

Colorectal cancer develops in the colon or the rectum, also known as the large intestine of the digestive system. The digestive system is responsible for breaking down food, and turning the food you eat into nutrients for the body to use as energy. The longest part of the large intestine is the colon, which is a muscular tube, measuring nearly five feet in length. As food moves through the large intestine, water and minerals are absorbed through the walls of the colon. Leftover waste (feces) passes through the rectum which makes up the end of the large intestine, and is then expelled through the anus. When colorectal cancer is analyzed by anatomical sites, most cancers are found in the rectum (28.4 percent) followed by the sigmoid colon (24.1percent).

Figure 1. Proportion of Colorectal Cancer by Anatomic Sub-Site, 2012



COLORECTAL CANCER INCIDENCE

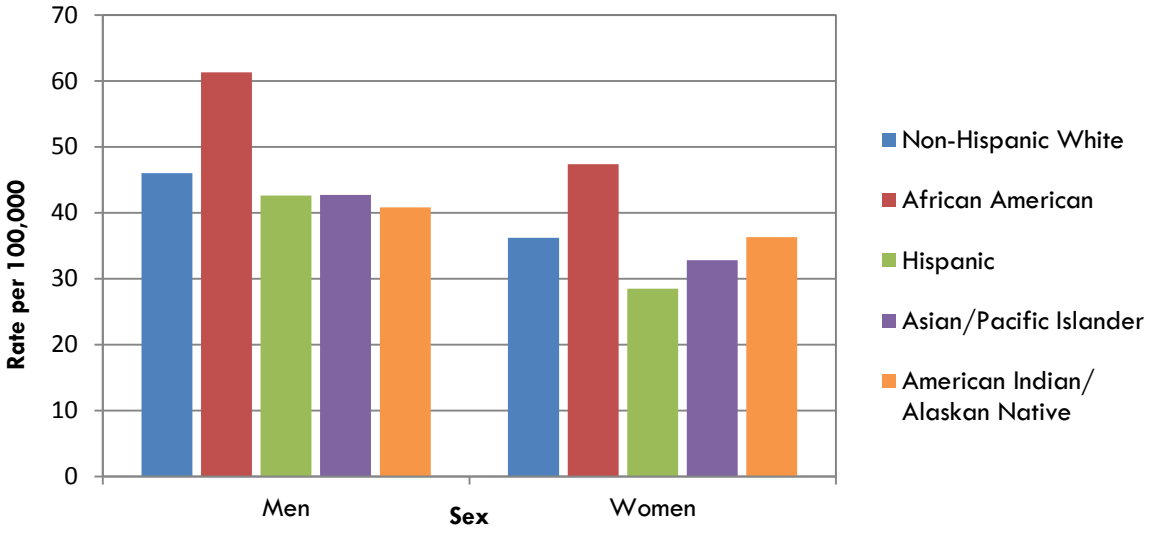
Five-Year Average Colorectal Cancer Incidence Rates by Race/Ethnicity

Colorectal cancer incidence rates vary by race/ethnic group and sex. Incidence rates were highest among African American men and women (61.3 and 47.7 per 100,000), respectively. Among

men, non-Hispanic white men had the second highest average rates of colorectal cancer incidence, followed by Hispanic and Asian/Pacific Islander men, who had nearly identical rates of average incidence (42.6 and 42.7 per 100,000), respectively. American Indian/Alaskan Native men had the lowest five-year average incidence rates among all of the race/ethnic groups (40.8 per 100,000).

American Indian/Alaskan Native women have the second highest average incidence rates (36.3 per 100,000), followed closely by non-Hispanic whites (36.2 per 100,000). While Asian/Pacific Islander men have similar incidence rates to Hispanic men, Asian/Pacific Islander women have higher five-year average incidence rates than Hispanic women (32.8 and 28.5 per 100,000).

Figure 2. Five-Year Colorectal Cancer Incidence Rates by Race/Ethnicity and Sex, California, 2008-2012

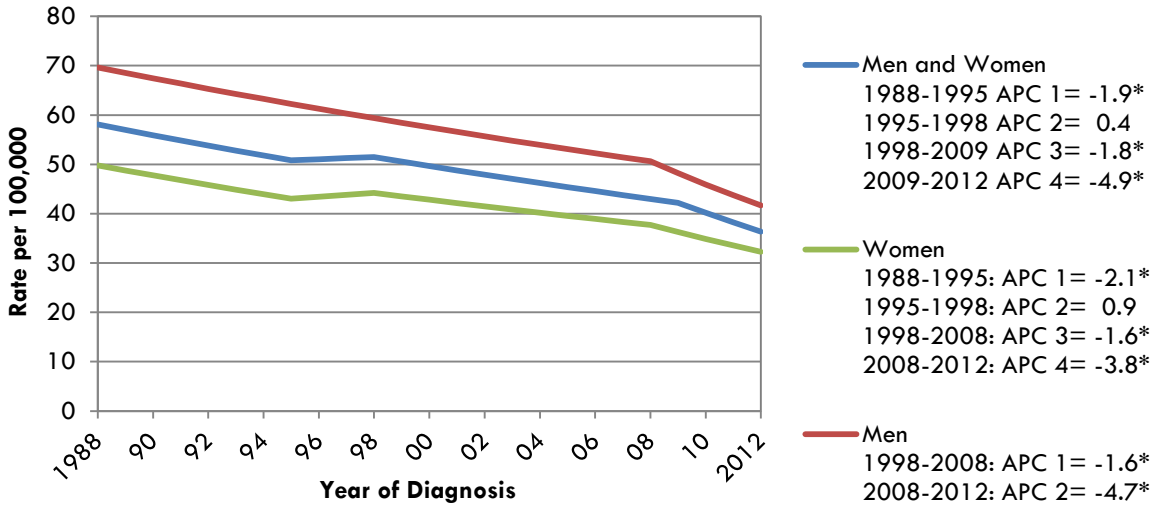


Source: California Cancer Registry, California Department of Public Health.
Rates are age-adjusted to the 2000 United States Standard Population.

Changes in Colorectal Cancer Incidence by Sex

Among both men and women the incidence of colorectal cancer has declined significantly. The incidence rates of colorectal cancer declined significantly from 1988 through1995, then stabilized until 1998 when incidence rates began to drop again; since 2009 incidence has plummeted with an average decrease of nearly 5 percent per year. Colorectal cancer incidence among women followed a similar pattern with a major decrease (-2.1 percent per year) from 1988 to 1995, then a stabilization, followed by a sharp decline in rates beginning in 1998. Incidence rates among men have been consistently declining since 1988, but since 2008 have decreased more rapidly to nearly 5 percent per year.

Figure 3: Trends in Age-Adjusted Incidence of Colorectal Cancer by Sex, California, 1988-2012



Source: California Cancer Registry, California Department of Public Health.
* Annual Percent Change (APC) is significantly different from zero at $p<0.05$.
Rates are age-adjusted to the 2000 United States Standard Population.

Changes in Colorectal Cancer Incidence by Race/Ethnicity and Sex

Colorectal cancer incidence has declined for most all race/ethnic groups, regardless of sex; however, the rate of decline has not been equal.

Non-Hispanic whites have the second highest incidence rates of invasive colorectal cancer. While rates among both men and women have been decreasing over the 25-year period, the decline among men has been more dramatic. Incidence rates of invasive colorectal cancer among non-Hispanic white men began decreasing in 1988, but stagnated between 1995 from 1998 when the rate of decline again significantly improved. A similar but less dramatic decline was witnessed among non-Hispanic white women.

