Needs of a Drug Information System

IN RESPONSE to their successful demonstrations of remedial possibilities in managing drug information, the Public Health Service invited a group of pioneers in hospital-based drug information services to take part in a seminar at the National Library of Medicine, Bethesda, Md., on March 8–9, 1965. Participants are listed on page 606.

The accomplishments they reported for pharmacy-based drug information centers in hospitals offered eloquent evidence of opportunities to improve the safety, efficacy, and economy of medication practices (*1*). Rather than dwell on the need for such improvements, the seminar concerned itself with the needs of a drug information system which would bring about such improvements.

The keynote of the meeting was President Lyndon B. Johnson's statement of October 31, 1964:

> New knowledge and the full dissemination of existing knowledge are equally important in the achievement of [our health] goals. New drugs, and new techniques for their use, for example, cannot help those who do not know their value. An essential part of the health program for a new Democratic Administration would be the development of a system of drug information centers to collect and disseminate information, not only on adverse side-effects of drugs, but on their latest developments and applications. This would be a service to the practicing physician, whose traditional burden has been the basic inability of one person to keep up with international drug development as reported in professional journals. Under the center concept, physicians could contribute to and draw from the accumulated current knowledge of the center, by telephone if necessary. Its organization, management, and direction would be in large measure the responsibility of the private medical community.

The Program

The program of the seminar was designed to be permissive and creative rather than conventional. About the only conventional elements in it were the opening statements: an announcement of intentions; a welcome by the director of the National Library of Medicine; an outline of the Federal resources for information; and a summary of the drug information activities of the American Society of Hospital Pharmacists.

Even in this portion of the program, there were frequent questions and digressions to clarify understanding and to explore the implications of certain facts. Thereafter, the pharmacists, in turn, related their experiences with a drug information center to the needs of a drug information system. Here again, each speaker was exposed to a crossfire of comments and questions from all participants.

Representatives from the American Society of Hospital Pharmacists, which pioneered the concept of a pharmacy-based drug information center, described their organization as an autonomous, nonprofit, professional society, with 25 employees in Washington, 4,100 members, and a potential membership of 20,000 by 1975 (*2*). Currently, 8,000 or more hospital pharmacists are in practice (fig. 1).

Of 7,004 hospitals in the continental United States in 1957, 2,644 employed 5,833 full-time or part-time pharmacists. These included nearly all of the large hospitals but few of the smaller ones. At that time, no pharmacists were employed in 894 hospitals for long-term patients or in 3,466 hospitals with fewer than 300 beds for short-term patients (table 1). Full-time pharmacists were employed for less than half of the hospitals' bed capacity (table 2).

Hospital pharmacists have participated in establishing Pharmacy and Therapeutics Committees, informally known as PT Committees, in many of our major medical centers. These committees provide continuing evaluation of local clinical experience with medications, especially those which are experimental or which,

having been approved by the Food and Drug Administration, are still relatively untried.

An outstanding achievement of their society is a series of monographs on drugs issued by the American Hospital Formulary Service. These are issued in a form which permits any hospital to select what it wishes for looseleaf binding in its individual hospital formulary. The service has 23,000 subscribers in 50 countries.

The society also publishes *International Pharmaceutical Abstracts* 24 times a year with an index every 6 months.

Major Conclusions

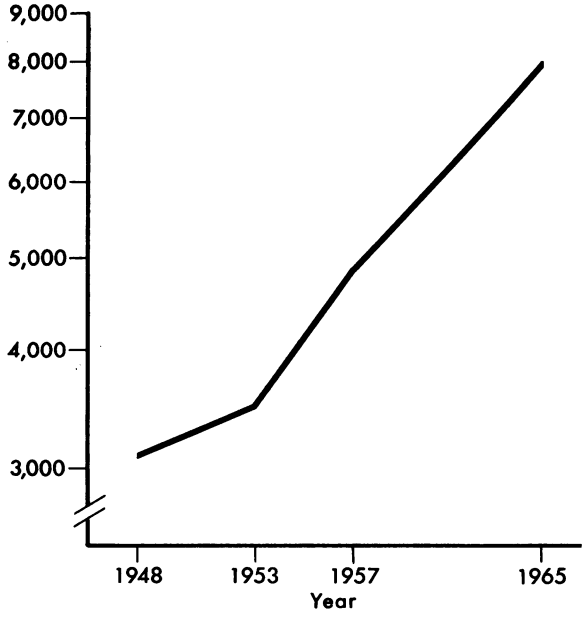
The conference was summarized by Paul Parker, University of Kentucky, last of the pharmacists to discuss his drug information center. Although no formal resolutions were voted, the conversations, which continued long into the night, did achieve a broad consensus.

