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A Survey Approach for Finding Cases of Epilepsy

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Synopsis

Identify persons with epilepsy by first looking for prescriptions for particular antiseizure drugs. Follow these prescriptions from the pharmacies to the physicians who wrote them for patients. Ask the physicians whether the patients have epilepsy. Finally, contact the patients who do have epilepsy to elicit information about the impact of that condition on their lives.

With these steps, it may be possible to carry out successfully a probability survey of epilepsy in the United States population. To learn more about this approach, a field test was funded by the National Institute of Neurological and Communicative Disorders and Stroke (NINCDS) of the Public Health Service. From 1978 through 1982, the work was planned, carried out, and evaluated by Research Triangle Institute, Research Triangle Park, NC.

Epilepsy is a sensitive topic to ask about in a survey. Also, the condition is sufficiently rare to render ordinary survey approaches inefficient. Even if rarity were not an issue, there would be the problem of response error because a person with epilepsy does not, as a rule, have much clinical information on his or her condition. Better information lies with the physician who provides the care, but many physicians are busy with their practices. Furthermore, their record systems are usually not designed for easy retrieval of information, unless the names of patients are available. In the survey approach considered here, the names of patients are obtained through a random sampling of prescriptions for antiseizure drugs.

The field test was divided into three phases with special activities reserved for each. The most important problem confronted was how to safeguard the confidentiality of relationships between pharmacist and patient and between physician and patient. Special guidelines on confidentiality were put into effect for the data collection. These guidelines, however, contributed to serious problems of nonresponse—especially for physicians. This article provides a brief account of the field test, including a rationale for the survey strategy of finding cases of epilepsy through prescriptions for antiseizure drugs.

EPILEPSY REFERS TO A CATEGORY of chronic disorders characterized by sudden, recurrent attacks of brain dysfunction with abnormal electrical discharges. These attacks, called seizures, are usually associated with some alteration of consciousness and may or may not involve convulsive movements.

As a category, epilepsy embraces a wide variety of manifestations, and it represents a major public health problem in the United States. Measurement of the scope of this problem is important, yet difficult and expensive to achieve.

For many people with epilepsy, physicians prescribe drugs to control or prevent seizures. The choice of drugs depends partly upon the type of seizures experienced. Another consideration is the person's response to a given drug, namely, degree of seizure control and seriousness of side effects. If the response is unsatisfactory, another drug might be substituted. There are, of course, victims of epilepsy who do not take antiseizure drugs. Some of these people have never been evaluated medically for their problem. Others have not been treated in several years or more, and their seizures no longer recur.

In the United States, a survey of epilepsy in the general population presents sizable difficulties. One of these difficulties has to do with public attitudes toward epilepsy. For centuries in the Western world, epileptics were thought to be possessed by demons (*1,2*). As recently as the turn of the century, epileptics were considered morally corrupt and mentally retarded (*3*). Negative stereotypes persist today, prompting some sufferers of the disorder to hide their condition. Also, a physician may occasionally choose to conceal a diagnosis of epilepsy from a patient as a way to protect the patient from social stigma. In this situation, the patient would receive standard medical treatment, though he or she would not know of the epilepsy. Thus, to the extent that survey respondents decline to reveal family members with epilepsy or are unaware that any family members have epilepsy (possibly because of actions taken by the family physician), a household survey of epilepsy will produce undercounts.

A second difficulty in conducting a survey of epilepsy is that this category of disorders affects relatively few Americans—perhaps about 1 percent (maybe less) of the general population. From the public health standpoint, 1 percent is a large figure. In the realm of neurology, 1 percent is an exceptionally large figure. In planning a survey, however, 1 percent is considered small. A standard, door-to-door survey of households, with face-to-face interviews, would be impractical on the national level. A telephone survey of households might be a more cost-effective way to proceed. But there is still considerable inefficiency when the characteristic of interest has a 1 percent frequency. Furthermore, the telephone offers no solution to the potential problem of concealment of cases of epilepsy.

