VI. SMOKING-RELATED CANCERS

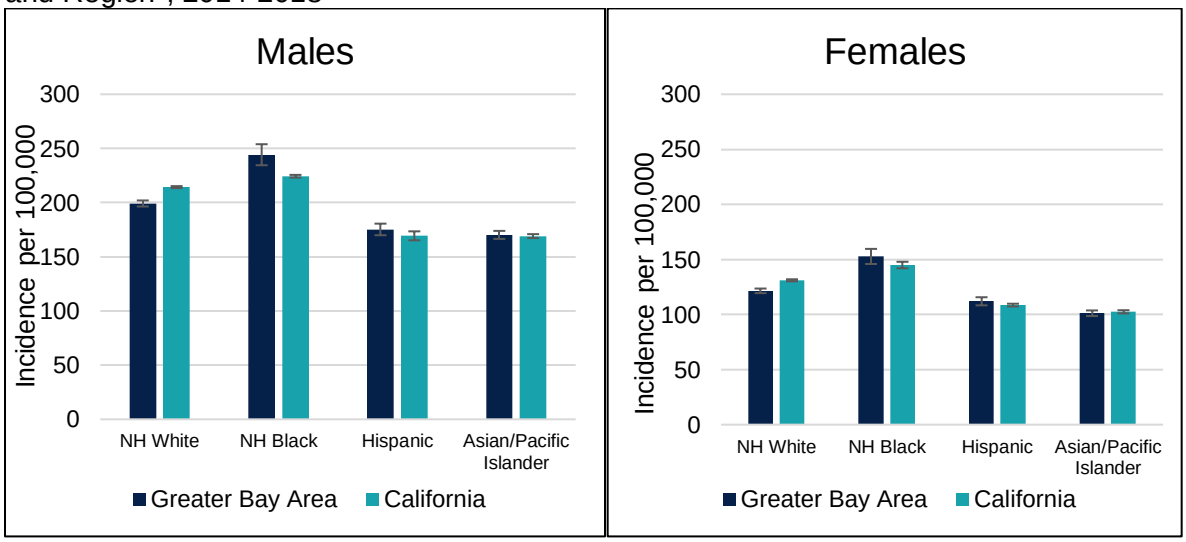
As defined by the U.S. Surgeon General, cancers known to be smoking-related include cancers of the lung, oral cavity and pharynx, esophagus, stomach, colon/rectum, liver, pancreas, larynx, bladder, kidney, and acute myeloid leukemia [29, 30]. Following national declines in smoking prevalence, incidence rates of these smoking-related cancers (combined) declined significantly from 1988 through 2018 among males and females in all racial/ethnic groups. From 1988-2018, among males, the most substantial annual declines in incidence were observed for NH Black males (-1.4%) and White males (-1.3%). Among females, incidence in NH White and NH Black females had the steepest annual decline (-1.2%), while declines among Asian/Pacific Islander and Hispanic females were less marked, -1.0% and -0.7% annually, respectively. Historically, declines in both incidence and mortality of smoking-related cancers in the Greater Bay Area have been among the steepest in the nation, likely due to the success of California's stringent tobacco-control programs [31]. For all smoking-related cancers combined, the incidence rates for NH Black males and females were higher than among all other racial/ethnic groups, both in the GBACR and in California. GBACR rates were higher than California rates for NH Black and Hispanic males and females, and for Asian/Pacific Islander males **(Table 6, Figure 14)**.

Table 6. Smoking-Related Cancers[1] Age-Adjusted Incidence Rates per 100,000 by Sex, Racial/Ethnic Group, and Region[2], 2014-2018

Race/Ethnicity	Greater Bay Area		California	
	Males	Females	Males	Females
All Racial/Ethnic Groups	192.5	117.8	200.2	124.1
NH White	199.2	121.5	214.3	131.1
NH Black	244.1	152.6	224.3	144.9
Hispanic	175.2	112.0	169.3	108.5
Asian/Pacific Islander	170.2	101.1	169.1	102.5

[1] Smoking-related cancer incidence is the combined incidence of lung, oral cavity and pharynx, esophagus, stomach, colorectal, liver, pancreas, larynx, bladder, kidney cancers, and acute myeloid leukemia, as defined by the U.S. Surgeon General [29, 30].
[2] The two regions represented include: (1) the Greater Bay Area (nine-county region) and (2) all of California (including the nine-county Greater Bay Area region).

Figure 14: Smoking-related Cancers Age-Adjusted Incidence Rates[1] by Sex, Race/Ethnicity, and Region[2], 2014-2018



[1] Error bars (in black at the top of the bars) indicate 95% confidence intervals surrounding the corresponding incidence rates.
[2] The two regions represented include: (1) the Greater Bay Area (nine-county region) and (2) all of California (including the nine-county region of the Greater Bay Area).

Cigarette smoking trends in the U.S.