In many respects, the views of those present were expressed in Parker's summary.

Resource for Data

A basic need for a drug information system, it was agreed, is a national resource such as might be provided in large part by the National Library of Medicine. In such a center, information could be organized to permit effective cross-referrals between drugs and their clinical uses.

Figure 1. Growth rate of hospital pharmacists, 1948–65



SOURCE: American Society of Hospital Pharmacists.

This resource could identify the chemistry of drugs, if known, and possibly give the percentage in dosage forms of additives, stabilizers, and solvents. It could also contain records of the hospitals' PT (Pharmacy and Therapeutics) Committees regarding specific drug evaluations and other unpublished data, such as drug formulations unique to some hospitals.

In effect, the center's files would list a given disease with data on drugs used for that disease, and, conversely, they would list each drug, its various applications, and the implications of its use.

Comparison of Efficacy

A second need, resembling the first but with different objectives, is data relating the uses of drugs and their effects to indicate, for example, which of several drugs were most effective in comparable situations. Such data would be available if the medical histories were recorded in a way to give confidence in their accuracy and to provide a ready means for statistical evaluation. The data would show, for example, how female patients with a history of rheumatic heart disease responded to various forms of digitalis.

Such resources would facilitate the work of the PT Committees, which may be expected to become valuable instruments for improving medical care.

The data would also be useful to support evaluation by a central service, deriving information from many sources, including the reports of hospital PT Committees, so that drug usage would benefit from constant and systematic reappraisal as a result of clinical experience.

Medical Profession's Role

The general sentiment expressed was that achievement of such improvements in the drug information system must necessarily be linked to the interest and activity of the medical profession. Although pharmacists and hospitals clearly have important contributions to offer,

Table 1. Hospitals employing pharmacists, continental United States, 1957

Bed capacity	Total number of hospitals	Number of hospitals employing pharmacists			Number of hospitals without a pharmacist	Percentage of hospitals with a pharmacist
		Full time	Part time	Total		
Short-term	5,645	1,967	212	2,179	3,466	39
Under 50	2,409	84	[1] 84	168	2,241	7
50–99	1,296	231	[2] 102	333	963	26
100–199	973	703	[1] 26	729	244	75
200–299	461	444	0	444	17	96
300–399	229	228	0	228	1	100
400–499	113	113	0	113	0	100
500 and over	164	164	0	164	0	100
Long-term, all sizes	1,359	372	[3] 93	465	[4] 894	34
Total	7,004	2,339	305	2,644	4,360	38

[1] 9 hospitals received services of pharmacist from another hospital.
[2] 3 hospitals received services of pharmacist from another hospital.
[3] 15 hospitals received services of pharmacist from another hospital.
[4] 6 hospitals stated that they handle no drugs.

SOURCE: Reference 2.

the cooperation of leading physicians in the work of the PT Committees is fundamental, essential, and vital to a successful drug information system.

Given such support, a hospital-based network of drug information centers, freely exchanging information among themselves, feeding information to the national center, drawing on the services of the national center, and looking to the national center for guidance in standards and procedures and for support in training and some initial financing, could be a powerful resource in the armamentarium of medical care.

Table 2. Number of beds in hospitals with and without full-time pharmacists, 1957

Bed capacity	Number of beds in hospitals with—		Total beds
	Full-time pharmacists	No full-time pharmacists	
Short-term:			
Under 50	2,334	64,347	66,681
50–99	15,437	72,772	88,209
100–199	105,516	39,225	144,741
200–299	102,005	3,919	105,924
300–399	70,298	283	70,581
400–499	45,518	0	45,518
500 and over	117,341	0	117,341
Long-term, all sizes	213,048	571,569	784,617
Total	671,497	752,115	1,423,612

SOURCE: Reference 2.

Appraisal of Issues

As to the issues discussed by individual pharmacists, the areas of agreement or uncertainty were not formally defined, but a fair approximation could be inferred from the interchange of comments.

