

# Cancer in California, 1942-56

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**L**UNG CANCER, especially among men, constitutes an increasing proportion of all cancer. Stomach cancer, on the other hand, has become a smaller constituent for both men and women (fig. 1).

Earlier casefinding has increased the proportion of patients with localized disease at time of initial diagnosis. Most of the improvement in early diagnosis has occurred in sites accessible to direct examination.

The finding of more cases in a localized stage has been one of the factors responsible for an increase in the survival of cancer patients. The improvement in survival rates is most marked for women, paralleling the sizable increase in the proportion of women with localized cancer at time of diagnosis. Survival rates for men have improved only slightly in recent years.

Five-year survival after diagnosis is no proof of "cure." The subsequent survival rates of cancer patients, particularly those with cancer of certain sites, who survived the first 5 years, continued to be lower than the survival rates of those without cancer.

These are some of the highlights drawn from the recently published monograph (October 1963), "Cancer Registration and Survival in California." The monograph is based on a total of 110,229 cancer cases initially diagnosed in 37 California hospitals between January 1, 1942, and December 31, 1956, and reported to the California Tumor Registry. The registry annually

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receives abstracts of approximately 20,000 case reports—about one-third of the cancer cases newly diagnosed in the State each year. A total of more than 250,000 cases has now been reported, and followup of patients is 93 percent complete.

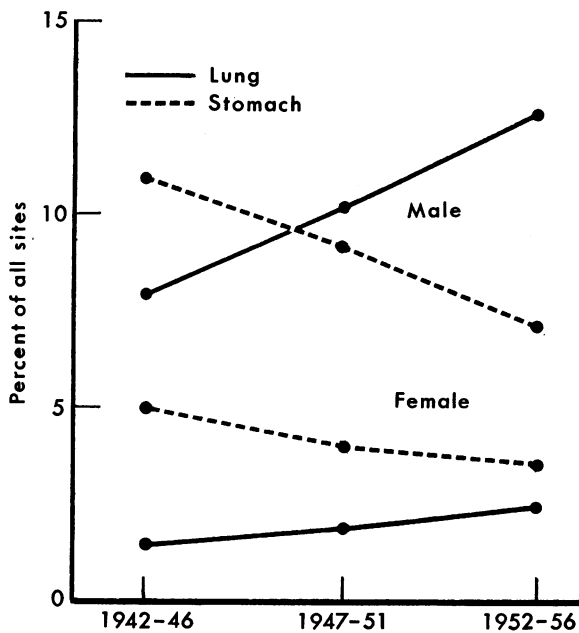
Men with cancer tended to be older than women. Negro men had higher relative proportions of esophageal, stomach, pancreatic, and prostatic cancer; Negro women had higher than expected proportions of esophageal and cervical cancer. Chinese men had a relatively excessive frequency of esophageal and liver cancer, as did Japanese men, who in addition had an excess occurrence of stomach cancer. Japanese women had higher than expected proportions of esophageal and stomach cancer. Single men and divorced or separated men and women had a relatively higher cancer risk.

## Stage of Disease

Forty percent of the cancer patients were diagnosed while the disease was still localized to the primary site; the proportion was the same for men and women, all sites combined. There was considerable variation in the percent localized from one site to another—from 13 percent for pancreatic cancer to 94 percent for skin cancer.

White patients generally had a higher proportion of localized cases than nonwhite patients. But Chinese and Japanese patients had a higher proportion of cancer of inaccessible sites. When cases of accessible sites were considered alone, the difference was reduced; in fact, the proportion of Japanese with localized disease was even higher than for white patients. Japanese women with stomach or breast cancer

**Figure 1. Trends in the proportions of lung and stomach cancer cases, 1942-56**



had a much higher proportion of localized cases than the other sex-race groups. (The findings are only suggestive, since they are based on relatively small numbers—25 stomach and 24 breast cases.)