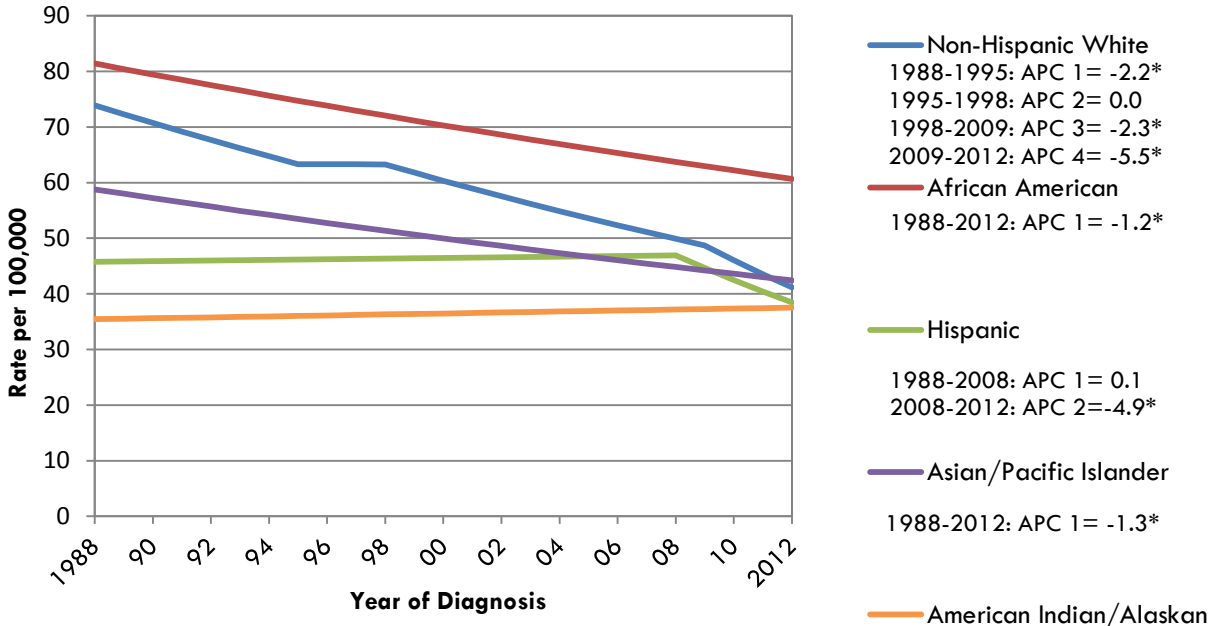
Incidence rates among African Americans remains the highest of any race/ethnic group; however, rates among both men and women have been declining. African American men have witnessed a steady decrease of 1.2 percent per year since 1988. Invasive colorectal cancer incidence rates among African American women slowly declined between 1988 through 2009, then incidence rates dropped dramatically, 7.9 percent per year between 2009 through 2012.

Reductions of invasive colorectal cancer incidence have been slow among the Hispanic population. Between 1988 through 2008 incidence rates of colorectal cancer among Hispanic men remained stable. Since 2008, Hispanic men have had a sudden and pronounced decline of colorectal cancer incidence of nearly 5 percent per year. Trends of colorectal cancer incidence were similar for Hispanic women, whose rates remained stable from 1988 to 2004. Between 2004 and 2012 there was an improvement of incidence with an annual reduction of 1.6 percent per year.

Asian/Pacific Islanders have seen steady declines of invasive colorectal cancer incidence between 1988 through 2012; with women demonstrating a more favorable trend. Colorectal cancer incidence among Asian/Pacific Islander men has slowly declined at a rate of 1.3 percent per year during the 25-year period. Alternatively, rates among Asian/Pacific Islander women was stagnant until 2007, when rates began to suddenly and dramatically decline at a rate of 3.9 percent per year.

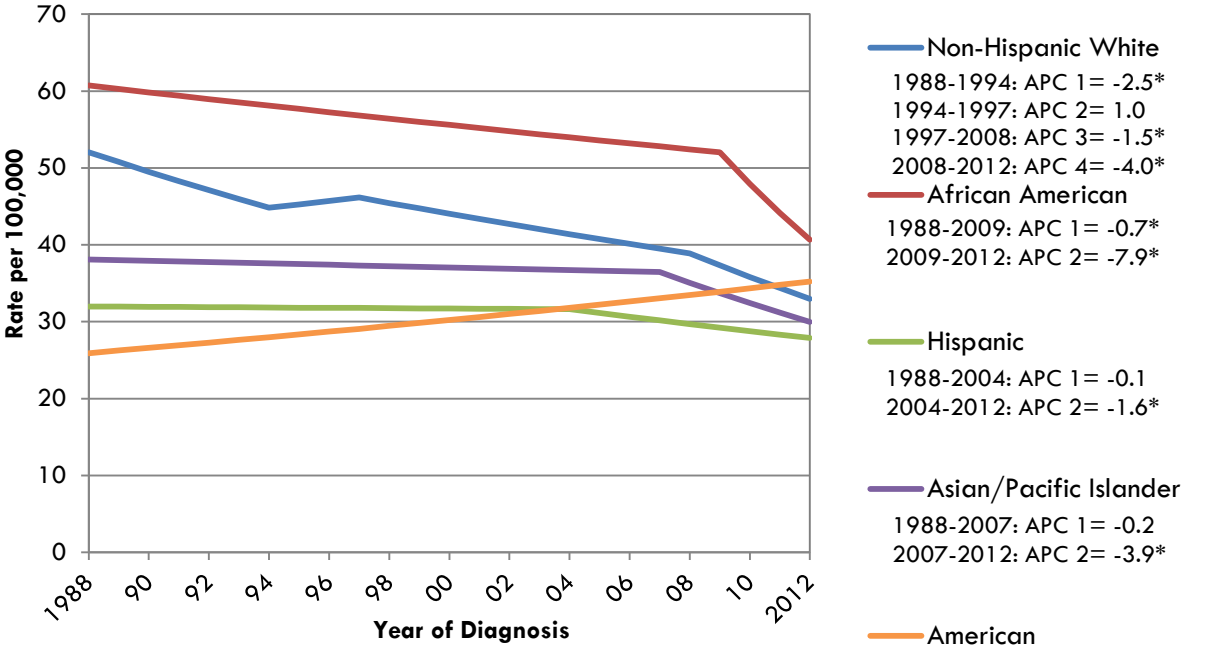
American Indians/Alaskan Natives have witnessed unfavorable trends in colorectal cancer incidence. Incidence rates among men have been stable during the entire 25-year period. Unfortunately, American Indian/Alaskan Native women are the only racial/ethnic subgroup to experience a steady and significant increase of colorectal cancer incidence. Since 1988, rates of invasive colorectal cancer incidence among American Indian/Alaskan Native women have increased by 1.3 percent per year. Rates among this group have surpassed incidence rates of Hispanics, Asian/Pacific Islanders and non-Hispanic whites. If the trend continues, American Indian/Alaskan Native women are on track to have the highest incidence rates of all women within the racial/ethnic subgroups.

Figure 4. Trends in Age-Adjusted Incidence of Invasive Colorectal Cancer by Sex and Race/Ethnicity, Men, California, 1988-2012



Source: California Cancer Registry, California Department of Public Health.
^ Rates are based on counts less than 15 cases.
* APC is significantly different from zero at $p<0.05$.
Rates are age-adjusted to the 2000 United States Standard Population.