Questions Received

The conferees agreed that the number of questions to be handled by a drug information center would vary with the quality of information service, the location of the center, relations with the users, and efforts to encourage questions. In their experience, if the information services are satisfactory, the demand for services will likely exceed the capacity of the information center.

Most questions are answered by existing drug information centers immediately or within a few minutes, but a minority of questions, such as a complete report on contrast media used in X-rays, require time-consuming investigations. About 10 percent of all the questions require more time to answer than all the others combined.

Nearly all questions received by existing centers relate to medical practice rather than to research, and most concern the immediate treatment of a specific patient.

Typical questions are: "Do you have this drug?" "What is this pill?" "What is the drug of choice for this condition?" "What does this drug do?" "Are these two chemicals compatible?" "Can I get this drug in any form?" "Is this drug better than that one?" Less frequent are such questions as, "What can you tell me about this drug?"

Questions come from nurses, students, young resident physicians or interns, as well as from senior medical staff members. As the reputation of a center develops, however, it becomes a focus of inquiries from other hospitals, from drug wholesalers, retail pharmacies, community practitioners, news reporters, and community leaders.

Services Performed

Although the needs of those who prescribe and administer drugs and other users of information naturally influence the services performed, fundamentally the hospital pharmacy is responsible for acquiring and compounding medications, maintaining records, auditing prescriptions, reviewing uses and effects of drugs, maintaining security of supplies and information, and dispensing doses for administration. (Roughly 10 to 20 percent of the prescriptions written must be clarified or verified for accuracy, by a call from the pharmacist to the prescribing physician, before they can be filled.)

Distribution of information is a necessary component of these essential responsibilities. This concept is taken for granted.

The area of uncertainty is the extent to which information services should be elaborated. For example, the distribution of health pamphlets to outpatients was regarded as an exceptional activity, but not germane. The patients, however, were glad to get them.

Another successful but unusual activity was the pharmacy's inquiring of outpatients if they understood what their medications were for and how they were to be used.

Two centers distribute with each prescribed medication a brief printed set of instructions to the staff on the nature of that medication,

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its administration, and significant signs and symptoms which may follow its administration. These hospitals also issue medications in unit doses, so the nurse is not concerned with selecting and measuring the dose, but with timing its administration and observing the results. The printed information supports the nurse in this duty and is regarded as the most valuable service of the center. The local physicians often request a complete set of the drug information cards used in one hospital for their files.

The conferees were also uncertain whether the hospital center should be concerned with any drug information except that which concerns patient care. They felt the extent of services depends considerably on the workload, motivation of the center staff, and interest of the medical staff. They strongly endorsed programs of research, instruction of patients, education of staff and medical and nursing students, and program evaluation, given sufficient staff and motivation.

Medical staff members were reported to be indifferent to drug information services until they had experience with them. The physician who has been accustomed to such services was said to be their strongest advocate when he finds himself deprived of them.

Auditing

Despite agreement on the responsibility of the pharmacist for auditing drug use, the practical exercise of this duty is limited. One center reported that it could not disclose the results of an audit because its data were incomplete and because, however weak the data, there was apparent evidence of improper use of medication.

Another center, in investigating intrahospital drug distribution, discovered that about 18 percent of the doses administered were not recorded on the patients' charts and that about 8 percent of those recorded on the charts were not administered.

Several hospitals were experimenting with automatic methods of recording drug dosage, but it was uncertain which technology was appropriate, whether a standard method should be recommended for all hospitals, or even whether it was humanly possible to obtain the data on the medical history which would permit a confident statistical analysis of the comparative effectiveness of drugs. The conferees reviewed both advantages and disadvantages of proposals for audits based on selected samples, on a few centers of excellence, or on a comprehensive national depository of medical records.

Unusual Effects

Agreement was general that, although hospital pharmacists have successfully piloted a program of reporting adverse reactions to drugs, such reporting is not currently a practical procedure. Moreover, all doubted that such reports would be likely to have statistical validity without data on the number of doses administered, the number of patients exposed, and the circumstances of exposure.

Structure of the System

There was agreement on the need for a national center for the system, but uncertainty as to its base. The merit of intermediate centers, having a regional or district status, was not defined, although a strong case was made for a district center which might serve an extended area outside the hospital, and for a regional center which would be a model of excellence, a superior resource of information, and a focus of recruitment, training, and research in information methods.

It was agreed that a few excellent centers would be preferable to a large number of inferior ones, but the inception of 25 drug information centers of high quality in the next 5 years was regarded as an attainable goal.