**Treatment**

The first course of treatment is reported to the California Tumor Registry. Surgery, the principal type of treatment reported, was used more than twice as often as radiation therapy. Its use increased during the 15 years, with a concomitant decrease in the use of radiation.

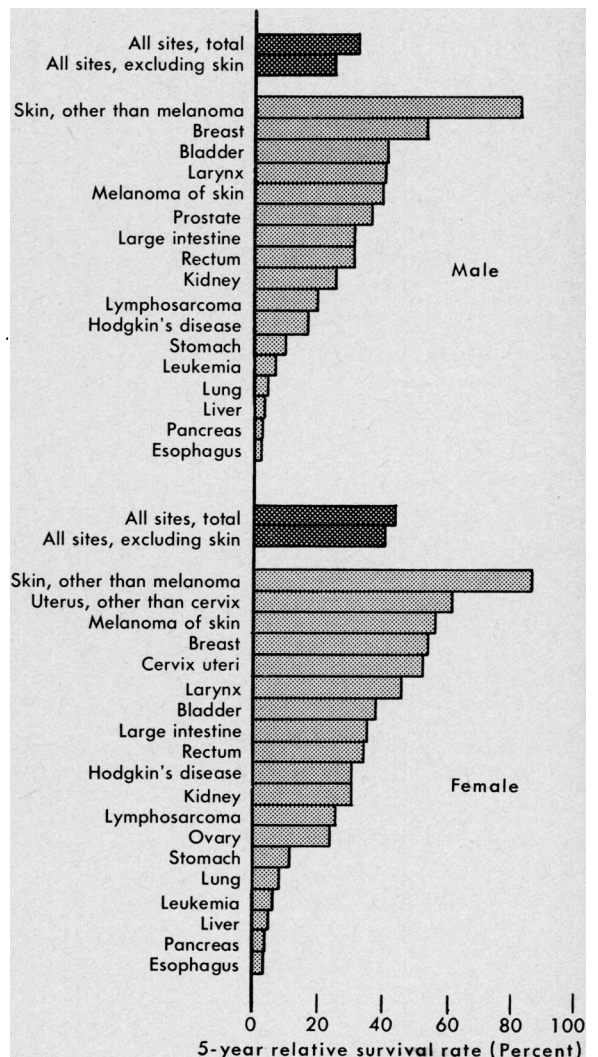
**Survival**

Survival data, covering a 15-year period from time of diagnosis, were computed using the actuarial method, which makes maximum use of followup information. Data on survival for comparable sex, age, and racial groups in the general population were compiled from appropriate life tables. These were used to obtain relative survival rates, which are adjusted for the effect of mortality from causes other than cancer. Standard errors were computed for the survival rates.

The cases were clustered into three groups: those with high survival rates, for example—breast, cervix and corpus uteri, melanoma, and skin other than melanoma; intermediate survival rates—large intestine, rectum, ovary, bladder, lymphosarcoma, and Hodgkin's disease; and low survival rates—stomach, lung, and leukemia (fig. 2).

Women with cancer had higher survival rates than men for almost all the individual sites, for each age group, and for each stage of the disease. Most sites of cancer showed a decline in survival rates with increasing age, even when the rates were adjusted for the probability of

**Figure 2. Five-year relative survival rate of cancer patients, by site of cancer, 1942-56**



dying from other causes. This was not true for stomach and breast cancer in women, prostate in men, and leukemia.

White men had higher survival rates than nonwhite men. No difference was observed, however, in the survival rates for white, Chinese, and Japanese women. Survival rates for Negro women, all stages combined, were lower than the rates for other female groups, but the differences disappeared when analysis was restricted to localized cases.

Women with breast cancer had higher survival rates than women with cervical cancer during the first and second years after diagnosis, but the situation was then reversed, with cervical cancer patients having higher rates than breast cancer patients during each of the succeeding years.

