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**FEATURE**

**Community Cancer Assessment in Hinkley  
California,  
1988-1993**  
Updated September 25, 2000

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**ABSTRACT** - *This study was undertaken in an attempt to substantiate claims of increased cancer prevalence in an area that had experienced industrial practices which were known to be harmful. In a highly publicized case, some residents were awarded settlements from the company due to claims of industrial carelessness, which may have endangered the lives of the citizens of Hinkley, California. This study was taken up after the media and the courts had already judged the situation, to see if scientific evidence supported the claim that cancer cases had risen due to the environmentally unfriendly industrial practices of one company in the Hinkley area.*

**Introduction**

The Desert Sierra Cancer Surveillance Program (DSCSP) is the regional cancer registry that covers Inyo, Mono, Riverside, and San Bernardino Counties, serving a population of approximately 3.1 million residents. By law, all cancers diagnosed in California since January 1, 1988, are reported to one of the regional registries that form the California Cancer Registry (CCR), the legally mandated cancer reporting system of California. The DSCSP serves as Region 5 of the CCR. Cancer surveillance in the DSCSP is funded by the California Department of Health Services and by the Centers for Disease Control and Prevention (CDC) through the National Cancer Research Program (grant #U75-CC910677-01).

Included in the information reported for each cancer case are the precise type of cancer, date of diagnosis, the address of the subject at

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the time of diagnosis and demographic characteristics. This information makes it possible to assess specific types of cancers observed within the population of a geographic area and to compare them to the number of cancer cases that would have been expected to occur if the population experienced the same cancer rate as the entire region. The length of residence at that location and previous residence information are not available in the cancer registry database. Studies of occupational cancers have shown an average latency period of about 20 years between carcinogenic exposure and the manifestation of clinically diagnosable cancer, although there is a range of less than 2 years to more than 40 years. If past exposures convey an increase in cancer risk, many of the people who were exposed could have moved out of an area before developing cancer. Cancer concerns frequently relate to recent diagnoses, while cancer incidence data for recently diagnosed cases are usually not available. The extensive quality control procedures and time required to confirm cancer diagnoses creates a lag period of up to 2 years before CCR data for a given year are complete. In spite of these limitations, many neighborhoods have a sufficient number of long-term residents to allow detection of a substantial increase in the number of cancer cases if it occurs.

### **Problem**

In September 1995, the regional cancer epidemiologist at the DSCSP was contacted by a representative of a nationally syndicated television news show with a concern about a potential excess in the number of new cancer cases in Hinkley, California, a small desert community in San Bernardino County. In response to the concern about a potential cancer-excess, the cancer epidemiologist initiated a community cancer assessment in the census tract (tract 119) that included a majority of the Hinkley population. The assessment included all cancer types (sites) combined and several specific cancer sites mentioned in the telephone conversation.

### **Methods**

The DSCSP staff reviewed cancer cases that had been diagnosed among residents of the census tract where Hinkley is located. These cases were confidentially reported to the regional cancer registry by

health professionals, hospitals, diagnostic or treatment centers, or pathology laboratories as mandated by California Health & Safety Code section 103885.

The number of cancer cases that would be expected to occur among residents of the census tract encompassing Hinkley during 1990 was estimated by applying average annual age, sex, and race/ethnicity-specific incidence rates observed within the four county region between 1988-1992 to the population size and demographic features of the census tract measured during the 1990 census. This process, called indirect standardization, is an accepted practice used in population health assessments.

The number of new cancer cases observed among residents of the census tract that encompasses the majority of Hinkley (tract 119) between 1988 and 1993 were extracted from the regional registry database. In addition to including the observed number of new cancer cases that were geocoded to census tract 119 (Hinkley), the registry staff identified all cancer cases in San Bernardino County that had not been geocoded that listed Hinkley or one of two postal ZIP code areas that overlap with census tract 119 in their address. This process identified the observed (actual) number of cancer cases that were diagnosed between 1988 and 1993 for the census tract encompassing Hinkley.

Informal assessments were made to estimate changes in the size of the population residing in census tract 119 since the 1990 census. This process was facilitated by the cancer registrar at Barstow Community Hospital, located approximately 12 miles northeast of Hinkley and using recently published maps and computer databases. In addition to comparison of the numbers of observed and expected cancer cases in the census tract encompassing Hinkley, the residence location for each case within census tract 119 was plotted on a map.

### **Results**

Growth in the size of the population residing in the census tract encompassing Hinkley following the 1990 census is apparent. Although no formal census count has been made for tract 119 since 1990, new residential streets and single family homes are evident in the area of tract 119 that is directly north of Barstow, approximately 10 to 12 miles east of Hinkley.

Following is a listing of the number of new cancer cases observed, 99% confidence interval limits representing random variation in the number of observed cancer cases and the expected number of new cancer cases in census tract 119 for all cancer sites combined for the 1988-1993 time-period.

Observed new cancer cases	114 (88.5, 144.3)
Expected new cancer cases	91.2
Ratio of observed to expected new cancer cases	1.25 (0.97, 1.58)

### **Conclusions**

The number of new cancer cases observed in the census tract encompassing Hinkley does not differ significantly from the number expected when considering the age, sex, race/ethnicity, and population size of the census tract. Similar null findings were made for colorectal cancer, breast cancer, nasopharyngeal carcinoma, lung cancer, lymph node cancer and prostate cancer, with no significant excess in the number of new cancer cases identified for the 1988-1993 time-period. The absence of a cancer excess is further supported by the observation that the expected number of new cancer cases used in the assessment are undercounted for census tract 119 because of population growth between 1990 and 1993. The distribution of residence locations for new cancer cases in census tract 119 does not identify an excess number of new cancer cases in Hinkley. Identification of several cancer cases in a previously unpopulated section of census tract 119 that is directly north of Barstow, approximately 10 to 12 miles east of Hinkley, provides evidence of population growth in the tract.

### **Discussion**

Our assessment did not identify any excess in the number of new cancer cases in Hinkley between 1988 and 1993 that is greater than the level anticipated for sampling error. Although we did not formally assess growth in the size of the population residing in census tract 119, we believe that slight to moderate population growth following the 1990 census has tended to inflate the computed ratio of the observed to expected number of new cancer cases reported. In spite of our belief that this inflation has occurred, our assessment failed to

identify an excess number of new cancer cases in the Hinkley area that is greater than that attributed to random sampling error.

Data reflecting any changes in the age, gender, and race/ethnicity composition of the population residing in the assessment area following the 1990 census were not available for use in this assessment. In spite of these limitations, it seems reasonable to assume that these changes were slight, and would not appreciably alter the conclusions made for this assessment.

Recently, we extended our assessment of cancer in the census tract encompassing Hinkley through 1998. Our preliminary findings for this reassessment have identified 173 new cancer cases between 1988 and 1998. Using age, sex, and race/ethnicity-specific incidence rates for cancer within our entire region and the 1990 population size and demographic configuration of census tract 119, we determined that approximately 167.2 new cases were expected for this area between 1988 and 1998. The ratio of the number of observed and expected new cancer cases in census tract 119 is 1.03 (SIR = 1.03). This finding is presumed to be biased upward as the result of population growth in the tract since the 1990 census, and does not identify an excess in the number of new cancer cases in the area assessed. Although our current assessment failed to identify an excess number of new cancer cases between 1988 and 1998 for all cancer sites combined, we are continuing to evaluate specific cancer types, location of cases within the tract, and the impact of the change in population size within the area of concern.

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