Sponsors of the System

There was wide agreement that, given cooperation by the medical profession, the system would also require the collaboration of many agencies and societies concerned with public health. The conferees were not certain that the system should be dominated by public agencies or private associations, but most agreed that a privately operated system with governmental support was desirable. The role of the PT Committees was regarded as critical, although they are not all highly influential at this stage.

Separation of Functions

Some conferees conceived of the system of drug information as an array of interconnected pipelines, equipped at intervals with filters of graded porosity, so that 90 percent of the questions asked might be answered at once in a local center and the more difficult ones relayed to places with the staff, equipment, or other resources required to answer them.

As noted elsewhere, training, research, acquisition, and evaluation would be the tasks of the large centers.

A national center might have special responsibility for comprehensive coverage of information sources, financing, standards, and international relations.

No judgment was determined as to the locus of responsibility for selecting pertinent and significant drug information, but there was a strongly felt need for methods of "eliminating the junk" from the literature.

Literature

There was no doubt that the literature, published and unpublished, in association with medical records, is the foundation of drug information services. But there was uncertainty as to the methods of selecting and using unpublished literature, abstracts, translations, and reviews. There seemed evident agreement that the National Library of Medicine, with expanded coverage of the literature, could meet virtually all the needs for the original published literature.

Wide recognition of the need for reviews was not matched by assurance that it will be possible to obtain the time and talent necessary to prepare reviews of specific aspects of the drug literature. With respect to this need, there appeared to be a wait-and-see attitude.

In large part, the attitude toward abstracts appears to depend on the nature of the audience. (In other fields, those in basic studies prefer full papers, and those concerned with applications are more interested in abstracts.) Those at the seminar agreed that abstracts are the best way of keeping alert to current developments. If an abstract indicates something of value, copies of the full text of the paper as a rule are readily acquired. There was little doubt that the manpower was available to prepare abstracts, but some questioned the capacity of present publishing facilities to distribute the abstracts promptly.

Although more than half of the literature received by the National Library of Medicine is in a language other than English, there seemed relatively little concern with the need for obtaining translations. The fact that no one reported difficulty in identifying drugs because of foreign terminology indicated that the foreign literature is little used. As one conferee put it, it did not seem worth spending money on translations if there were other unmet needs of high consequence.

At the same time, the conferees were interested in foreign experience. They wished to know why some drugs are withdrawn from foreign markets and sold in the United States, or why some drugs are marketed abroad and not known here. They felt that foreign experience with drugs could be quite important. And they indicated they would welcome the addition of abstracts of foreign literature to the present abstract journal.

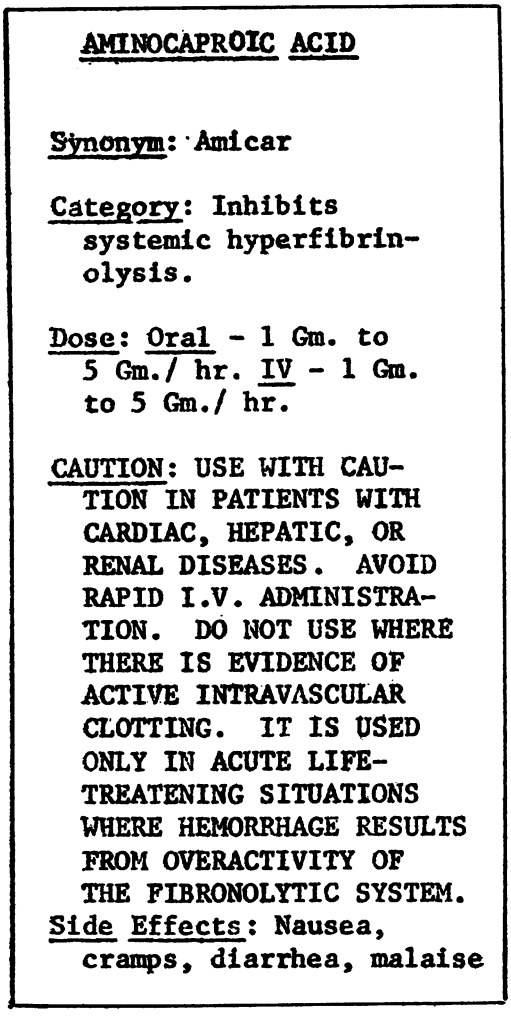
The use of leaflets for special situations had complete endorsement. For example, the brief notes prepared by the pharmacy and attached to the unit doses (*3*) supplied the nurses in two hospitals aroused enthusiasm (fig. 2). The distribution of informative leaflets to outpatients and similar audiences was endorsed. The questions unanswered were how the literature was to be prepared, published, selected, and paid for, in the context of a drug information system.