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An alternative to the household survey is to find victims of epilepsy through the health care system. A survey of hospitals will not suffice, since hospitalization is seldom required for treatment of epilepsy. A survey of the physicians might be fruitful. There are serious drawbacks, however, with this approach. Physicians are often asked to participate in surveys of one kind or another, so they might be reluctant to cooperate in a survey of epilepsy, important as it may be. Even if physicians are willing to cooperate, they might be unable to identify readily epilepsy cases among patients they have evaluated or treated during a specified time period, because physicians typically organize their records alphabetically by last name of patient. Also, those physicians who consult away from their offices might not have access to all of the patient records on which they have written their clinical observations. Finally, some physicians in office practices keep abbreviated records that are difficult for other people to interpret. In this situation, physicians cannot prudently delegate to supporting staff the burden of survey response.

These considerations have led to a survey approach that places a minimal, though crucial, burden upon physicians. The approach has three steps. First, screen prescriptions at pharmacies, searching for those prescriptions written for particular antiseizure drugs. Second, contact physicians who wrote the prescriptions of interest (from step 1), and inquire about diagnoses of the patients whose names appeared on those prescriptions. Third, contact patients whom the physicians indicated had epilepsy (from step 2), and inquire about drugs used and where purchased. Also inquire about the social and economic costs of having epilepsy.

This three-step approach was conceived as a broad framework from which a national probability survey of epilepsy could be designed. Avoided is the risk of losing people who would deny their condition. We of course restrict our attention to persons who have within a specified time period had

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prescriptions filled for particular antiseizure drugs. Aspects of this three-step approach have been field-tested, and comprehensive reports of that investigation are available elsewhere (*4,5,6*). In this article, we concentrate on the highlights of the field test, giving special attention to the important issues of confidentiality, survey response, and multiplicity—that is, the problem of unknowingly counting the same person more than once.

Methodology

Background. On the national level, the scope of the epilepsy problem has been determined largely by guesswork. For example, the existing information on prevalence comes chiefly from community studies (*7*), and national estimates are presumed to be more or less the same as those for the communities surveyed. National estimates produced in this way are, as Deming once observed, "worth no more than the reputation of the man that signs the report" (*8*). Although expert opinion may be useful, a survey should be planned scientifically to yield national estimates that have margins of uncertainty based upon probability theory, not opinion.

The field test described here was not intended to produce national estimates. Rather, this test was an investigation of methodology that could be useful in a national survey of epilepsy. The survey would have strictly enumerative aims: it would yield information about the scope of the epilepsy problem in the noninstitutionalized population of the United States; estimates from the survey would relate to the frequency and the social and economic costs of epilepsy to society; and techniques of probability sampling would be used to select epilepsy sufferers for the survey.

Many people with the disorder in the United States benefit from membership in nonprofit organizations that specialize in providing information and other assistance to people with eilepsy. Taken together, the membership lists of these organizations would not, however, provide a suitable master list or frame from which to select victims for a national probability survey. The master list would exclude a large number of the people with epilepsy, and those missing from the list would very likely be different in important characteristics from those who are on the list.

Since there is no complete roster of epilepsy victims in the United States, some alternate way is needed to reach them with each individual of interest having a determinable, nonzero probability of selection. As mentioned previously, we considered using prescriptions for antiseizure drugs. This approach to epilepsy, which also requires the participation of physicians, has many complications—some legal, some operational. For this reason, a field test was warranted.

Field test. Although community pharmacists have generally had experience with marketing surveys conducted on behalf of drug companies, they have only been involved to a limited extent in health studies. It was questionable whether pharmacists would agree to perform a number of activities as participants in a survey of epilepsy. The field test, therefore, was divided into three phases. Phase I was a small effort; its purpose was to obtain a preliminary assessment of feasibility of the survey approach. Phase II was a period of time for the principal investigators to review the results of the first phase and to decide whether to continue the project. If the project was to be continued, the investigators would plan for the main effort, phase III. As will become apparent, all three phases of the field test were implemented.

Phase I. Our survey approach to epilepsy begins, but does not end, with prescriptions for antiseizure drugs. Since these drugs are often prescribed for reasons other than controlling seizures, it is necessary to contact the physicians who wrote the prescriptions to find out whether the patients indeed have epilepsy. Those patients who do have epilepsy must be contacted about how the condition has affected their lives. During each step, the privacy of the patients must be vigorously maintained. Also, the confidential relationships of pharmacist to patient and physician to patient must not be breached through the actions of people connected with the research. These constraints of privacy and confi-

dentiality are not easily satisfied. What is legal may be unethical. What is ethical may be offensive to the public.