Figure 5. Trends in Age-Adjusted Incidence of Invasive Colorectal Cancer by Sex and Race/Ethnicity, Women, California, 1988-2012

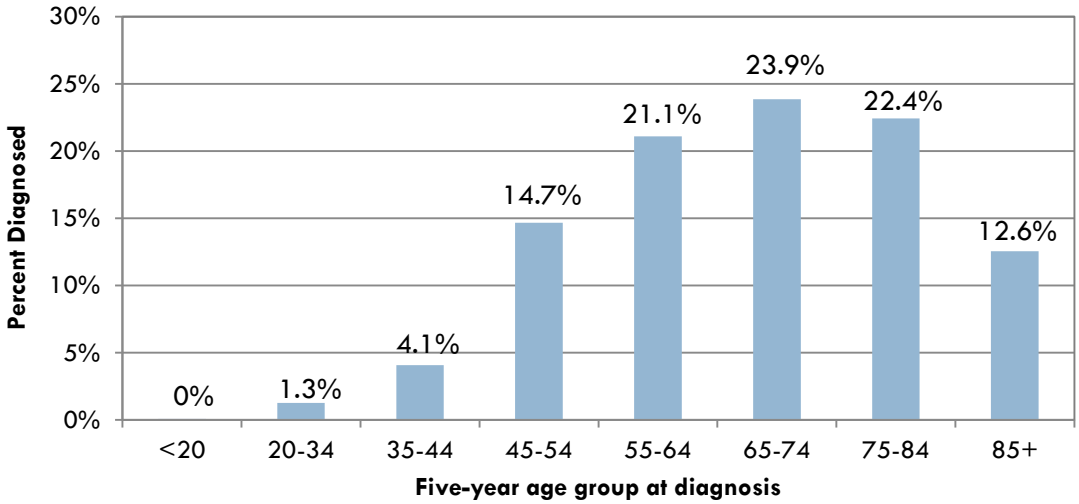


Source: California Cancer Registry, California Department of Public Health.
^ Rates are based on counts less than 15 cases.
* APC is significantly different from zero at p<0.05.
Rates are age-adjusted to the 2000 United States Standard Population.

Changes in Colorectal Cancer by Age at Diagnosis

Typically, colorectal cancer is associated with age; the older you are the more likely you are to develop a cancer of the colon or rectum.

Figure 6. Distribution of Age at Diagnosis, California, 2008-2012

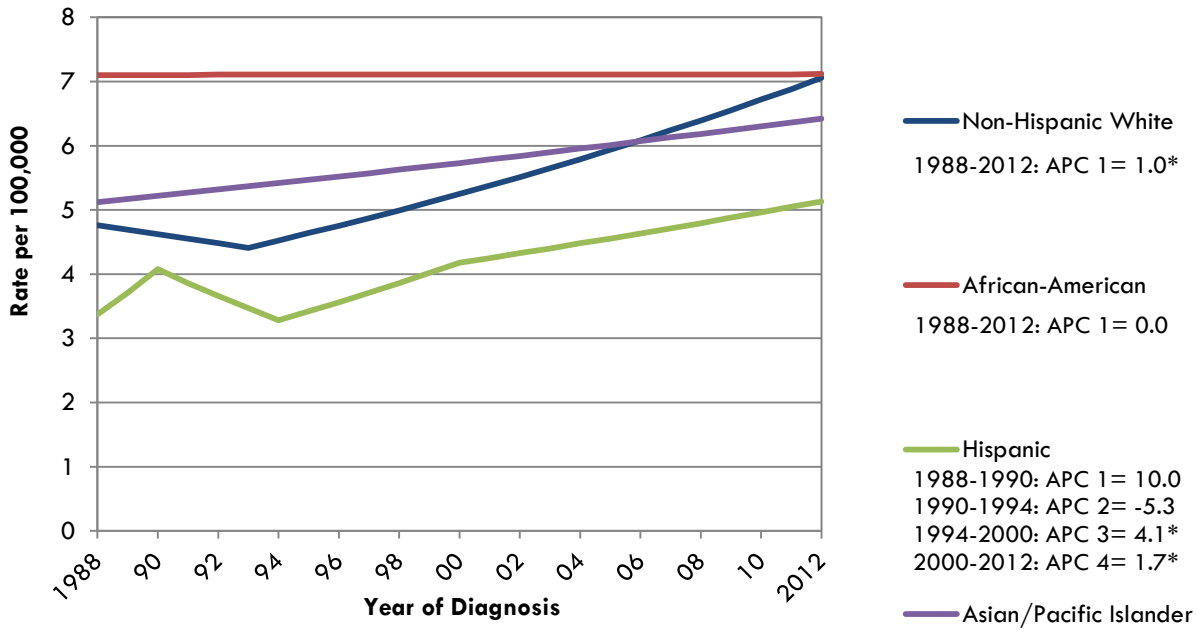


Source: California Cancer Registry, California Department of Public Health.

While colorectal cancer rates have been declining among people ages 50 and older, they are increasing among adults younger than 50 years. The exact reason for this increase is unknown, but one possible explanation is the increase of obesity rates. Over the 25-year period, non-Hispanic whites, and Hispanics have seen the largest increase in colorectal cancer incidence among people younger than 50 years.

Among non-Hispanic whites, incidence rates began to significantly increase by 2.5 percent per year beginning in 1993. Hispanics witnessed a more dramatic increase in incidence beginning in 1994, when rates increased at 4.1 percent per year. However, since 2000 the increasing trend has slowed (1.7 percent per year) but still remains significantly high. The rates of colorectal cancer among Asian/Pacific Islanders younger than 50 years old began to increase in 1993 at an annual rate of 2.5 percent. African Americans have not witnessed the same increase as the other major racial/ethnic groups; their rates have remained very stable during the 25-year period. Trends of colorectal cancer incidence among American Indian/Alaskan Natives less than 50 years were unable to be calculated due to small case counts.

Figure 7. Trends in Age-Adjusted Incidence of Colorectal Cancer among Californians Younger than 50 years by Race/Ethnicity, 1988-2012



Source: California Cancer Registry, California Department of Public Health.
* APC is significantly different from zero at $p<0.05$.
Rates are age-adjusted to the 2000 United States Standard Population.

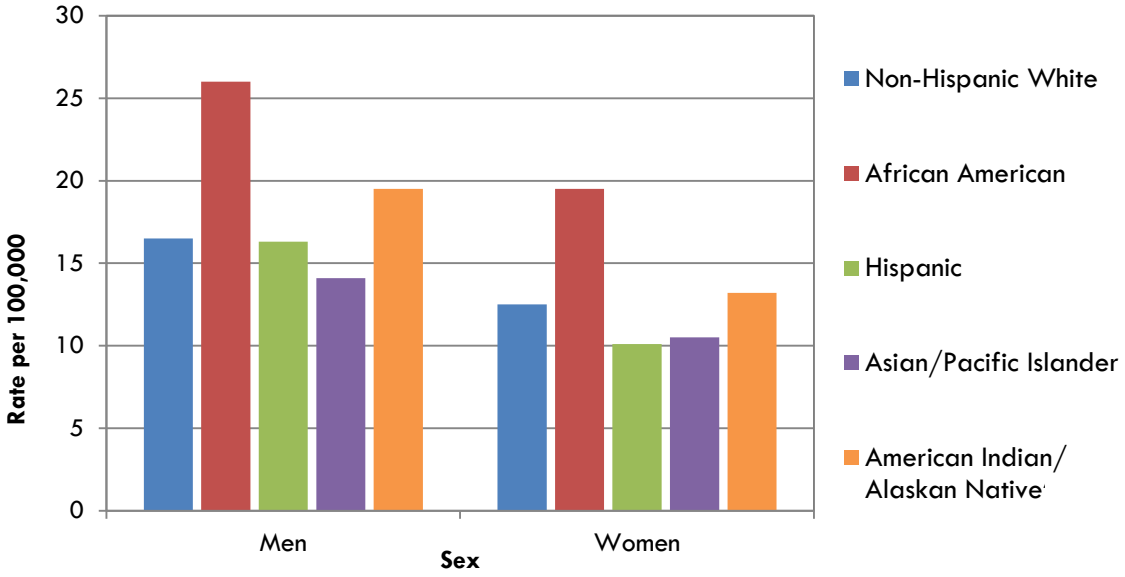
COLORECTAL CANCER MORTALITY

Five-Year Age-Adjusted Mortality Rates by Race/Ethnicity

During the five-year period (2008-2012), African American men had the highest five-year average mortality rates among men of all race/ethnic groups (26 per 100,000), followed by American Indian/Alaskan Natives (19.5 per 100,000). Non-Hispanic and Hispanic men had nearly identical five-year average mortality rates (16.5 and 16.3 per 100,000), respectively. Asian/Pacific Islander men had the lowest five-year average mortality rate (14.1 per 100,000) among all race/ethnic groups.