There was less than complete satisfaction with the health literature available for the public. The need for evaluation of such literature, with regard for the source and mode of distribution, was generally endorsed.

Relations With Libraries

All agreed that the information center should not be engaged in maintaining a large file of literature for search and retrieval. The center's dependence on these services, however, implied the need for access to such a file, possibly a regional or central file, through a well-organized library with well-trained librarians.

Figure 2. Illustration of mimeographed notes, prepared by pharmacy, to be attached to unit doses of medication



AMINOCAPROIC ACID

Synonym: Amicar

Category: Inhibits systemic hyperfibrinolysis.

Dose: Oral - 1 Gm. to 5 Gm./ hr. IV - 1 Gm. to 5 Gm./ hr.

CAUTION: USE WITH CAUTION IN PATIENTS WITH CARDIAC, HEPATIC, OR RENAL DISEASES. AVOID RAPID I.V. ADMINISTRATION. DO NOT USE WHERE THERE IS EVIDENCE OF ACTIVE INTRAVASCULAR CLOTTING. IT IS USED ONLY IN ACUTE LIFE-TREATENING SITUATIONS WHERE HEMORRHAGE RESULTS FROM OVERACTIVITY OF THE FIBRONOLYTIC SYSTEM.

Side Effects: Nausea, cramps, diarrhea, malaise

In the absence of such resources, it was not certain what initiative should be taken to obtain them.

Location

Although there appeared a clear indication for location of a national information center near the National Library of Medicine, and for regional centers at selected medical complexes in major metropolitan areas, no particular sites were discussed. More attention was given to the need to place the local drug information center in a conspicuous location, perhaps adjacent to a main entry or to a main cafeteria or along some heavily traveled artery. The placement of the center was considered more critical to the obligation to handle questions than to the function of storing and fabricating medical supplies.

Operations

The day-to-day operations of the drug information centers are in a highly experimental and therefore fluid state. The potential of automation, suggested by the availability of a computer to most medical complexes, has stimulated a fever of creative thinking about medical records, audits, packaging, searches, acquisition of data, and timing.

The concept of a permanent medical record for each patient, with a complete history, has gained considerable support from the potential of modern technology. Coupling these records with the records of medication, their prescription, administration, and effects opens a wide vista for research administration, drug regulation, medical economics, and therapy.

Improvements in the record system were seen as essential to the improvement of audits, but human as well as technological factors were considered. Accurate input of information would be contingent on the quality of administration and medical care and the training of personnel, and acceptance of the information revealed by the audit would largely depend on the exercise of social responsibility by the professions most concerned.

Despite overwhelming respect for the system of packaging unit doses, there are technical obstacles to successful repackaging in the pharmacy. Notably, the pharmacist has difficulty obtaining the information on stability and formulation which would affect the efficacy and form of repackaging. It was not clear from the discussion whether packaging in unit doses by manufacturers was a practical possibility. A special advantage of the unit dose packaging to the information system is that it heightens control and accuracy of data entered in drug and patient records, and it facilitates accounting in a private hospital, but unit doses are not necessarily an advantage where patients are not charged for medication.

The need for expediting the handling of drug information was completely accepted. Infor-

mation which fails to reach the practitioner in time is of little more value than none at all. Some potential for speeding information was seen in accelerating the publication and distribution of reports of PT Committees, abstracts, and journals; in automated storage and retrieval systems; and in a network which would offer instant telephone connection to regional or central authorities.

Little alarm was expressed over nomenclature of drugs as far as safe practice by the pharmacist may be affected, although the prospect of a standard code for chemical structures was warmly appreciated. The conferees seemed satisfied that the listing of a variety of trade names with generic names was sufficient to identify the drugs on the market, but they suggested that listing by chemical groups would be helpful in avoiding drugs which might distress sensitive patients.