Early in the planning of phase I, we had to determine when and how the pharmacists, the physicians, and the patients would be asked to become involved in the investigation. Our main concern, of course, was for the patients. To find a feasible way to protect private information consistent with the aims of the field test, we sought advice widely—especially from lawyers and leaders of the pharmaceutical and medical professions.

After careful consideration, we decided on the following guidelines to maintain privacy and to preserve confidentiality of the relationships among pharmacists, physicians, and patients:

1. The pharmacist would establish initial contact with the physician to determine his desire to participate in the field test, and if the physician agreed to participate, the pharmacist would transmit the name(s) of the patient(s) to the physician.
2. If the physician declined to participate or was not selected for contact, the data collector would never remove the patient's name or the physician's name from the pharmacy.
3. The physician or his office staff would establish initial contact with selected patients; only after the patient had agreed to be interviewed would investigators be privileged to receive the patient's name or make any contact with the patient.

Although these guidelines complicated the survey approach to epilepsy, they were considered necessary, since it was impractical to obtain prior consents of patients for review of prescriptions and interview of physicians.

Phase I of the field test did include some data collection. Nine pharmacies were selected by judgment to represent a variety of situations, including type of pharmacy, level of urbanization, region of the country, and retail volume. One of the pharmacies was a mail order business. Endorsements of the research were obtained from medical and pharmaceutical societies. A panel of experts produced a list of antiseizure drugs for use in the research. Pharmacies were enlisted in the field test by consultants in pharmacy administration. These consultants also identified students in schools of pharmacy who would serve as data collectors. Prescriptions for antiseizure drugs of interest, filled during selected weeks of the years 1970 through 1977, were identified and abstracted. Nine physicians were selected by judgment to provide experience with several specialties. Seven of the physicians, and proxies for the other two, were interviewed by one of us (BSHH) about patients identified from the screening of prescriptions. Finally, nine patients responded to a questionnaire concerned with the personal impact of epilepsy.

Phase II. The limited experience of phase I was evaluated during phase II, a planned hiatus in the collection of data. Had there been a fiasco with the carefully nurtured field operations of phase I, the research would have been quickly terminated as a result of reviews undertaken during phase II. Fortunately, phase I was successful, and the experience indicated that a larger test was needed. We therefore continued the research.

Phase III. The chief objectives in the main effort of the field test were to implement fully the confidentiality guidelines developed in phase I and assess their feasibility; to obtain estimates of response rates for pharmacies, physicians, and patients; and to evaluate the multiplicity problem that arose from our survey approach. The multiplicity problem was simply that of producing overestimates of various characteristics, such as the number of people with epilepsy, because individuals can have more than one prescription for antiseizure drugs and can purchase the drugs at more than one pharmacy.

The list of antiseizure drugs used in phase I was reviewed and revised slightly for phase III. The revised list included 17 drugs. These are presented in table 1, in two groups. Group 1 includes antiseizure drugs considered to be the most important in controlling seizures. Group 2 includes antiseizure drugs considered to be mainly adjuncts to other drug therapies.

In phase III, 48 pharmacies were selected to reflect different conditions that might be expected in a full-scale national survey. The pharmacies were located in six places: Brooklyn, NY; Chapel Hill, NC; Iowa City, IA; New Orleans, LA; Stockton, CA; and Storrs, CT. Each of the sites was specially defined to be the geographic area within 50 miles of a preselected school of pharmacy. Large urban areas were represented by Brooklyn and New Orleans. Smaller urban areas were represented by Iowa City and Stockton. Rural areas were represented by Chapel Hill and Storrs. The pharmacies were either community pharmacies or outpatient clinic pharmacies, and eight were selected randomly at each of the six sites.

The six schools of pharmacy, around which the sites were defined, provided consultants in pharmacy administration to assist with phase III. Each