Five-year average mortality rates for women were highest among African Americans (19.5 per 100,000), followed by American Indian/Alaskan Native women (13.2 per 100,000). The average mortality rate among non-Hispanic white women was 12.5 per 100,000. Asian/Pacific Islander women had slightly higher average mortality rates than Hispanic women (10.5 and 10.1 per 100,000).

Figure 8: Five-year Age-Adjusted Mortality Rates of Colorectal Cancer by Race/Ethnicity and Sex, California, 2008-2012

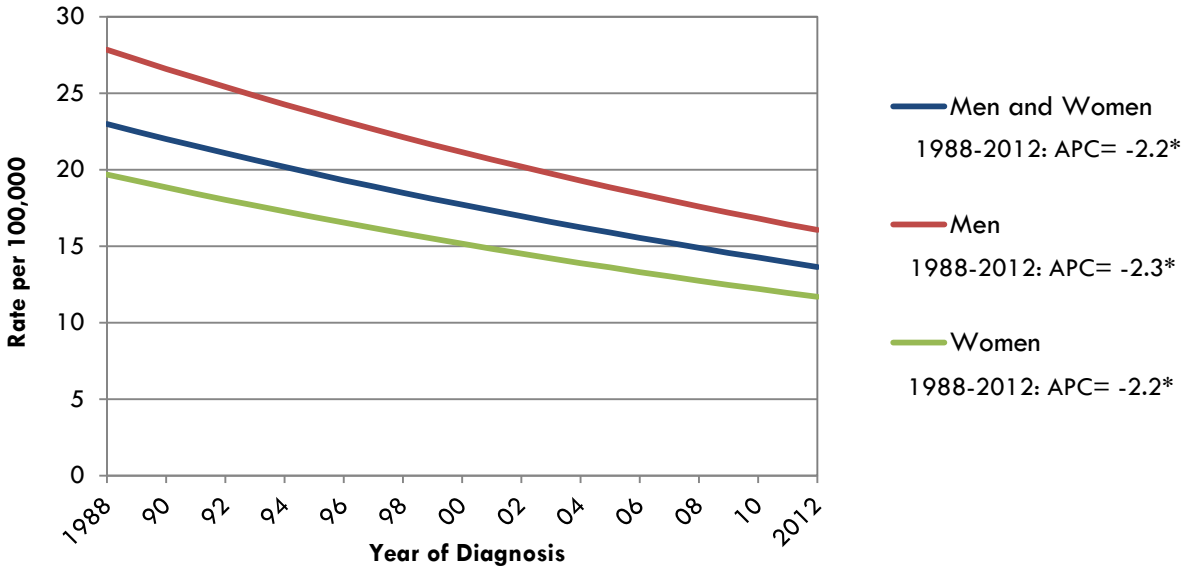


Source: California Cancer Registry, California Department of Public Health.
Rates are age-adjusted to the 2000 United States Standard Population.

Changes in Colorectal Cancer Mortality

Colorectal cancer mortality rates have been significantly declining in California between 1988 through 2012 at an average rate of 2 percent per year over the 25-year period. The mortality rates have been consistently higher for men; however, the annual rate of decline for both men (-2.3 percent per year) and women (-2.2 percent per year) has been nearly identical.

Figure 9: Trends in Colorectal Cancer Mortality by Sex, California, 1988-2012

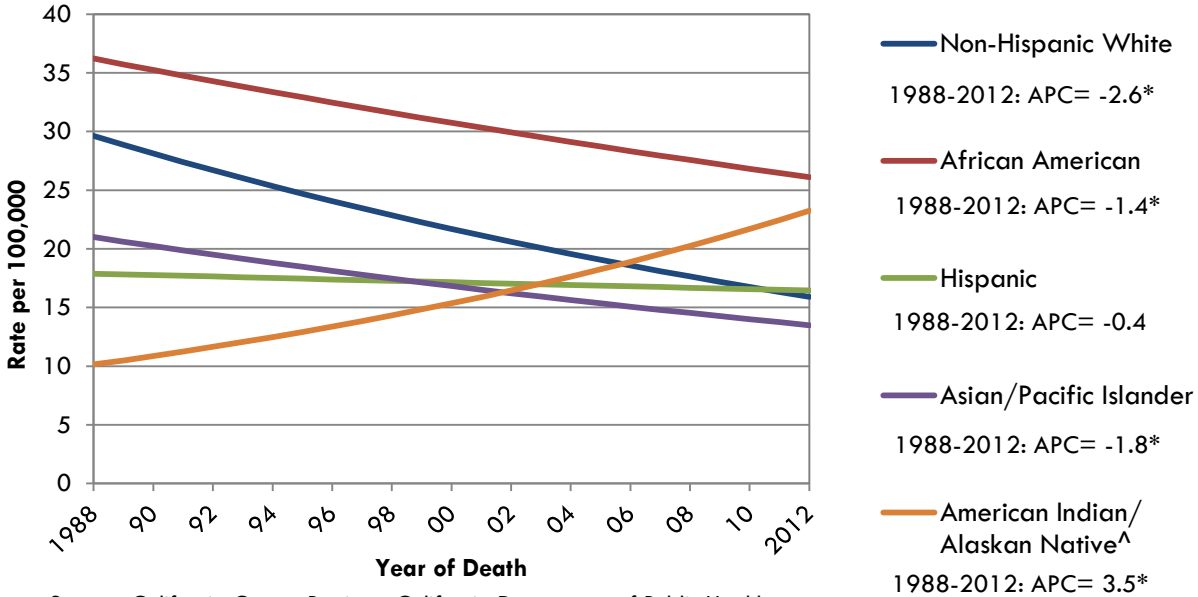


Source: California Cancer Registry, California Department of Public Health.
* APC is significantly different from zero at $p<0.05$.
Rates are age-adjusted to the 2000 United States Standard Population.

Changes in Colorectal Cancer Mortality by Race/Ethnicity and Sex

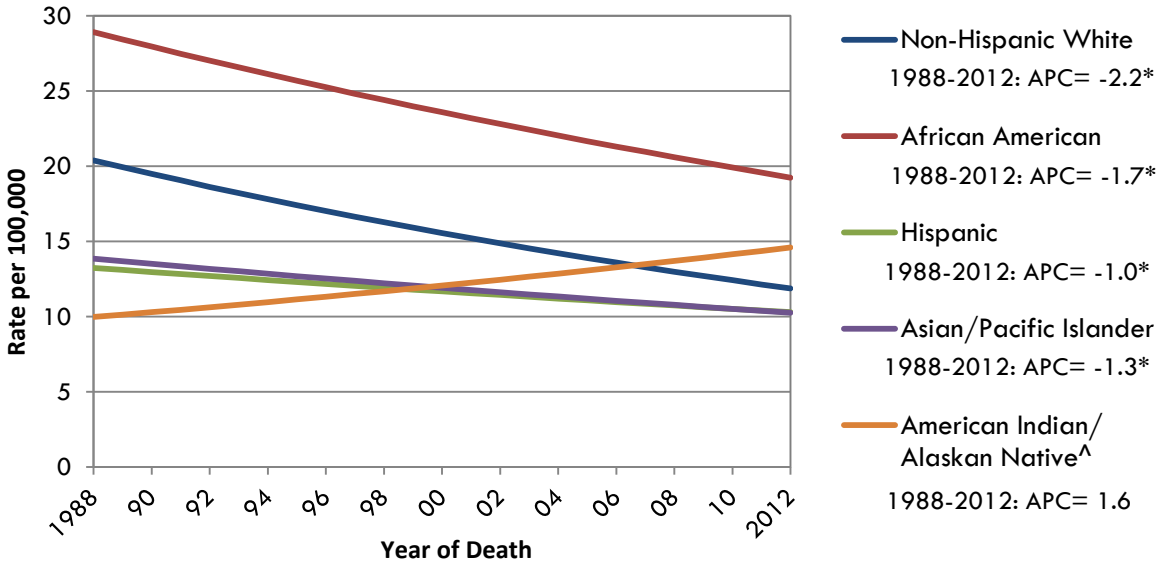
Mortality rates have declined significantly in almost all race/ethnic groups, but like incidence rates, the decline has not been the same.

