AN EVALUATION OF THE PHARMACIST SERVING AS A SOURCE OF DRUG INFORMATION TO THE PHYSICIAN

A Thesis

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John Joseph Piecoro, Jr., B.S.

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Approved by

Harold A. Wolf

Adviser
College of Pharmacy

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A. Literature Review

Pharmacy, as well as all the other health sciences, is dedicated to serve the health needs of the general public and to promote better patient care. The pharmacist, furnishing accurate drug information, could provide valuable service to other members of the health team, especially the physician, in promoting better patient care. An examination of the role of the pharmacist in this area is the purpose of this project.

If the pharmacist is indeed providing drug information then he must be made aware of the importance of this service. This would greatly improve his self-image which all too often has been waning. He must know that he has something to contribute that no other member of the health team possesses--the thorough knowledge of drugs.

Even though there has been a strong relationship that has existed for centuries between the "prescriber" and the "dispenser", there is still the need for greater rapport and better communication between the physician and the pharmacist. The pharmacist should let the physician know that he has the knowledge and the tools to provide drug information, and that he is willing to be of service.

Pharmacy, as are the other professions, is dedicated to perpetuating and providing the means by which precept and example can be passed on to the students in pharmacy. If pharmacists are providing drug information, then students in pharmacy must be trained to fulfill this role.

Through the ages the pharmacist has historically and traditionally supplied information on drugs to other members of the health team, and in particular, to the physician. The pharmacist in this role has been termed by many authors in pharmacy as the "informant" or "consultant" on drugs. However, reports on the merits of the pharmacist serving in this role are conflicting. Although many authors have speculated on the pharmacist serving in an informative or consulting role to the physician, few studies have been conducted to delineate this role.

The literature concerning the pharmacist in the capacity of an "informant" or "consultant" to the physician includes numerous references. These references can be divided into three distinct groups: (1) reports of opinions on the pharmacist as a source of drug information; (2) reports of studies of pharmacists providing drug information; and (3) other pertinent references.

1. Reports of Opinions on the Pharmacist as a Source of Drug Information

In discussing new horizons ahead in the field of pharmacy, Briggs (1957) stated that

> The practicing pharmacist of the future can, if he so wills, become more than a consultant in drug therapy. He can become a professional partner with the physician in the selection, use, dosage, and administration of drugs. And this position will be held by properly qualified pharmacists, not by sufferance or mere convenience, but rather by necessity.
>
> There can be little doubt that some authoritative local source will meet the daily needs of medicine for guidance in pharmacodynamics. It could be done by closed circuit television, or telephone tape recordings. But this vital source should be provided "live" by pharmacists. I believe that many pharmacists in the years ahead will be working partners with physicians, because

> the problems of drug therapy in the future will be too involved for determination without recourse to specialized guidance. And from this new domain of pharmacy will come the long-sought professional acceptance and public respect that, at the moment, may appear to be waning, but which may actually be at the beginning of its upswing (p.344).

Bellafiore (1958) designated the pharmacist of tomorrow as "the therapeutic consultant." He suggested this as a new professional duty, replacing the heretofore responsiblity of compounding. The pharmacist in this capacity will be expected to be an expert on the composition and pharmacological action of drugs, their therapeutic uses and indications, their toxicities and side reactions, their contraindications, their available forms and methods of administration, and their comparison with competing specialty products of many manufacturers.

In reference to hospital pharmacists Gelperin (1959) stated

> . . . to be a drug therapy consultant to the staff physicians is not a new role (for the pharmacist) . . . an effective pharmacist is not just the filler of prescription and medical supply orders; but, in addition, is a source of objective study, reasoning, and evaluation. The fulfillment of this basic function can truly be attained in the hospital, to advise as well as to administer (p. 217).

Miller (1959) pointed out that the pharmacist is used as a source of drug information by the physician. He also stated that the pharmacist is the most accessible source of drug information from the following list: detailmen, direct mail advertisements, medical journals (and journal advertisements), convention displays, colleagues, pharmaceutical reference books, and pharmacists. He stated "it is simply a matter of the physician picking up the telephone and he can be sure there will be

a pharmacist on duty to answer his questions" (p.11).

According to Miller (1959) a distinction is in order between the pharmacist functioning as a source of information to the physician and as a therapeutic consultant.

> The former role is that of directly reporting information about a product. The latter terminology denotes a discriminatory ability to compare the therapeutic properties of medication and offer an unbiased opinion of the efficacy of a particular product for a given situation (p.39).

Brodie and Myers (1961) indicated that the physician is receptive to the concept of a drug consultant. They believed that this is true as shown by the success of detailing as a promotional and sales technique in the pharmaceutical industry, and they feel that this function might be better performed by a competent pharmacist operating as an independent professional consultant. They also point out the following:

> Quite often when a pharmacist is cast in the role of consultant he would be more accurately portrayed as an informant. A pharmacist can provide a physician with the name, source, dose, use, price, therapeutic equivalents and physical properties of a drug, serving well as an informant, but actually falling considerably short of performing the service that a consultant might provide under the same circumstances. The drug consultant, in addition to the above information, should be able to provide a discriminatory evaluation of the drug in question and supply a professional judgment, if requested, regarding rational therapeutic use of the agent or equivalent agents (p.11).

In an editorial by Francke (1962), in the American Journal of Hospital Pharmacy, the pharmacist is pictured as both an informant and an advisor or consultant. He is an informant when he provides the following type of information: price, size, manufacturer, and contents. The advising role begins when he applies his knowledge of the physical, chemical, and biological properties of drugs to

the questions asked, i.e., compatibility, milliequivalents, the absorption, distribution, and fate of drugs in the body, duration of action, side effects, and antidotes (p.359).