Manpower

It was observed that multiple names of drugs and different measurement systems create serious hazards in administration of drugs by the unsophisticated professionals. The availability of manpower to staff a drug information system largely depends on reassignment of pharmacists not presently using their professional training and to some extent on special training in information handling, especially for designing computer programs. No absolute shortage of available pharmacists was seen. For several reasons, the pharmacists were considered the most likely source of manpower for drug information services. Among these reasons were the exceptional degree of interchange of information among hospital pharmacists, the training of pharmacists to recognize drug hazards not anticipated by the physician or nurse, a concentration of interest in drugs per se, a detached point of view toward patient care, a potential for contributing to research and inventing techniques, and a close working relationship with physicians.

Clientele

In general, the conferees expected a broadening of the clientele of the drug information centers. At present serving mainly those engaged in patient care in the hospital, the centers were felt to have the potential of providing increased services for education of patients and students, community health practitioners, nursing homes, clinical and laboratory research, population studies, community pharmacies, drug manufacturers, administrators, and agencies engaged in regulation of drugs and devices.

Specificity

The conferees agreed in general that advances in molecular biology would contribute to increasing knowledge of biological processes and chemical reactions to the extent that the present ability to prescribe a specific drug in specific circumstances would soon be multiplied many times. They thought that a sound system of data on drug use could also contribute heavily to such knowledge. The net effect, they predicted, would be to increase vastly the value and utility of drug information services.—*Marcus Rosenblum*

Commentaries

THE American Society of Hospital Pharmacists has demonstrated a high degree of professional responsibility in its pioneering efforts to augment the rational uses of medications. These efforts have justified conception of an articulated system of drug information centers. The centers would serve a variety of users, but their major emphasis would be to assist those concerned with medical care.

Especially noteworthy is the society's perception of the increasing specificity of knowledge of the biological effects of drugs and the potentiality of an automated record system both to enhance and capitalize on such specific knowledge.

Federal agencies are prepared to meet professional associations more than halfway in their efforts to establish and develop such a system.

Authority and funds are available to contribute to support of training personnel, support of scientific publications, and planning, design, and construction of hospital facilities. A good part of these resources will surely be directed toward improvement of drug information services.

In time, with experience, many of the issues touched upon in this conference will be clarified and rational conclusions reached. Certain of these issues are exceptionally important.

The National Center

The conference report implies a strong argument for a national drug information center which is controlled by a private association of professional leaders, somewhat along the lines of the National Academy of Sciences-National Research Council, rather than by government or by any single professional society. Joint representation of hospital administrators, physicians, pharmacologists, nurses, toxicologists, biometricians, economists, pharmacists, and information specialists appears to be the logical pattern of a governing council for the center, to supervise the performance of an executive director.

Evaluation of Methods

The conference report also implies the need for evaluative research in communications methods. The mercurial state of the technology especially calls for comparative studies of the efficacy and economy of various instruments, because once a method is chosen it tends to freeze the technology for the entire system. A system wedded to microfiche might find itself unable to use tapes for the storage and retrieval of documents. One target would be a system which would permit variety, flexibility, and innovation of techniques.

Training

A third major need highlighted by the conference discussions is the training of personnel to staff and operate drug information centers. This implies a blending of pharmaceutical knowledge, clinical knowledge, information technology, and the arts of scholarship and communication. It is rare to find anyone who combines such training, talent, and technique. But it is not inconceivable that such personalities can be developed by a combination of formal training and on-the-job education.—*F. Ellis Kelsey*

THE pharmacist's motives for providing drug information services must not be misunderstood. The main objective is to provide factual, unbiased drug information as a part of an effort to improve patient care.

When a particularly deep question arises, the literature usually does not provide a pat answer. Many sources must be explored for the facts essential to a reasonable and accurate answer. A drug information center should be able to respond to a specific question concerning a specific patient with a unique set of parameters.

It would be wrong for a drug information center network to have as one of its goals the publication of reams of information. This would merely add to the already insurmountable mountain of information the physician is expected to digest. Irrelevant information is worse than no answer at all.

On the other hand, a national drug information system could provide an excellent service in the form of state-of-the-art reviews of important aspects of drug therapy.—*Phillip A. Greth*

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AS I reflect on this meeting, it seems to me that the most telling statement was "important medical data have not reached the biomedical community when it was needed because individual efforts in making published drug information available have been uncoordinated and incomplete." This states the real challenge, if new knowledge is to be used in meeting the President's health goals with respect to drugs.