Figure 10: Trends in Colorectal Cancer Mortality by Race/Ethnicity, Men, 1988-2012



Source: California Cancer Registry, California Department of Public Health.
^ Rates are based on counts less than 15 cases.
* APC is significantly different from zero at p<0.05.
Rates are age-adjusted to the 2000 United States Standard Population.

Figure 11: Trends in Colorectal Cancer Mortality by Race/Ethnicity, Women, 1988-2012



Source: California Cancer Registry, California Department of Public Health.
^ Rates are based on counts less than 15 cases.
* APC is significantly different from zero at p<0.05.
Rates are age-adjusted to the 2000 United States Standard Population.

Mortality rates of colorectal cancer among non-Hispanic white men and women have significantly declined over the past 25-years. The decrease has been more prominent among men (-2.6 percent per year) compared to women (-2.2 percent per year).

African Americans have the highest mortality colorectal cancer rates, but between 1988 through 2012, rates have significantly declined 1.4 percent per year among men and 1.7 percent per year among women.

Hispanic men and women have experienced slower trends in the reduction of colorectal cancer mortality. Mortality rates among Hispanic men have been nearly stable, with a slight but non-significant decrease between 1988 through 2012. On the other hand, Hispanic women have shown a significant decrease in mortality rates of 1 percent per year over the 25-year period.

Mortality trends among Asian/Pacific Islander men and women have shown declines; although the rate of decline has been a little more pronounced for men (1.8 percent per year) than women (1.3 percent per year). In 1998, the mortality rates among Asian Pacific Islander men fell below those of Hispanic men, and the gap has grown wider since. However, the mortality rates among Asian/Pacific Islander women and Hispanic women narrowed in the early 2000's but mortality rates in 2012 were identical.

American Indians/Alaskan Natives were the only group that witnessed increases of mortality associated with colorectal cancer. Unfortunately, American Indian/Alaskan Native men have seen a significant increase of 3.5 percent per year; while mortality rates among women increase nearly 2 percent per year, though not at a statistically significant rate. Nonetheless, colorectal cancer mortality rates among American Indian/Alaskan Natives have surpassed all other race/ethnic groups with the exception of African Americans. However, if the current rate continues they will soon surpass the decreasing colorectal cancer mortality rates of African Americans.

STAGE AT DIAGNOSIS

Colorectal cancer is easiest to treat and has the best chance of survival when tumors are detected at an early stage. While colorectal cancer incidence rates have steadily declined from 1988-2012, more than half of all colorectal cancers are still detected at an advanced stage (the cancer has spread beyond the colon or rectum).

Among men, Hispanics have the highest proportion of colorectal cancers diagnosed at advanced stage (56 percent), followed by American Indian/Alaskan Native men (55 percent). 53 percent of non-Hispanic white and Asian/Pacific Islander men were diagnosed with advanced stage colorectal cancers. Compared to men of other racial/ethnic groups, African American men had the lowest proportion of advanced stage disease.

Women had slightly higher proportions of advanced stage diagnoses compared men. Among all women, American Indian/Alaskan Natives had the highest proportion of advanced stage colorectal cancer (57 percent) followed by non-Hispanic white and Hispanic women (55 percent). African-American and Asian/Pacific Islander women had the lowest proportion of advanced stage colorectal cancer diagnoses (54 percent).

Table 1. Proportion of Advanced* stage Colorectal Cancer by Race/Ethnicity and Sex by SEER Summary Stage, California, 2008-2012

Race/Ethnicity	Men		Women	
	# of advanced stage cases	% advanced stage	# of advanced stage cases	% advanced stage
Non-Hispanic White	10,845	53%	10,484	55%
African American	1,320	51%	1,316	54%
Hispanic	3,372	56%	2,700	55%
Asian/Pacific Islander	2,284	53%	2,221	54%
American Indian/ Alaskan Native	86	55%	89	57%

Prepared by the California Cancer Registry, California Department of Public Health.

* Advanced stage defined as regional and distant, according to the SEER Summary Staging System.

Survival

Cancer stage at diagnosis determines treatment options and has a strong influence on the length of a patient's survival. Survival rates are much higher when colorectal cancer is diagnosed at an early stage. The five-year relative survival of colorectal cancers diagnosed between 2007 through 2012 at a localized stage (when the cancer is still confined to the colon or rectum) was 93.1 percent. When the cancer spreads to the lymph nodes, also known as regional stage, five-year relative survival drops to 71.9 percent. Five-year relative survival among patients whose colorectal cancer is diagnosed at a distant stage is 14.8 percent.

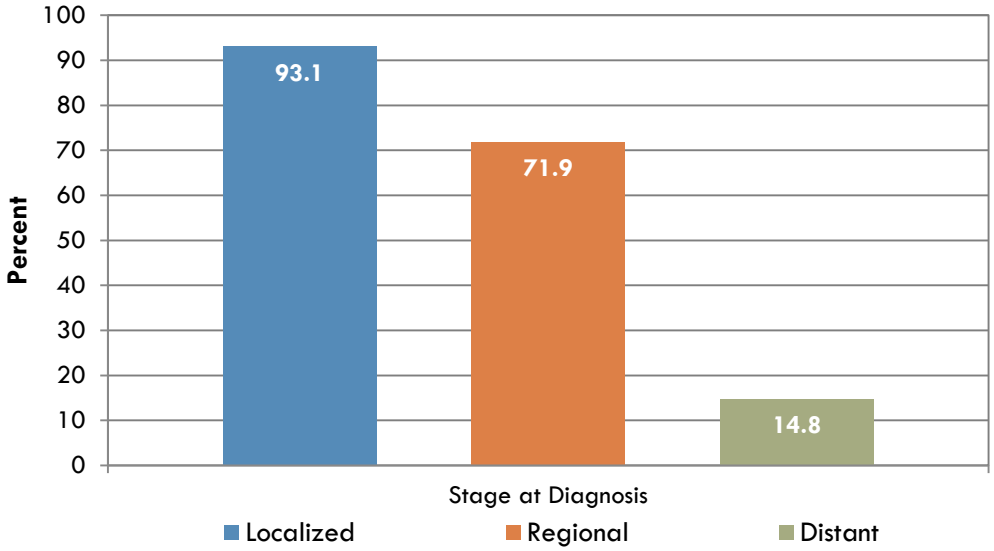
Surveillance, Epidemiology, and End Results (SEER) Summary Staging System:

Localized: the cancer is confined to the colon or the rectum.

Regional: the cancer has spread to regional lymph nodes.

Distant: the cancer has spread to distant lymph nodes and other organs.