Among adults in the U.S., an estimated 13.7% of the population were estimated to be current smokers. There are differences by sex, race/ethnicity, and region of the U.S. [32, 33]. In the U.S. population, 15.6% of males and 12.0% of females were estimated to be current smokers. Among adults, the percentage of current smoking ranked as follows by race/ethnicity: 22% for American Indian and Alaska Native; 15% for NH White; 14.6% for African American, 9.8% for Hispanic, and 7.1% for Asian American.

The percentage of the population that is estimated to be current smokers varies significantly by region. The Midwest has the highest percentage of smokers (16.2%) followed by the South (14.8%), and the Northeast (12.5%). The Western U.S. has the lowest percentage of current smokers (10.7%). Second only to Utah (9.0%), California has the lowest percentage of smokers in the U.S. (11.2%). This is likely due to California passing the nation's earliest statewide anti-smoking legislation (1995).

Highlights of trends in specific smoking-related cancers

Cancer of the oral cavity and pharynx (oropharyngeal cancer) was more common in males than females [27, 34, 35]. Risk factors include tobacco and heavy alcohol use, as well as infection with certain cancer-causing strains of human papillomavirus (HPV) [36]. The number of oropharyngeal cancers linked to HPV infection has increased dramatically over recent decades, with approximately 70% now caused by HPV infection [37, 38]. Efforts are underway to monitor HPV-related forms of oropharyngeal cancer.

The incidence of oropharyngeal cancer in males has steadily declined by -0.9% per year from 1988-2018. In females, there has been a greater decline in incidence of -1.4% per year from 1988-2018. In 2014-2018, the incidence rate (all races/ethnicities) was 15.0 per

100,000 in males, and 5.9 per 100,000 in females. Incidence was almost twice as high in NH White males (18.2 per 100,000) than in Hispanic males (9.1 per 100,000). Less variation in incidence occurred among females. Asian/Pacific Islander and NH White females had the highest rates (6.5 and 6.2 per 100,000, respectively) and Hispanic females had the lowest rate (3.8 per 100,000). Incidence in Asian/Pacific Islander females in the Greater Bay Area was higher than in California, and rates in the Greater Bay Area were comparable to California for all other racial/ethnic groups.

There has been a consistent decline in mortality from oropharyngeal cancer since 1988 for both sexes: -2.0% per year for males, and -2.9% per year for females. This trend may be due to changes in the underlying cause of oropharyngeal cancers. As the prevalence of smoking in the U.S. has declined, so has the incidence of smoking-related oropharyngeal cancers. At the same time, the incidence of HPV-positive oropharyngeal cancer has increased, and these tumors are associated with significantly improved survival [39]. For 2014-2018, the mortality rate for NH Black males (4.6 per 100,000) was the highest of all racial/ethnic groups, followed by Asian/Pacific Islander males (3.6 per 100,000), NH White males (3.5 per 100,000), and Hispanic males (2.3 per 100,000). The mortality rates of oropharyngeal cancer in females were very low, ranging from 1.2 per 100,000 in NH White and Asian/Pacific Islander females, to 0.8 per 100,000 in Hispanic females. The mortality rate for NH White males in the Greater Bay Area (3.5 per 100,000) was slightly lower than in California (4.5 per 100,000), but rates between the Greater Bay Area and California were comparable for NH Black, Hispanic, and Asian/Pacific Islander males, and among all racial/ethnic groups for females.

Bladder cancer, both invasive and *in situ*, was the 8th most commonly diagnosed cancer in the Greater Bay Area from 2014 through 2018, and was about four times more common in males (28.0 per 100,000) than females (6.8 per 100,000). Age-adjusted incidence rates were highest in NH White males and females (35.9 and 8.6 per 100,000, respectively) and lowest in Asian/Pacific Islander males and females (15.5 and 3.8 per 100,000, respectively). Incidence of bladder cancer increases sharply with age; approximately 85% of bladder cancers were diagnosed in people aged 60 and older. Smoking increases the risk of bladder cancer two- to four-fold and approximately half of urothelial bladder cancers (the most common kind of bladder cancer) are attributed to smoking [40-43]. Other risk factors for bladder cancer include exposures to various chemicals in the dye, rubber, metal, textile, and leather industries [42].

Incidence rates of bladder cancer have been declining over time. Overall since 1988, the incidence rates for males have decreased by -1.0% per year; for females, rates have decreased by -1.2% per year. Incidence rate trends have been declining in NH White males and Hispanic males, and steady or decreasing for NH Black males and Hispanic males. Among females, incidence has been steady or declining among all racial ethnic groups. Bladder cancer incidence was higher among Hispanic males in the Greater Bay Area compared to California, but similar in all other racial/ethnic groups. Among females, bladder cancer incidence rates were similar between the Greater Bay Area and California. However, bladder cancer mortality rates in NH Whites were lower in the Greater Bay Area than in California (5.8 vs 6.6 per 100,000 for males, and 1.6 vs 1.8 per 100,000 for females).