An Areawide Cancer Reporting Network

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THE CANCER SURVEILLANCE Program was formed in 1970 as part of a comprehensive and interdisciplinary research project on cancer virus within the Department of Pathology of the University of Southern California School of Medicine. The aim of the program is to provide a mechanism for the early identification of newly diagnosed cancer cases among the large and varied population of Los Angeles County. Thus, the approximately 22,000 cases projected annually, by use of incidence rates obtained from the third National Cancer Survey *(1)*, would be available for specific epidemologic, immunological, and virological studies.

Los Angeles County is well-suited to a multifactorial analysis of the causes of human cancer. It has such diverse environmental conditions as undeveloped desert and mountain areas, coastal and suburban communities industrial and petrochemical production sites, and intense urban concentrations. Air sampling and analysis conducted by the research project on cancer virus over the past few years has demonstrated that these areas do, in fact, differ significantly in terms of air quality *(2)*. The county's more than 7 million residents include three sizable ethnic groups—approximately 1,200,000 Latins, 700,000 blacks, and 275,000 orientals.

Unlike conventional tumor registries whose reporting procedures are often delayed in order to incorporate therapeutic history, the Cancer Surveillance Program (CSP) utilizes a rapid reporting system. This procedure, which identifies cancer cases within a few weeks of diagnosis, facilitates early access to patients for interviews and collection of specimens.

The CSP now has on computer file approximately 65,000 records of malignancies—approximately 18,000 from 1971 and prior years; 21,300 from 1972; 19,700 for 1973; and 6,000 thus far for 1974. Application of the third National Cancer Survey's age-specific incidence rates for 1970 *(1)* to the Los Angeles County population without adjusting for differences in racial composition produces an expected total cancer incidence of 21,953. The 21,300 cases recorded for Los Angeles County in 1972 comprised more than 97 percent of the expected total. Followup procedures, including review of death certificates, should make the 1973 figures comparable to those for 1972.

Components of the CSP

The components of the Cancer Surveillance Program are hospital liaison, rapid reporting, review of death certificates, and quality control.

Hospital liaison. Because the CSP operates under the aegis of the Department of Pathology, we decided to take advantage of that department's widespread and favorable reputation within the medical community. Therefore, our initial contact with community hospitals generally has been through hospital pathologists. Additionally, the Cancer Committee of the Los Angeles County Medical Association has provided valuable contacts with oncologists in the area.

After the pathologists were apprised of the importance of the CSP, they were asked to obtain approval from their hospitals' executive committees for participation in the program. In most instances, the pathologist would then be designated by the hospital to be the medical liaison to the CSP. He, in turn, would select a person to serve as a record liaison—most typically this person would be a pathology secretary, a tumor registrar, or a medical records librarian. As of April 1974, this approach resulted in the voluntary participation of 177 of the 185 hospitals in which cancer diagnoses are made (see table). In addition, a number of hospitals in surrounding counties are screened for

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Hospitals participating in the Los Angeles County Cancer Surveillance Program, by number of hospital beds, April 1974

Number of beds	Hospitals		Cancer beds	
	Number	Percent	Number	Percent
0–49	31	85	915	85
50–99	50	90	4,022	91
100–199	48	100	7,137	100
200 and over	48	100	20,344	100
Total	177	95	32,418	98

NOTE: The county has a total of 165 hospitals with cancer beds and a total of 32,924 acute-care beds.

residents of Los Angeles County who are receiving initial cancer diagnosis in these facilities.

The reporting procedure best suited to a particular hospital is worked out between CSP staff and hospital liaison personnel. In some instances it is determined that hospital personnel can select, record, and mail in all necessary case information. Usually, it is found to be more suitable to have CSP personnel visit the hospital periodically to abstract case information.

Rapid reporting. For identification of malignancies as soon as possible after microscopic diagnosis, the primary source of case selection is hospital pathology files. The files include hematology, cytology, and autopsy reports in addition to surgical pathology records. Periodically (daily, weekly, biweekly, or monthly, depending on cancer case volume at the hospital) these files are searched for all microscopically diagnosed malignancies. Reports are collected on all brain tumors, benign or malignant, because of their aggressive behavior. On the other hand, superficial skin cancers are not reported because the majority of these are diagnosed on an outpatient basis. More than 2 years of experience with this method has proved it to be an effective and expeditious means for case selection.

For epidemiologic analysis, it is important to define certain demographic characteristics of the cancer population. In most hospitals, demographic data can be abstracted from the admitting form. It is sometimes necessary to review the patient's medical chart to obtain certain demographic information considered essential, such as ethnic group and occupation. The chart is also reviewed routinely to establish primary site and date of first diagnosis of the malignancy. Date and place of first diagnosis are crucial in identifying cases incident to Los Angeles County for any particular year.

When abstracts with pathology reports attached are received at CSP offices, they are logged in, coded, keypunched, and filed. Primary site and cell type are coded according to the seventh revision of the ICDA *(3)*, as is done by the California Tumor Registry. Demographic information is coded in a manner consistent with that of the Bureau of the Census *(4,5)*. Each coding step is reviewed by a least two trained coders who also review for completeness, accuracy, and consistency—for example, age and birth date and sex and site.

