

XVIII. LEUKEMIA

Acute lymphocytic leukemia

Acute lymphocytic leukemia (ALL) is the most frequent malignancy in children (aged 0-14 years) and the leading cause of cancer death in this age group in the U.S. [94, 95]. From 1988 through 2018, the incidence rates of childhood ALL in the Greater Bay Area remained stable for all racial/ethnic groups. For the period 2014-2018, Hispanic males had the highest incidence rate of childhood ALL (5.6 per 100,000) while NH Black males had the lowest rate (3.0 per 100,000; **Table 11**). For males and females of all racial/ethnic

groups, the incidence rates were 4.8 and 4.6 per 100,000 respectively, in the Greater Bay Area, which were slightly less than overall California rates for males and females (5.3 and 4.4 per 100,000, respectively).

Childhood ALL is a highly curable disease, with five-year survival up to 80%–90% [94, 95]. Survival has improved dramatically in the last few decades due to advances in treatment and supportive care. The mortality rates in the Greater Bay Area from 2014-2018 were comparable to the rates in California.

Table 11: Childhood ALL Incidence Rates per 100,000 by Sex, Race/Ethnicity, and Region¹, 2014-2018

| Race/Ethnicity | Greater Bay Area | | California | |
|--------------------------|------------------|---------|------------|---------|
| | Males | Females | Males | Females |
| All Racial/Ethnic Groups | 4.8 | 4.6 | 5.3 | 4.4 |
| NH White | 4.0 | 4.7 | 4.5 | 4.3 |
| NH Black | 3.0 | ^ | 2.4 | 1.8 |
| Hispanic | 5.6 | 4.6 | 6.0 | 4.7 |
| Asian/Pacific Islander | 3.7 | 4.1 | 4.2 | 4.0 |

¹ 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).

^ Statistic not displayed due to fewer than 11 cases.

Acute myeloid leukemia (AML)

Acute myeloid leukemia is the most common type of leukemia and its incidence increases substantially with advancing age, particularly among males. Incidence rates of AML increased annually from 1988 through 2018 for NH Black males (1.8%), Asian/Pacific Islander males (1.0%), and NH White males (0.6%). The 2014-2018 incidence rates of AML were higher for males than females with NH White males having the highest incidence

(5.2 per 100,000), followed by NH Black males (4.9 per 100,000), Asian/Pacific Islander males (4.7 per 100,000), and lowest for Hispanic males (3.9 per 100,000). For all racial/ethnic groups, AML incidence rates for males were similar in the Greater Bay Area and California whereas for females, the incidence rate in the Greater Bay Area (2.9 per 100,000) was lower than the state-wide rate (3.3 per 100,000).

From 1988 through 2018, AML mortality rates increased annually for NH Black males (2.5%) and NH White males (0.8%). For all races/ethnicities and both sexes, AML mortality rates in the Greater Bay Area were similar to those in California **(Table 12)**.

Chronic lymphocytic leukemia (CLL)

The incidence of chronic lymphocytic leukemia increases with age, with more than 70% of patients older than 65 years at diagnosis [96]. Among all racial/ethnic groups, incidence was about twice as high in males as in females (males: 5.0 per 100,000; females: 2.4 per 100,000). In the Greater Bay Area, the incidence of CLL among males and females of all racial/ethnic groups remained somewhat stable over the period 1988 through 2018. The 2014-2018 incidence rate was highest for NH White males and females (5.3 per 100,000), followed by NH Black (3.4 per 100,000), Hispanic (1.7 per 100,000), and Asian/Pacific Islander males and females (1.2 per 100,000). Incidence for NH Black females was 22% higher in the Greater Bay Area (2.5 per 100,000) than California (1.3 per 100,000). Incidence for Asian/Pacific Islander males was higher in the Greater Bay Area (1.7 per 100,000) than California (1.3 per 100,000).

From 1988 through 2018, the mortality rate for CLL was higher in males (1.4 per 100,000) than females (0.5 per 100,000) and decreased by -1.6% per year for males and by -1.7% for females. Among both males and females, mortality rates were highest in NH White males and females (1.3 per 100,000) and lowest in Asian/Pacific Islander males and females (0.2 per 100,000). Mortality rates for

CLL in the Greater Bay Area were similar to California rates except among NH Black males (0.7 vs 1.4 per 100,000, respectively) **(Table 12)**.

Chronic myeloid leukemia (CML)

For males and females of all races, incidence rates of CML declined from 1988 through 2018 by an average of -0.6% per year, mainly due to the decreasing incidence among Asian/Pacific Islander males and females (-1.1%). Incidence rates from 2014-2018 for both sexes combined were similar for NH White, NH Black, and Hispanic males and females (approximately 1.5 per 100,000) but lower for Asian/Pacific Islander males and females (1.2 per 100,000). CML incidence rates for males and females of all racial/ethnic groups in the Greater Bay Area were lower than California with the exception of Hispanics, among whom the incidence was slightly higher than California (1.5 and 1.3 per 100,000, respectively) **(Table 12)**.

Mortality rates for CML declined by -4.7% per year from 1988 through 2018 for all sexes and racial/ethnic groups combined. In the last 15 years, the introduction of tyrosine kinase inhibitors as the first line treatment for CML has dramatically improved survival from this disease [97]. While mortality rates for all racial/ethnic groups in the Greater Bay Area (males: 0.3 per 100,000; females: 0.1 per 100,000 for females) were similar to those in California (males: 0.4 per 100,000; females: 0.2 per 100,000), rates were higher for Hispanic females in the Greater Bay Area than California (0.4 per 100,000 vs. 0.2 per 100,000).

Table 12. Leukemia Incidence and Mortality Rates for Both Sexes and All Racial/Ethnic Groups Combined, by Histology Type and Region¹, 2014-2018

| Histology Type | Incidence per 100,000 | | Deaths per 100,000 | |
|---|-----------------------|------------|--------------------|------------|
| | Greater Bay Area | California | Greater Bay Area | California |
| Childhood Acute Lymphocytic Leukemia (ALL) ² | 4.7 | 4.8 | 0.3 | 0.3 |
| Acute Myeloid Leukemia (AML) | 3.8 | 3.9 | 2.6 | 2.7 |
| Chronic Lymphocytic Leukemia (CLL) | 3.6 | 3.6 | 0.9 | 1.0 |
| Chronic Myeloid Leukemia (CML) | 1.5 | 1.6 | 0.2 | 0.3 |

¹ 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).

² Childhood ALL includes cases diagnosed at 0-14 years of age; all other leukemia rates include all cases regardless of age at diagnosis.