Figure 12: Five-Year Relative Survival of Colorectal Cancer by SEER Summary Stage, California, 2007-2012



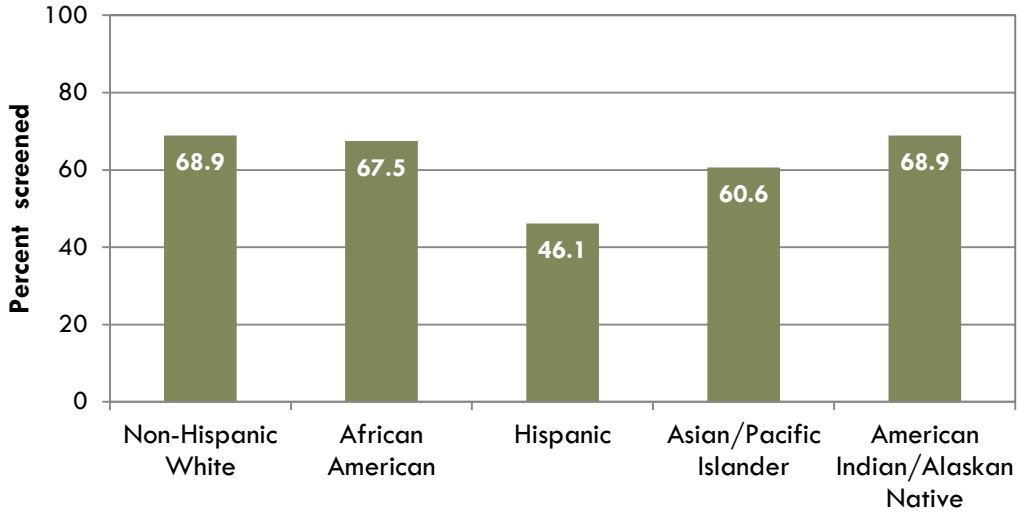
Source: California Cancer Registry, California Department of Public Health.

COLORECTAL CANCER SCREENING

Early stage colorectal cancers may have no symptoms, and therefore, are most often detected only through screening. Beginning at age 50, the American Cancer Society (ACS) recommends that both men and women at average risk for developing colorectal cancer get routine colorectal cancer screening. For more information on current screening guidelines, visit the ACS's website www.cancer.org.

In 2012, 63.6 percent of Californians over age 50 reported having had either a fecal occult blood test (FOBT) in the past year or a sigmoidoscopy or colonoscopy within the past ten years. While over 60 percent of non-Hispanic whites, African Americans, Asian/Pacific Islanders, and American Indian/Alaska Natives reported having either a FOBT in the past year or a sigmoidoscopy or colonoscopy in the past ten years, Hispanics (46.1percent) were less likely to have been screened using any of the three tests. Additional findings indicate that Californians ages 50 to 75 years old with a lower household income (45.4 percent from $15,000 - $24,999 annually), lesser education (36.9 percent with less than a high school education), and the uninsured (25.7 percent) were also less likely to be screened for colorectal cancer by any of the available tests.

Figure 13: Sigmoidoscopy/Colonoscopy/Fecal Occult Blood Test (FOBT) Use Among Persons Ages 50 and Older by Race/Ethnicity in California, 2012



Note: Data are weighted to the 2010 California population.
Source: California Behavioral Risk Factor Surveillance Survey.

A number of lifestyle-related factors have been associated with colorectal cancer. Links between weight, physical activity, alcohol use, and smoking and colorectal cancer risk are some of the strongest for any type of cancer.[1]

Being overweight or obese can increase the risk of developing and dying from colorectal cancer.[2] Excess body weight, as defined by the body mass index (BMI), has been associated with an increased risk for several diseases.[3] Findings from Behavioral Risk Factor Surveillance Survey (BRFSS) indicated that those who were obese and known to be at higher risk to develop and die from colorectal cancer were slightly less inclined (51.0 percent) to be screened by use of a sigmoidoscopy or colonoscopy as compared to those considered overweight (56.2 percent) or not overweight (55.6 percent).

Physical activity can also affect the risk for colorectal cancer.[4] Physical activity may reduce the risk of cancer of the colon, in addition to several other cancer types. Adults, who increase their physical activity either in intensity, duration, or frequency, may reduce their risk of developing colorectal cancer in addition to benefitting from weight control and overall health improvement. In 2012, findings indicated that those with inactive lifestyles were also the least likely to be screened for colorectal cancer by either a FOBT test in the past year, or a sigmoidoscopy in the past five years, or colonoscopy in the past ten years.

[1] http://www.cancer.org/cancer/colonandrectumcancer/index
[2] http://www.cancer.gov/cancertopics/factsheet/Risk/obesity
[3] http://www.cdc.gov/nccdphp/dnpa/pdf/CalltoAction.pdf
[4] http://www.cancer.org/cancer/news/six-ways-to-lower-your-risk-for-colon-cancer

Heavy alcohol use can increase the risk of developing colorectal cancer. [4] Binge drinkers (defined as four or more drinks for women and five or more drinks for men on an occasion during the past 30 days) are at increased risk of developing colorectal cancer as compared to nondrinkers or occasional drinkers. Heavy alcohol use is also associated with low colorectal screening compliance. Findings from the Behavioral Risk Factor Surveillance Survey (BRFSS) indicate that among Californians who were binge drinkers for more than 15 days in the previous 30 days, only 35.4 percent elected to be screened for colorectal cancer by any of the recommended methods for testing.

Long-term cigarette smoking is associated with an increased risk of colorectal cancer. [4] Long-term smokers are at higher risk than non-smokers to develop and die from colorectal cancer in addition to the risk for colorectal cancer from smoking being higher for women versus men. Findings indicate that of current smokers in California, 49.5 percent between 50 and 75 years of age were screened for colorectal cancer in 2012.

Table 2. Lifestyle Characteristics and Colorectal Cancer Screening among California Adults, aged 50 - 75 years, 2012 California BRFSS

	Blood stool test (FOBT/FIT) in past year		Sigmoidoscopy in past five years OR Colonoscopy in past ten years		Blood stool test in past year, OR sigmoidscopy in past five years, OR colonoscopy in past ten years	
	%*	95% CI	%	95% CI	%	95% CI
Total [N=6,663]	20.0	18.8-21.3	54.0	52.4-55.6	63.3	61.7-64.8
Sex						
Men	20.5	18.5-22.4	54.1	51.7-56.6	62.8	60.4-65.2
Women	19.6	18.1-21.2	53.8	51.7-55.9	63.7	61.7-65.7
Annual household income						
< $15,000	14.0	10.8-17.1	35.2	31.0-39.3	42.9	38.5-47.2
$15,000-$24,999	15.9	12.3-19.6	36.6	32.0-41.2	45.4	40.5-50.3
$25,000-$49,999	23.2	20.2-26.2	52.5	48.8-56.2	63.9	60.3-67.5
$50,000-$74,999	22.1	18.6-25.5	57.8	53.6-61.9	69.0	65.0-72.9
$75,000+	21.2	19.1-23.3	64.6	62.1-67.1	73.3	70.9-75.6

Educational attainment	%*	95% CI	%	95% CI	%	95% CI
Less than high school	10.0	7.0-13.0	30.0	25.6-34.5	36.9	32.1-41.6
High school or GED	21.5	18.2-24.8	46.2	42.3-50.1	57.7	53.8-61.6
Some college	21.1	18.7-23.6	57.5	54.5-60.5	66.8	63.9-69.6
College graduate	21.7	19.8-23.6	61.5	59.2-63.8	70.7	68.5-72.9
Insurance status						
Uninsured	7.4	4.5-10.4	20.3	16.4-24.3	25.7	21.3-30.0
Medi-Cal	16.5	13.0-20.1	42.3	37.5-47.0	49.6	44.7-54.5
Private or other insurance	22.5	21.1-24.0	61.0	59.3-62.8	71.2	69.6-72.9
Weight						
Not overweight	18.3	16.2-20.4	55.6	52.8-58.4	63.4	60.6-66.1
Overweight	19.8	17.8-21.9	56.2	53.6-58.8	64.7	62.2-67.3
Obese	21.9	19.4-24.4	51.0	48.0-54.0	62.6	59.6-65.5
Alcohol Use (Binge drinking**)						
No binge drinking in past 30 days	20.8	19.0-22.7	62.0	59.8-64.3	70.9	68.8-73.1
1 to 15 times in past 30 days	19.1	15.1-23.2	45.0	39.9-50.0	56.6	51.4-61.8
> 15 times in past 30 days	11.2	1.2-21.3	33.5	16.1-50.8	35.4	17.6-53.2
Smoking						
Current smoker	17.1	13.5-20.6	40.6	35.8-45.4	49.5	44.6-54.5
Non-smoker	20.4	19.1-21.7	55.7	54.0-57.3	65.0	63.4-66.6
Physical Activity						
Highly active (301+ min/wk)	20.2	17.1-23.3	57.5	53.5-61.4	66.5	62.7-70.3
Active (150 - 300 min/wk)	17.1	12.8-21.5	51.4	45.3-57.7	59.5	53.3-65.7
Moderately active (1-149 min/wk)	20.6	14.7-26.4	51.0	44.3-57.7	63.8	57.4-70.2
Inactive	18.9	16.0-21.8	48.9	45.2-52.7	58.3	54.6-62.0

Source: Behavioral Risk Factor Surveillance Survey, California Department of Public Health.
*%=Percentage; 95% CI= Confidence Interval (at the 95 percent probability level).
Percentages are weighted to population characteristics.