Table 1. Antiseizure drugs of interest during phase III of the field test

Chemical name	Principal use (seizure type)
Group 1	
Carbamazepine	Generalized tonic-clonic, complex partial, simple partial
Clonazepam	Absence, myoclonic
Ethosuximide	Absence
Phenobarbital	Generalized tonic-clonic, complex partial, simple partial
Phenytoin	Generalized tonic-clonic, complex partial, simple partial
Primidone	Generalized tonic-clonic, complex partial, simple partial
Valproic acid	Absence, generalized tonic-clonic, myoclonic
Group 2	
Acetazolamide	Catamenial
Ethotoin	Generalized tonic-clonic, complex partial
Mephenytoin	Refractory generalized tonic-clonic, complex partial
Mephobarbital	Generalized tonic-clonic, absence
Metharbital	Generalized tonic-clonic, absence, myoclonic
Methsuximide	Refractory absence
Paramethadione	Refractory absence
Phenacemide	Refractory generalized tonic-clonic plus complex partial
Phensuximide	Absence
Trimethadione	Refractory absence

consultant was called upon to identify two or three pharmacy students who would collect data at the pharmacies. The students had to have a working knowledge of pharmacy filing systems and experience in reading prescriptions. The students working in phase III, unlike those of phase I, also had to interview physicians and patients.

The consultants in pharmacy administration were responsible for contacting the pharmacies selected for study, to explain the field test and seek the participation of the stores. As an incentive to participate, the consultants offered professional books valued at up to $50. A cash incentive of $50 was available to pharmacists as an alternative to the books. Some chain pharmacies were not authorized individually to decide whether or not they could participate. In these situations, the consultants contacted the chain management directly about the field test.

There was a legal barrier to some pharmacy activities of phase III. A California regulation prohibited access to pharmacy prescription files by persons not employed by the pharmacy. After consultations with the California Board of Pharmacy and the Office of the Attorney General, it was decided to modify the procedures for data collection. In California, the pharmacy students who screened the prescriptions would actually be hired by the pharmacies where the work was to be done. Each pharmacy was reimbursed for the labor costs plus a 20 percent surcharge for overhead expenses.

Under the confidentiality guidelines, pharmacists participating in the field test were personally to seek the cooperation of selected physicians. Pharmacists were also to transmit the names of patients to the physicians. A modest reimbursement, separate from the $50 incentive, was provided to pharmacists for this effort.

To simplify the work of obtaining cooperation of physicians, we took advantage of a fortunate circumstance. Each physician licensed to prescribe drugs has a unique number from the Drug Enforcement Administration. In phase III, the DEA number of each physician selected was transmitted from the participating pharmacies to the survey office. There, the DEA numbers were listed by pharmacy. When two or more pharmacies provided the same DEA number, it was assigned to only one of those pharmacies—the one with the smallest number of identified physicians. Thus, pharmacists from different stores did not approach the same physician about taking part in the field test. This avoided a nuisance in the physician's office; it also offered an opportunity to balance somewhat the burden of pharmacists in contacting physicians for the study.

The physicians in phase III were interviewed by pharmacy students about patients identified at the pharmacies. To avoid ambiguities of terminology for epilepsy categories, each physician was asked to make use of a preliminary version of the International Classification of Epileptic Seizures when responding about patients. This classification, later revised (*9*), was based upon clinical observation and laboratory evidence.

Those patients identified were eligible for a brief interview by telephone about their use of antiseizure drugs and the number of pharmacies where the drugs were purchased. Patients were not asked, in phase III, to respond to the detailed questionnaire concerned with the social and economic costs of having epilepsy. From the confidentiality guidelines, the physicians or supporting staff had responsibility for approaching patients about participation in the field test. There was no reimbursement for this effort.

The interviews of patients were performed usually by supporting staff of the physicians and occasionally by pharmacy students. The information obtained was important in quantifying the severity of

the multiplicity problem that would arise if our approach through pharmacies was used in a probability survey of epilepsy. To take account of this multiplicity problem, one of us (JTL) devised some special statistical estimators (*5,10*).

Results

Although phase III was the main investigation of the field test, there were activities in phase I that were not carried over to phase III. One of these was an important comparison of prescription data collected prospectively and retrospectively. The question was this: Would pharmacists in the course of their normal workday list prescriptions of particular antiseizure drugs as they were being filled or refilled? To answer this question, pharmacists in six stores were asked to list the prescriptions of interest prospectively over a 2-week period. Then, after the fact, pharmacy students came into the stores and reviewed all prescription files for the same 2-week period. The students, with their concentrated effort, were better able to identify the prescriptions of interest: 138 prescriptions for the students versus 112 prescriptions for the pharmacists. From this comparison and similar work at a hospital pharmacy, we embraced the idea of retrospective identification of prescriptions.