Differences in survival rates for individual sites among several registries (England and Wales, New Zealand, and other parts of the United States) were smaller than differences in survival rates among the sites within each registry. The similarity in survival rates among registries in various geographic areas, despite probable differences in age, race, stage of disease, and treatment methods, suggests that the natural course of the disease is the most profound influence on survival.

### **County and Private Hospitals**

Cancer patients in county hospitals were older than those in private hospitals; a greater proportion were male and nonwhite; and their cancers occurred with relatively higher frequency in the esophagus, stomach, liver, pancreas, lung, and cervix uteri.

County hospitals had a smaller proportion of cancer patients with localized disease (25 percent) than private hospitals (46 percent). This relationship persisted even when the factors of site, sex, age, and race were taken into account. It is unlikely that differences in histological type or host resistance, even if present, could account for the marked difference in the proportion of patients with localized disease in the two kinds of hospitals. The more advanced stage in county hospital patients probably reflects a longer delay period between onset of symptoms and diagnosis, suggesting that public education for early diagnosis should be aimed

more directly at persons in the social groups who must depend on hospitalization at public expense.

A smaller proportion of Negro patients were diagnosed with localized disease (29 percent) than white patients (40 percent). Negro men in private hospitals, however, had a higher proportion of localized cases (30 percent) than white men in county hospitals (25 percent). The difference was even greater among women—48 percent localized for Negro women in private hospitals compared with 24 percent for white women in county hospitals. It seems likely that the differences in the proportion of localized cases among white and Negro patients are more the result of differences in social class than in race.

A smaller proportion of the cancer patients in county hospitals received definitive treatment (at least partially accounted for by their older ages and later diagnoses). They also had a poorer survival experience than cancer patients in private hospitals, even when comparisons were made for the same site and stage of disease. (Further studies are underway to confirm the differences in survival.)

### **Cancer of the Stomach**

The proportional frequency of stomach cancer to all cancer decreased during the 15 years between 1942 and 1956, with no indication that the decrease was compensated by increases in cancer of other digestive organs.

Older patients comprised an increasing proportion of stomach cancer cases. The increasing age of patients with stomach cancer may be related to the decreasing occurrence of the disease. The data are consistent with the hypothesis that stomach cancer is receding from the population as a whole, with the residue increasingly concentrated in the older persons exposed decades ago to some environmental factors that no longer affect the population, at least to the same degree.

### **Cancer of the Lung**

The ratio of male-to-female lung cancer cases was 5.1, similar to that found in other series. Women were more likely to have adenocarci-

noma of the lung while men more often had squamous cell carcinoma.

More than 85 percent of the patients presented advanced lung cancer at time of initial diagnosis and the survival rates mirrored this fact—only 4 percent survived the first 5 years. Delay in seeking diagnosis apparently did not explain the very high proportion of lung cancer patients with advanced disease, since the median age of men diagnosed with advanced lung cancer was lower than that of males with localized disease. If patient delay were the only reason or even a major reason for the high proportion of advanced cancer, the delaying patient would be older than the patient who seeks diagnosis early. The inverse pattern of stage and age (patients with localized cases being older than those with spread) was found to be generally true for patients with adenocarcinoma as well as those with squamous cell carcinoma. The analysis suggests that diagnosis at a localized stage, particularly for lung cancer, depends on a slower rate of growth or metastasis.

An attempt to discern varying patterns of survival in lung cancer patients revealed that almost one-third of the surgically treated men with localized lung cancer achieved a normal life expectancy; that is, their survival was equal to that expected of their counterparts in the general population. This group of survivors, unfortunately, represented less than 2 percent of the total group of men with lung cancer.

### **Cancer of the Breast**

Cancer of the breast was the most frequently reported site among women (23 percent of all women with cancer). It was relatively more frequent among patients in private hospitals, a social class relationship already documented in other studies. Breast cancer patients in private hospitals also survived longer than similar patients in county hospitals.