** Binge drinking = four or more drinks for women and five or more drinks for men on an occasion during the past 30 days.

GEOGRAPHICAL DIFFERENCES IN COLORECTAL CANCER:

Colorectal Cancer in California Compared to the Nation

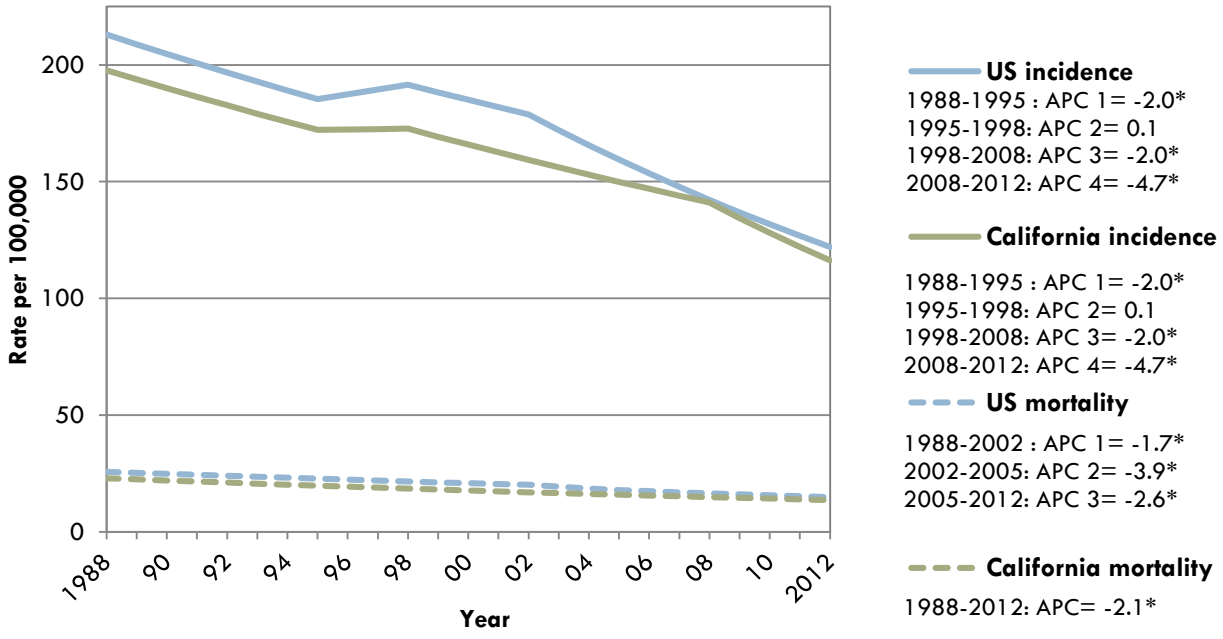
The incidence of invasive colorectal cancer has significantly declined, both within California and nationwide. Currently, incidence rates in California are slightly lower than the rest of the nation.

Trends of invasive colorectal cancer incidence in the United States, witnessed a 2 percent reduction per year between 1988 through 1995. Rates stagnated during the period between 1995 through 2002, and then began to dramatically decline in 2002 (3.7 percent per year).

California witnessed similar invasive colorectal cancer trends. The rate of decline from 1988 to 1995 in California was identical to the nation at large (2.0 per year). Between 1995 through 1998 there was no change in incidence rates; but since 1998 the gap between nationwide and California-specific incidence rates has narrowed.

When comparing colorectal cancer mortality rates, there has been very little difference between the nation and California. Both have had consistently declining rates of colorectal cancer mortality since 1988, although rates in California have remained slightly lower than the rest of the nation.

Figure 14: Trends in Invasive Colorectal Cancer Incidence and Mortality in California and United States Other than California, 1988-2012



Source: California Cancer Registry, California Department of Public Health.
^ Rates are based on counts less than 15 cases.
* APC is significantly different from zero at $p<0.05$.
Rates are age-adjusted to the 2000 US Standard Population.

Advanced Stage Colorectal Cancers in California Communities, 2007-2011

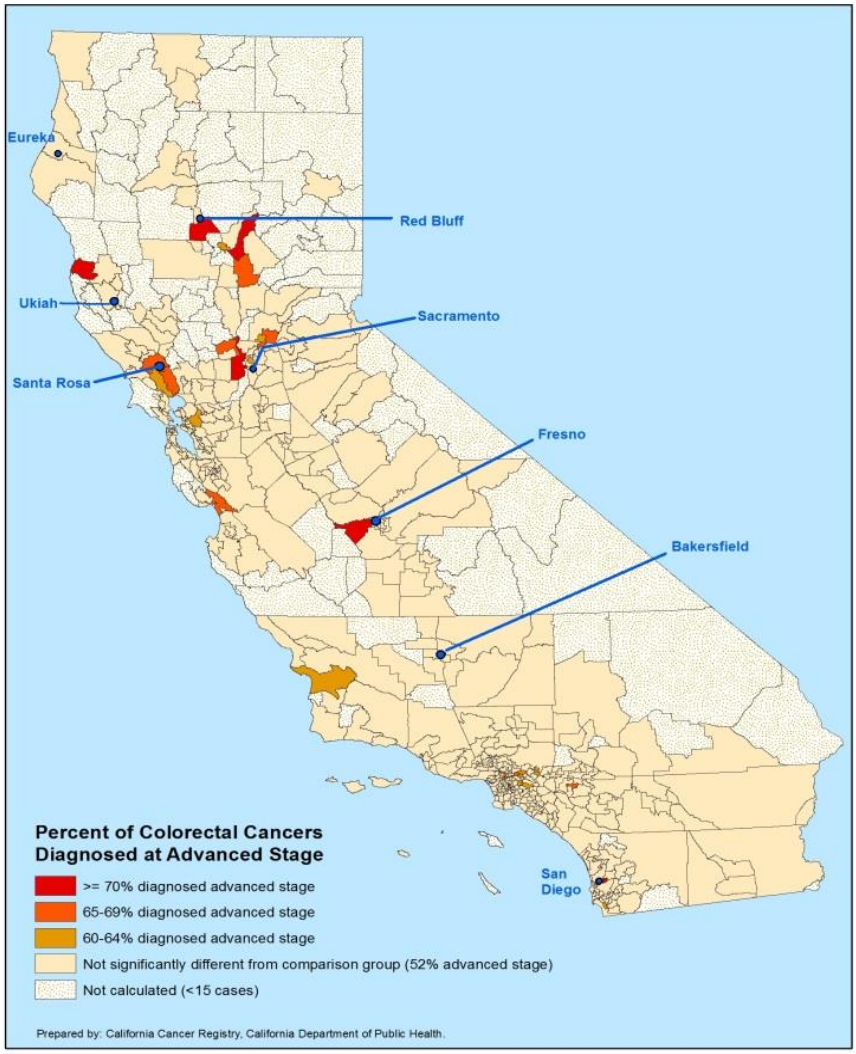
Although early diagnosis of colorectal cancer through screening improves outcomes and reduces mortality, colorectal cancer screening is underutilized in California. To determine geographical differences in advanced stage colorectal cancer and to highlight areas of the state that would benefit from increased screening interventions, California Cancer Registry (CCR) created a project to map areas which had high proportions of advanced stage colorectal cancer diagnoses.

