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# Preliminary Assessment of Cancer Occurrence in the Hinkley Census Tract, 1996-2008

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**Background:** As part of the statewide cancer surveillance program of California, the Desert Sierra Cancer Surveillance Program (DSCSP) provides monitoring of cancer occurrence in Inyo, Mono, Riverside, and San Bernardino Counties, that currently include approximately four million residents. The DSCSP serves as part of the statewide California Cancer Registry (CCR), and has evaluated cancer occurrence in the Census Tract encompassing Hinkley, San Bernardino County, on two previous occasions. These results, which initially covered cases diagnosed from 1988-1993 were updated on September 25, 2000, to include findings for 1988-1998. No excess occurrence of all invasive cancers combined was found in either evaluation (1). Recent newspaper and media reports have described higher than normal levels of hexavalent chromium (chromium 6) in groundwater in the vicinity of Hinkley, California. These reports have raised concerns that the occurrence of cancer could be elevated in the population living in the area around Hinkley. In response to these concerns, the DSCSP conducted a third assessment of observed and expected counts of new invasive cancer cases in the Hinkley Census Tract for 1996-2008. Findings from this recent assessment serve as an update to previous reports (1).

**Methods:** The *observed* count of new cancer cases occurring among residents of the Hinkley Census Tract for 1996 through 2008 was extracted from the DSCSP database. Other data extracted from the database included the age, sex, and race/ethnicity (demographic) distribution characteristics of the Hinkley Census Tract population recorded in the Year 2000 Census.

The number of new cancer cases *expected* to occur among residents of the Hinkley Tract in 2000 was estimated by applying average annual demographic variable-specific incidence rates for the DSCSP from 1998-2002, weighted according to the demographic distribution of the Hinkley Census Tract measured in Census 2000. This result was then multiplied by the size of the Hinkley Census Tract population, yielding the expected count of new cancer cases in the tract during 2000, if residents experienced the average risk of cancer for their demographic characteristics. This Year 2000 expected count was then multiplied by the number of years in the assessment, providing an estimate of the

number of new cancer cases expected in the Hinkley Census Tract population during 1996-2008, if the population size remained constant.

To compute the standardized incidence ratio (SIR), the observed number of new cancer cases in the Hinkley Census Tract for 1996-2008 was divided by the expected count for the same time period. This indirect standardization (2) process is widely used in population health assessments to balance (adjust) the effects that unwanted demographic variables contribute to variation in disease occurrence.

Estimates of lower and upper 99 percent confidence interval (CI) limits were computed for observed numbers of new cancer cases using an equation based on the Poisson distribution that evaluates random error inherent to counts of rare, unrelated events (3). These results, along with expected numbers of new cases, were used to compute confidence interval limits for the SIR value representing a range around computed SIR findings that can be reasonably attributed to sampling error. The DSCSP used similar methods to compute SIR values and 99 percent confidence interval limits using the entire California population as the standard population.

**Results:** The Year 2000 Census identified 3,644 residents of the Hinkley Census Tract, representing more than 47,000 person-years of risk during the study. The observed number of new invasive cancer cases that occurred in the Hinkley Census Tract from 1996-2008 was 196 cases. This compares to 224.2 new cancer cases expected in the tract during the same time-period, using the DSCSP as the standard population. The standardized incidence ratio (SIR) for this finding is 0.87, with 99 percent confidence interval limits ranging from 0.74 to 1.04. The expected number of new cancer cases in the Hinkley Census Tract computed using the statewide, California population as the standard population was 224.5, yielding an SIR value of 0.87, having 99 percent confidence interval limits that round to the same values computed using the DSCSP as the population standard (0.74 to 1.04).

**Conclusions:** These findings identify cancer occurrence in the Hinkley Census Tract that is slightly, but not significantly below the number of new cases expected for an average risk population having the same demographic characteristics as the Hinkley Census Tract population. Similar to the previous two cancer assessments that evaluate cancer occurrence in 1988-1993 and 1988-1998 (1), these 1996-2008 preliminary findings do not identify a generalized cancer excess in the Census Tract encompassing Hinkley, San Bernardino County. Staff in the DSCSP will continue to monitor cancer occurrence in the Hinkley Census Tract and elsewhere in the DSCSP.

**References:**

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