Almost all sites of cancer showed an inverse relationship between survival and age (survival rates decreasing as age increased), even after adjustment was made for the probability of dying from other causes of death. Breast cancer was one of the few exceptions; the relative survival rates were about the same for each age group.

Breast cancer was the only major site (except for women with localized cervical cancer who were less than 65 years old) where the relative survival rate for the first year after diagnosis was higher than the survival rate during the second year after diagnosis.

### **Cancer of the Uterus**

The increasing use of vaginal cytology from 1942 to 1956 profoundly affected the age pattern of the patients and stage of the disease at the time of diagnosis of cervical cancer. The proportion of cervical cancers diagnosed in a localized stage (including *in situ*) increased during the 15-year period. Vaginal cytology is used more frequently for younger women than for older women. As a result, cervical cancer accounted for an increasing proportion of all cancer among young women, a stationary proportion for middle-aged women, and a decreasing proportion of all cancer among older women.

The relative risk of cervical cancer was higher among married, widowed, separated, or divorced women; among women in the lower income groups; and among Negro women. Cancer of the uterine corpus was also associated with these characteristics, but in the opposite direction.

### **Cancer of the Prostate**

Cancer of the prostate, one of the most frequently reported cancers among men, comprised 11 percent of all male cancers reported to the registry. Patients with prostatic cancer were generally older than patients with cancer of other sites. Patients with localized cancer of the prostate tended to be older than those with more advanced disease.

Registry data showed a slight excess of prostatic cancer in private hospitals for white patients, but the disease was relatively more frequent among nonwhite patients in county hospitals than among nonwhite patients in private hospitals.

Men with cancer of the prostate had a better survival experience than those with cancer of other sites during the first few years after diagnosis. By the third year and thereafter, however, the situation was reversed and patients

with cancer of the prostate had a poorer prognosis than other cancer patients.

### **Leukemia**

Leukemia patients showed a bimodal age distribution, with one peak in the group under 15 years of age and another in the age group 65-74 years. Lymphatic leukemia, comprising one-half of the total leukemia cases, was relatively more frequent among males than among females. Myeloid leukemia accounted for about one-third of the total.

Survival rates for males with leukemia were similar to the rates for females, unlike the pattern observed for most sites of cancer. The

rates were low, however, for both sexes. Survival rates for Negro females, based on relatively small numbers, were twice as high as the rates for Negro males or white females.

The 1-year and 3-year relative survival rates for leukemia patients increased between 1942-46 and 1952-56, but the 5-year rates remained the same, suggesting that some short-term improvement for acute cases may have resulted from the use of new antileukemic agents.

NOTE: Copies of the monograph, "Cancer Registration and Survival in California," can be obtained from the California Tumor Registry, Bureau of Chronic Diseases, California State Department of Public Health, 2151 Berkeley Way, Berkeley, Calif., 94704.

## **Chemicals Studied for Carcinogenicity**

The cancer-inducing potential of a variety of chemical substances, including pesticides, will be studied under a Public Health Service contract awarded to Bionetics Research Laboratories, Falls Church, Va. As part of the National Cancer Institute's expanding program of research on cancer causation, these long-term biomedical investigations will focus on principles involved in the cumulative effects of pesticides and other chemical agents on organs of immature and adult laboratory animals.

Dr. Michael Klein, head of the Bioassay Section, Carcinogenesis Studies Branch, National Cancer Institute, is project officer for the \$645,000 contract. He and his colleagues will seek to further develop refined and rapid techniques for evaluating the cancer-inducing effects of environmental compounds on laboratory animals. Concurrently, other studies under contract will investigate the tumor-producing potential of some 40 insecticides, fungicides, weedkillers, and other chemical compounds. The chemicals will include those resulting from the processing, packaging, and storage of food.

It is anticipated that a combination of cancer testing in animals and basic physiological studies will provide data for evaluating potential hazards to man. Where possible, experiments will be designed to stimulate some of the conditions of man's exposure to these substances.