Basically, I see a need for a two-way flow of drug information between user and source. At the point of consumption, in the clinical setting, the formal channel would be the Pharmacy and Therapeutics Committees. Information from the sources would be vested in the central documentation of drug information, using the resources of the National Library of Medicine, regional facilities, and other medical and pharmaceutical library services.

To make use of the daily increment in knowledge of drug uses, there must be a literature resource which is (*a*) broad enough to consider all aspects of drugs from their development, manufacture, handling, and administration to their indications for use, manner of use, and

results, and (*b*) deep enough to encompass the worldwide experience with drugs, singly or in combination. Such a resource should be continuously updated by reports of clinical experience, basic research, marketing experience, pharmacy practices, experimental trials, drug handling, and the still unexplored domain of common applications and practice. This last series of reports might tell what are the actual drugs of choice and why. What is the rationale for certain drug selections? Efforts to report adverse reactions deal with only one aspect of this important subject.

Some teaching hospitals are now studying drug programs, including systems of handling and administering drugs as well as clinical usage. Such studies are a concern of the Pharmacy and Therapeutics Committees. A drug information center extends this interest to a full-time pursuit which acts rather than reacts.

The information developed in such centers could form a national resource of opinion and experience never before made available. Best of all, this information and objective data would represent the combined observations, experience, and judgment of several hundred medical specialists. A well-planned system of drug information centers could supply the source material for such a national resource.

Whatever system is developed to classify drug information and its retrieval, I am hopeful that it will use a coding system which is versatile enough to retrieve the desired information, whether the approach is made with a drug subject or a clinical subject.

The scope of drug information available should be broad enough to serve the needs of the entire biomedical community and not just those who prescribe drugs. Most of the manufacturers' data are tailored to the specific needs of physicians. In particular, I believe there is a need for more complete information on chemical compatibilities when drugs are mixed, dosages recommended for infants and for specific conditions being treated, stability of different dry drugs after they are reconstituted or solubilized in different vehicles, and optimal storage conditions. These are pharmaceutical and nursing problems encountered daily. There should also be noted the overt signs of overdosage and what tests can be applied to identify the drug in body fluids; that is, methods of assay—both qualitative and quantitative. This information would greatly assist the toxicologist.

The identification of solid dosage forms, (tablets and capsules) is still an important and frequent request made by clinicians. Some further effort should be made to identify readily the several hundred solid dosage forms available. This information may be requested to establish a patient's drug history or when there has been inadvertent overdosage. The Council on Drugs of the American Medical Association has done an excellent job in commissioning the use of an "Identification Guide for Solid Dosage Forms" (JAMA 182: 1145–1302, Dec. 22, 1962), but I understand they do not plan to update this guide—at least not in the near future. A far more accurate procedure, and surely easier to follow, would be to imprint a code number or symbol on every different solid dosage form of a drug commercially available, but this would, of course, probably require some legislative action.

By some method there should be ready access to information about two opposite classes of drugs which bracket the bulk of prescription drugs. These are the investigational drugs and the proprietary over-the-counter drugs. The present Food and Drug Administration regulations governing the use of investigational drugs consider only the need for this information by individual sponsors and investigators. Yet, within institutions there are several other people (intern and resident physicians, nurses, pharmacists, laboratory personnel) who may know little or nothing about the new drug. The publication, *Unlisted Drugs*, and more recently the pharmacy bulletins from the Ohio State University Hospital's pharmacy department are helpful. In addition, there is extremely limited information in cumulated reference form on over-the-counter drug items. The simple listing of their major active ingredients is often not enough. Clinicians are becoming quite concerned with the total composition and the exact amount of each ingredient, particularly for the different electrolytes present.

It may be considered beyond the scope of our immediate interest, but I believe there should be some organized effort to upgrade the quality

of drug literature published or reported. Standards should be developed and adopted by editors which are clearcut in their interpretation for the acceptability of papers to publish. This could be encouraged by the practice of having drug literature reviewers, abstractors, and indexers initiate a rating system for the quality of published articles. These might be rated or characterized by a set of given criteria such as type of controls used, number of cases treated, and so forth. A rating system for the qualitative aspects of drug information should probably be studied on a continuing basis through the joint efforts of a committee composed of researchers, clinicians, pharmacists, and statisticians.—*David F. Burkholder*