In phase III, getting the selected pharmacies to participate in the research proved difficult, even with the $50 cash incentive that was offered. This experience is summarized in table 2. Of the 48 pharmacies selected, only 27 agreed to participate after the initial contacts were made by the consultants in pharmacy administration. Because this level of cooperation was unacceptable, the consultants returned to the nonparticipating pharmacies to invite them once again to join in the research. This effort produced an additional 4 pharmacies. There were, then, a total of 31 pharmacies out of 48 that had agreed to participate. In survey terms, the response rate was 64.6 percent; which was still unacceptably low.

After a review of developments, we made two adjustments in the procedures for approaching pharmacies. Financial incentives were increased to further encourage the nonparticipating pharmacies to join the study. Instead of $50, the incentives were $200 to $300 for nonchain pharmacies and $300 to $500 for chain pharmacies. Also, survey specialists, rather than the consultants, would contact the pharmacies. In the original sample of 48 pharmacies, use of the adjusted procedures produced an additional 8 pharmacies beyond the 31 that had already agreed to participate (table 2), thereby boosting the response rate to 81.3 percent.

Table 2. Pharmacy participation in phase III, by site

Category	CA	CT	IA	LA	NC	NY	Total	NY[1]
Initial contact	4	5	6	5	5	2	27	7
1st conversion	...	...	...	1	2	1	4	...
2d conversion	3	1	2	1	...	1	8	3
Total	7	6	8	7	7	4	39	10
Sample size	8	8	8	8	8	8	48	12

[1] Special substudy confined strictly to the Borough of Brooklyn. Experts in survey operations, who were knowledgeable in methods of gaining cooperation, approached pharmacies about participation. In the original sample of 48 pharmacies, participation was first solicited by faculty members of local schools of pharmacy.

To evaluate further the procedures for approaching pharmacies, a special substudy was undertaken in the Borough of Brooklyn, New York City. (See NY[1] in table 2.) A fresh sample of 12 pharmacies was selected. These pharmacies were initially approached by survey specialists experienced in field operations. The original $50 incentive was offered, and 7 of the 12 pharmacies agreed to participate in the research. This compared with 2 of 8 Brooklyn pharmacies from the earlier work. For return visits to the nonparticipating pharmacies, the higher incentives mentioned previously were offered. Finally, 10 of the 12 pharmacies in the substudy agreed to cooperate in the research, a response rate of 83.3 percent. We considered the Brooklyn substudy to be a severe test of the new procedures. Higher response rates would be expected in most other localities.

In the original sample of 48 pharmacies, the noncooperating pharmacies were replaced by other pharmacies willing to join in the research. In each of the 48 participating pharmacies, some 2,000 prescriptions were selected randomly. Generally, about 880 prescriptions were selected for the study year 1980, and 280 prescriptions were selected for each of the years 1976, 1977, 1978, and 1979. For 1980 alone, 40,818 prescriptions were screened and 273 prescriptions for antiseizure drugs of interest were identified. The screening ratio was 0.7 percent.

Data collection for physicians and patients was carried out at all sites except New Orleans. There, following the pharmacy work, field operations were suspended because delays caused all of the students to leave the project. By that time, the students had graduated from school and wanted to pursue their careers. At the remaining five sites, 168 physicians

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were identified as having written prescriptions for the particular antiseizure drugs of interest. Of these physicians, 71 agreed to cooperate, 34 refused to cooperate, and 63 could not cooperate. The latter group included physicians in all types of situations; for example, several physicians were away on vacation and did not return until after the scheduled completion of data collection. Interviews were completed with only 62 of the 71 cooperating physicians. These interviews were in regard to 71 patients, 44 of whom were said to have epilepsy. The physicians allowed contact with 33 patients; only 20 were interviewed. The remaining 9 physicians and 13 patients were not interviewed, for reasons of time and cost.

Information on use and purchase of antiseizure drugs was obtained from the patients: they reported an average of 1.95 antiseizure drugs used. Ten of the 20 patients reported using only one antiseizure drug. By contrast, the physicians also reported on the number of antiseizure drugs used by the patients. That number was 1.6 drugs, on average. There was exact agreement between physician and patient in 14 instances. On the number of pharmacies where antiseizure drugs were purchased, the patients reported an average of 1.3 pharmacies. Sixteen of 20 patients purchased antiseizure drugs at just one pharmacy.