Diagnostic and identifying information on each case are then keypunched onto two separate magnetic tapes to insure strict. Linkage between the medical and identification tapes is possible only through a set of coded access numbers. Abstracts are then filed in locked cabinets. The majority of cases are on computer file within a month of initial microscopic diagnosis. Newly reported cases in patients with names similar to those already on file are carefully screened with regard to identifying items such as age, residence, and social security number to prevent duplication. Abstracts received on cases already in CSP files are combined with the initial reports in such a way as to maximize the completeness and accuracy of our data.

Death certificates. To assure completeness of the morbidity information collected through the CSP and to gather cancer mortality statistics for Los Angeles County, all county death certificates are reviewed routinely. Through a contract with the county's Department of Health Services, we obtain photocopies of the approximately 11,000 out of 60,000 annual death certificates in which malignancy is mentioned. These death certificates are then checked against the master files of CSP cases. Those cases already in the file are updated to include death certificate information. For deaths due to malignancies not previously reported to our system, we attempt to determine why they were not reported. The most frequent reasons are *(a)* the malignancy had never been microscopically diagnosed or *(b)* the malignancy was first microscopically confirmed at autopsy, and the case would have been abstracted for the CSP when the autopsy report became available. Approximately 600 new microscopically confirmed cancer cases are identified annually by this method. An additional 900 clinically diagnosed malignancies are identified, abstracted, and submitted as probable cases.

Quality control. The review of death certificates is just one of several quality control measures used by the CSP. Others include review of hospitals for possible missed cases, internal checks on the consistency of reporting, review by an outside consultant for coding accuracy, and comparison of our findings with those of other cancer incidence studies. At least semiannually, our list of cases for each hospital is checked against hospital case records such as disease indices and tumor registry files. In addition to checks for reporting consistency during coding, we frequently review the pattern of reporting from each hospital. Irregularities are noted, and their causes are determined.

Annually, an expert in tumor-registry operation examines a 5 percent stratified random sample of the previous year's abstracts and submits a detailed report on the types of errors found. Cancer incidence observed in Los Angeles County by means of the CSP is compared with expected figures that are calculated from rates reported by the California Tumor Registry (which collects incidence figures in the San Francisco Bay area), the third National Cancer Survey, and other

sources (*1*). Improvements prompted by these quality-control findings have allowed us to develop a well-grounded data base for epidemiologic studies.

Uses of the Data

Data on cancer cases gathered by the Cancer Surveillance Program are used in three basic ways: to generate incidence statistics, to locate cases for special studies, and to provide statistical data to participating hospitals. The countywide reporting system of the CSP includes data on residence, birthplace, religion, marital status, ethnic group, occupation, and industry. This information allows epidemiologic studies of several factors which may have an etiological relationship to human cancer. Among these factors are genetic susceptiblity, exposure to air pollutants and industrial carcinogens, and possible viral transmission. An initial step in the analysis of these factors is the calculation of incidence figures for the entire county as well as for select population groups. Since 1972, we have sufficiently complete data to approach true incidence figures allowing studies of cancer incidence among specific ethnic groups.

The rapid reporting nature of the CSP system facilitates contact with cancer patients, through their attending physicians, for studies requiring interviewing and specimen collection. A team of trained nurse interviewers has already been used in studies of lung cancer and air pollution (*6*), possible viral transmission of breast cancer (*7*), nasopharyngeal cancer in the oriental population (*8*), urogenital tract cancer in young males (*9, 10*), suspected clustering of cases of Hodgkin's disease and lymphoma cases (*11, 12*), and human lymphocyte antigen (HL-A) typing among cancer patients (*13, 14*).

As a service to the 177 hospitals voluntarily cooperating in the Cancer Surveillance Program, we provide each hospital with reports of its cancer experience. These confidential reports compare each hospital's caseload by sex and site with figures from Los Angeles County as a whole and with 1960–64 data from the California Tumor Registry for Alameda County. Additionally, physicians from those hospitals may, with approval from the medical liaison and from the CSP, receive assistance in accumulating information for their own investigations.

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SYNOPSIS

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A Cancer Surveillance Program was formed in 1970 to provide a mechanism for the early identification of some 22,000 cancer cases that are diagnosed annually among the large and varied population of Los Angeles County. The program's rapid reporting procedures facilitate early access to patients for interviewing and specimen collection.

Routine review of all reports of microscopically diagnosed malignancies in hospitals throughout the county and screening of all of the county's death certificates provide virtually complete data on cancer incidence in the county.

Case reports include information on age, ethnic group, birthplace, residence, religion, marital status, occupation, and industry. Continuing analysis of this information has led to the development of epidemiologic studies of several factors which may have an etiological relationship to human cancer. Among these factors are genetic susceptibility, exposure to air pollutants and industrial carcinogens, and possible viral transmission.