The maps display advanced stage (regional and distant stages) colorectal cancers diagnosed in California communities between 2007 through 2011. The analysis only included people aged 50 and older because current guidelines recommend screenings beginning at age 50. State and county statistics often do not show local variations in cancer that are of interest, therefore, this study used Medical Study Service Areas (MSSAs) which are aggregations of census tracts.

The proportion of colorectal cancer cases diagnosed at advanced stage was significantly higher in 32 of the 542 MSSAs. Of those, six MSSAs had 70 percent or more of all colorectal cancer cases diagnosed at advanced stage. To protect patient confidentiality, MSSAs with fewer than 15 cases were not displayed.

For county-specific maps, please visit:
http://www.ccrcal.org/Data_and_Statistics/CRC/MapData.shtml

Map 1. Percent of Colorectal Cancer Cases Diagnosed at Advanced Stage in California Communities Among Men and Women 50 Years and Older, 2007-2011



PARTNERS IN THE FIGHT AGAINST COLORECTAL CANCER IN CALIFORNIA:

California Dialogue on Cancer

The California Dialogue on Cancer (CDOC) is a coalition of diverse cancer control stakeholders created specifically to develop and implement California's Comprehensive Cancer Control Plan, a strategic plan to reduce the burden of cancer in the state. CDOC has embarked on a mission to increase colorectal cancer screening rates in the state of California. Increasing colorectal cancer screening rates has been a priority of CDOC as well as many partners for several years and many successful interventions have been implemented by various partners throughout the state.

Increasing colorectal cancer screening rates is also a goal shared nationwide by many organizations and led by the National Colorectal Cancer Roundtable (NCCRT) through the *80% by 2018* initiative. This movement involves dozens of organizations that have committed to

eliminating colorectal cancer as a major public health problem. All involved in this initiative are working toward the shared goal of 80 percent of adults aged 50 and older being regularly screened for colorectal cancer by 2018. CDOC has signed the *80% by 2018* pledge and is working with the California Department of Public Health (CDPH) and the California Department of Health Care Services (DHCS) to realize this goal in California through working with managed care plans in adopting the Fecal Immunochemical Test (FIT) as an option for front line colorectal cancer screening. CDOC is administered by the CDPH Comprehensive Cancer Control Program and works in collaboration with its sister program, the California Colon Cancer Control Program (C4P) and the California Colorectal Cancer Coalition (C4).

California Colon Cancer Control Program

CDPH-C4P is a grant-funded program through the Centers for Disease Control and Prevention (CDC). C4P began in 2009 and is entering into a new five-year grant cycle beginning in the 2015-16 fiscal-year. Its mission is to increase public awareness of colorectal cancer and the importance of early detection through screening to reduce prevalence of colorectal cancer. C4P has a number of activities in which it engages to accomplish this mission, including collaborating with health systems to improve colorectal cancer screening in quantity and quality. Additionally, C4P works with other agencies on statewide initiatives to promote screening and reduce the colorectal cancer burden.

To improve colorectal cancer screening rates, C4P partners with Federally Qualified Health Centers (FQHCs). One of the partnerships was with the Ocean Park Health Center (OPHC), who is a member clinic of the San Francisco Health Network. This partnership resulted in increasing OPHC's colorectal cancer screening rate from 40 percent in 2008, to 75 percent in 2012. This was accomplished through the use of FIT tests as a first-line screening for colorectal cancer and patient navigation.

Currently, C4P is partnering with Alameda Health System, in Northern California, and FQHCs in Southern California to improve colorectal cancer screening efforts in those locations. Under the new grant cycle, the focus of these partnerships will be on a systems change approach with the goal of sustainable improvements to colorectal cancer screening among low-income and underinsured populations. Patient navigation will play a key role in achieving this goal, as well as additional evidence-based interventions such as patient reminders, provider reminders, and provider assessment and feedback.

C4P continues to partner with DHCS with the goal of increasing the use of FIT tests as they are more effective in detecting colorectal cancer than the first generation FOBTs, and are a more cost-effective test than using colonoscopy for first-line screening. C4P and DHCS partnered to implement an increase in the reimbursement rate for FIT tests for Medi-Cal providers. Previously

FIT tests were reimbursed at the same rate as the FOBT test, despite being a more expensive test. Additionally, C4P will be partnering with CDPH's Comprehensive Cancer Program and DHCS to promote FIT as the first-line screening test for colorectal cancer screening among Medi-Cal providers and Medi-Cal managed care health plans.

C4P has also partnered with the University of California, San Francisco, to produce a continuing medical education (CME) course on the topic of how to increase colorectal cancer screening in a physician's practice. C4P has been able to offer the CME course to more than 600 physicians free of charge, and will continue to offer the course through the end of the 2016-2017 fiscal-year.

Nationwide, C4P partners with the NCCRT, CDC, CDOC, and other key stakeholders in the goal of increasing colorectal cancer screening rates to *80% by 2018*.

TECHNICAL NOTES:

Incidence (New Cases)

This report includes cases of cancer diagnosed between January 1, 1988, and December 31, 2012, and reported to CCR as of June 2015. A "case" is defined as a primary cancer; tumors that results from the spread, or metastasis, of cancer to another organ from a primary cancer are not counted as new cases. Only invasive cancers (those that have infiltrated the tissue of the organ of origin) are included in this report. Regional registries, covering the entire state, report cancer incidence data to CCR. Standards for data abstracting, collecting, and reporting are specified by CCR. Only cases diagnosed in California residents are included in this report: persons who were treated for cancer in California but who were residents of another state or country are not included.

Mortality (Deaths)

Computerized files containing information on cancer-related deaths were obtained from CDPH, Center for Health Statistics. Beginning in 1999, cause of death was coded by the International Classification of Diseases, Tenth Edition (ICD-10). All mortality analyses presented in this report are the responsibility of the authors and were not reviewed or endorsed by the Center for Health Statistics prior to publication. Only deaths among California residents were included in these analyses.

Statistical Methods:

Calculation of Age-Adjusted Rates: Rates were calculated as the number of new cases (incidence) or deaths (mortality) in specific age groups per 100,000 persons each year and were age-adjusted to the 2000 United States standard population. Age-adjusted rates are weighted averages of age-specific rates, where the rates represent the age distribution of a standard population. Such adjustment eliminates differences in rates due to changes in the age of a population over time or differences in age distribution between age groups. Rates in this report were calculated using the Surveillance Research Program, National Cancer Institute SEER*Stat software 8.2.1 (http://www.seer.cancer.gov/seerstat).

Annual Percent Change (APC)

The estimated annual percent change (APC) represents the average percent increase or decrease in cancer rates per year over a specified period of time. It is calculated by first fitting a linear regression to the natural logarithm of the annual age-adjusted rates (r), using calendar year as the predictor variable:

$$\ln(r) = m(\text{year}) + b.$$

From the slope of the regression line, the APC is calculated as:

$$APC = 100*(em-1)$$

Testing the hypothesis that the APC is equal to zero is equivalent to testing the hypothesis that the slope of the line in the regression is equal to zero. Statistical significance was set at alpha= 0.05. This means that the trend in cancer rates was considered statistically different if there was less than five percent chance the difference was the result of random variation.

Joinpoint Analysis of Trends

Joinpoint linear regression was used to determine trends in cancer incidence and mortality. In this analysis, a statistical algorithm detects joinpoints, or points in time where the slope of the regression line significantly changes. Thus, the model describes trends during different time segments. At each segment, trends in rates are measured using the estimated APC, which assumes that rates change by a constant percentage each year. The SEER JoinPoint regression software version 3.5.4 (http://www.surveillance.cancer.gov/joinpoint/) was used for all trend analyses in this report.