Discussion

The confidentiality guidelines were central to the field test. The protocol for data collection was constructed around them, and the results of the field test were subsequently affected by them. The guidelines were developed for the field test, and by and large they were followed. The major difficulty was that pharmacists were reluctant to call physicians and ask them to participate in the study. Several pharmacists refused to do it; they requested that the pharmacy student call the physicians about joining the study. On those occasions, the pharmacy students did telephone the physicians. They always indicated, however, that they were calling for the pharmacy. A similar situation obtained when physicians refused to participate in the study. Since it was too much to ask the pharmacists to call the refusing physicians a second time, survey specialists were brought in for this purpose. They, too, called as representatives of the pharmacy.

Nonresponse was a serious problem at the pharmacy level, at the physician level, and at the patient level. This was disturbing because nonresponse can dramatically affect survey estimates. The procedures used in the Brooklyn substudy may be the solution to the nonresponse problem for pharmacies. As for physicians and patients, their nonresponse problems resulted partly from artificial circumstances. For example, data collection from them had to be scaled back because resources were diverted to the Brooklyn substudy of pharmacy participation. Nonresponse for physicians might be reduced by offering financial incentives, as was done for the pharmacists. It might also be helpful to modify the confidentiality guidelines so that survey specialists would be responsible for making the contacts from pharmacy to physician. These contacts could be made in a way that would not violate privileged relationships. Nonresponse of patients resulted principally from the physicians' barring contact. This could be the most important nonresponse problem of the three, because the reasons for barring contact might well be related to study variables of interest.

The multiplicity information is skimpy—yet thought-provoking. Eighty percent of the patients purchased their antiseizure drugs at only one pharmacy. On average, all of them purchased their drugs at essentially one pharmacy. If this finding would hold beyond our sample size of 20, then it might be possible to do a morbidity survey of epilepsy without contacting patients at all. Not having to contact patients would probably result in a greater response by physicians to the survey. We assume that information obtained from physicians on number of antiseizure drugs used by patients would be acceptable. Again, in 14 of 20 instances, we had complete agreement between physician and patient on number of drugs used by the patient.

Overall, the experience of the field test suggests that the pharmacy-physician-patient approach to finding people with epilepsy could perhaps be the basis for a probability survey of epilepsy in the United States. More testing is needed, however, under conditions that would apply in an actual sur-

vey. A successful application of the approach requires high rates of participation for pharmacies, physicians, and patients. A survey of epilepsy would best be restricted to noninstitutionalized populations. Even at that, the resulting estimates would exclude those who had never been treated for their epilepsy. The estimates would also exclude persons with epilepsy who, during the specified time period, had not had a prescription filled for any antiseizure drug of interest. These limitations notwithstanding, the survey could, if successfully implemented, provide morbidity and cost data useful for administrative purposes, such as planning for public services. An added benefit of the survey could be data on distributions of antiseizure drugs prescribed.

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Monitoring Health in Los Angeles County

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The authors were members of a special committee of UCLA School of Public Health faculty members and Los Angeles County health department personnel formed in 1982 to reconcile health department programs with county health needs. The other UCLA members of the committee were: Lester Breslow, MD, MPH, Dean Emeritus and Professor of Health Services; Jonathan Fielding, MD, MPH, Professor of Health Services and Pediatrics; Ralph Frerichs, DVM, DrPH, Associate Professor of Epidemiology; William Shonick, PhD, Professor of Health Services; and Paul Torrens, MD, MPH, Professor of Public Health. Other Health Department personnel included Ellen Alkon, MD, Chief of Public Health, West Area; and Martin D. Finn, MD, Medical Director for Public Health Programs.

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Copies of the committee report, "An Approach to Monitoring the Health Status of Los Angeles County Residents," as well as tearsheets of this article, may be obtained from Dr. Janis.

Synopsis

The University of California at Los Angeles School of Public Health, in collaboration with the Los Angeles County Department of Health Services, compiled data and developed a standardized format that displayed a comparison of mortality and morbidity data between Los Angeles County, the State of California, and the United States in 1960, 1970, and 1980 for 16 health topic areas. Findings noted both favorable and unfavorable health trends, as well as substantial data collection problems.

In 1980, compared with the United States, the Los Angeles County rates for tuberculosis, gonorrhea, syphilis, and hepatitis B were as much as 45 to 128 percent higher, the homicide rate was more than double, and, for the population aged 65 years and over, the cirrhosis of the liver rate was