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DRUG information is needed on an international scale. Such information is valuable for use under different conditions in different countries, even for different uses. It is useful also to know whether the same drug is marketed in different countries under different names, or whether the same name in different countries applies to different drugs, especially with regard to formulation or dosage. It would be helpful to know why some countries, with a restricted formulary, are using a variety of drugs which are not marketed in the United States. Much of this international information has applications in daily use.—*Milton W. Skolaut*

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PERHAPS the greatest need for drug information within the hospital arises from the lack of information provided by the manufacturer. When manufacturers do not supply pertinent information, they should at least give the pharmacist the name of the authority who can answer the questions relative to stability, composition, or other characteristics of the drug.—*Sister Mary Gonzales*

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THE small community hospital with limited facilities, staff, health program, and literature resources finds it difficult to compete with the larger medical centers in the use of drug information and methods of disseminating information. The absence of extensive teaching and research programs and a practice of medicine which differs greatly from that seen in the university centers naturally reduces the requirements for extensive drug information capability. However, the great bulk of medical care rendered in this country is provided in areas remote from the teaching centers. On this basis, I feel that any effective drug information system must be directed at those people who provide the bulk of the medical care. By making information more readily available to those who knowingly or unknowingly need it most, I am confident that the quality of medical care rendered to the public would be improved. And I am sure that improved patient care must be the basis on which any such program is to be built.

I do not believe that a drug information center in a small hospital would compete with larger centers, but would complement and supplement the work of the larger university-based centers. Indeed, it would serve to make the larger center more sophisticated and valuable by permitting it to concentrate on significant problems that require a higher degree of competence in order to satisfy the demands placed on it from within its own community and from smaller centers.

I can only visualize any such system as including the small-sized to medium-sized hospitals with better than average facilities and strong motivational forces at work in its staff, serving areas or districts consisting of 10 to 30 hospitals. Area centers should be capable of responding to 90 percent of the queries directed to them. The other 10 percent which require more extensive capability would be directed to larger, regional centers for proper disposition.—*R. David Anderson*

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TO be responsive to user needs, a drug information service should be capable of providing information that is evaluated, digested, and appropriate to a specific situation while that situation is still open to treatment. Such information is abundantly available, but it is not used because this link between the resource and the need is missing.

Usually the information required is clinical. In the absence of a systematic method of obtaining information, the users rely for the most part on word of mouth, including such authorities as the vendors of commercial preparations.

In contrast to such sources, the staff of a hospital pharmacy and the professional pharmacist have a relatively disinterested approach to drug selection. The pharmacist and pharmacologist, moreover, have devoted their careers to the study of medications: this information is not peripheral to their interests. But even this specialization needs the assistance of better methods and systems of handling drug information in order to cope with the present volume and variety of data. The specialists also need to be relieved of nonprofessional tasks if they are to use their full energies at their highest capacities.

Given the financial backing, hospital pharmacies would be in a better position to relate the information resources to clinical situations; to obtain essential sources of information, such as abstract publications; and to organize methods of evaluating the effectiveness of drugs in use. All these resources would support programs of continuing education in administering drugs.

Major deficiences in presently available information about drugs include the lack of clinical data, comparing one drug with another; data on pharmaceutics, especially the supposedly inert ingredients; and information fed back from clinical records and observations. Better procedures are needed to obtain reliable records on what medications are used, in what form, and under what circumstances.—*William M. Heller*

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Electronic Aid for the Deaf

A new electronic device enables a deaf person who can speak clearly to communicate, without assistance, with a hearing person on any direct-dialing telephone.

The device, called a speech indicator, consists of a tiny microphone connected to a meter with a needle indicator. The deaf person holds the microphone against the earpiece of a telephone. When the hearing person answers, the sound of his voice activates the needle sharply. The caller explains that he is deaf but that he will ask questions which can be answered "yes" or "no." If the answer is yes, the hearing person answers twice. This activates the needle twice; if the answer is no, he replies once, which moves the needle once. Thus the deaf person distinguishes yes from no.

The speech indicator was first tried out in a training project at San Fernando Valley State College in Northridge, Calif., to teach telephone communication to deaf people. The project, conducted in cooperation with the adult education branch of the Los Angeles school system and Pacific Telephone, was supported by a grant from the Vocational Rehabilitation Administration, U.S. Department of Health, Education, and Welfare.

The Vocational Rehabilitation Administration estimates that there are about 250,000 deaf persons in the United States. Some cannot talk, but many speak well enough to use the device.