Parrott (1962) stated that

> The primary worth of a pharmacist lies in his knowledge of stability and storage characteristics, his understanding of compatibilities, his preparation of dosage forms, and his ability to evaluate the relative merits of various dosage forms of a particular drug. Secondarily, as a source of information, the pharmacist should be able to advise on routes of administration, addictive tendencies, potencies, and composition of specialties (p.93).

Autian and Berman (1962) suggested that the pharmacist should take on a new role in the future and become the expert on drugs and drug products, and provide critical drug evaluations for the medical practitioner. They stated that "this role should become the main professional service the pharmacist renders." The pharmacist in this new role would be termed a pharmaceutical consultant:" . . . a pharmacist who advises and performs services for those seeking knowledge about drug products for which he (the pharmacist) has accumulated theory and knowledge by education and experience" (p.195).

2. Reports of Studies of Pharmacists Providing Drug Information

An unpublished study conducted by the National Opinion Research Center of the University of Chicago entitled "A Survey of the Pharmacist as a Professional Man" was both interesting and extensive. In addition to a sample of the general public it involved a nationwide sample of 500 physicians and 500 retail pharmacists from the same areas; all participants in the study were

interviewed. It was found that pharmacists generally considered themselves as sources of information about new drugs, while only 16% of the physicians said that they use the retail pharmacist to learn about new drugs and their application. Moreover, only one per cent of the physicians said they most generally depend upon the retail pharmacist in deciding when to start using a new drug. An encouraging suggestion was put forth: "the pharmacist has a potential for service to physicians and to the public generally which is not presently being wholly realized" (Bugbee, 1956, p.14).

Ferber and Wales (1958) conducted a comprehensive study on the effectiveness of pharmaceutical promotion. One of the objectives of the study was to ascertain how physicians obtain pharmaceutical information. Over 300 Chicago physicians were interviewed. They were asked to name the source of information from which they first found out about a new drug and the source which convinced them to start using the new drug. As expected, detailmen, medical journals, and direct mail advertisements were the most frequently mentioned sources. The pharmacist was not specifically mentioned in either case. The miscellaneous sources (which include the pharmacist) are far more important for "conviction" than "first notice," but one has no idea of the importance placed on the pharmacist here since there were numerous classes within this category.

There have been many marketing studies conducted which are similar to the Ferber and Wales study. In the studies of Caplow (1952), Menzel and Katz (1955-56), and Coleman et al. (1959), the pharmacist is not mentioned as a source of drug information. Caplow

and Raymond (1954) list the pharmacist as a secondary source of information and he is ranked the poorest of all sources in providing first mention of a new drug to the physician. Winick (1961) ranks the pharmacist a distant fourth behind medical journals, detailmen, and direct mail advertisements as a source of reliable information on new drugs. In studies of this nature one would certainly expect the pharmacist to be ranked poorly as the first source of providing information on a new drug to the physician, but he (the pharmacist) should rank much higher as a convincing source.

Although not truly conducting a study, Parker (1957) reported that the hospital pharmacist was used as a source of drug information by physicians. He stated that hospital pharmacists were not uncommonly called by physicians, usually on an informal basis, to supply information on dosage forms, sizes available, toxicity, etc. The meaning of etc. in this case was not divulged.

The American Druggist studies (1958, 1960, 1962, 1964, 1965a, and 1966) indicate the extent to which the nation's physicians and dentists call upon pharmacists for drug information. In 1963, based on the number of calls in the sample, there were 52,500,000 projected calls for drug information to pharmacists by physicians, dentists, and their aides. The following types of requests were received in 1964 (ranked by frequency): name of product, dose, availability, product form and packaging, price, manufacturer, composition, use, caution, compatibility, and refill status (American Druggist, 1964, p.12).

The pharmacists in the samples of the studies kept records and provided examples of requests from physicians, and completed a

questionnaire. Pharmacies were grouped by location (urban and rural) for comparison of the numbers and kinds of requests. Only retail pharmacies participated in the study, yet there are several thousand hospitals in the country with pharmacy service. Had the pharmacies been grouped by type of pharmacy and the study included hospital pharmacies, a great deal of more meaningful data could have been obtained. One interesting point about the studies was that the results obtained were on a projected basis; yet, there was no indication of the size or nature of the samples of participating pharmacies. The reader is entitled to complete data on the sample so that he may see how the projected results were drawn from the observed results.

In a study conducted by Benson and Benson (1962), similar requests as those received above in the American Druggist study were presented as the types of requests physicians reportedly ask of pharmacists. Almost all (96%) the physicians in the sample said that they sometimes ask a pharmacist for information on drugs. In this study a nationwide sample of physicians and pharmacists were interviewed; however, there was no indication of sample size or any other details of the sample.

Miller (1961) conducted a unique study. In an attempt to minimize bias and experimentally elicit the pharmacist's response in his natural environment, a physician called on the telephone every retail and hospital pharmacy in the test city. The pharmacist who answered was asked to suggest products for given conditions. During the study, 540 questions were answered by the pharmacists concerning the manufacturer, forms, strength, dosage, composition, and cautions of the products in question. Results were based on the performance

of the pharmacists in the telephone conversations which on the average lasted less than five minutes. Pharmacists were found to be performing commendably in most areas and they were prepared to function as a source of drug information.

A study by Newman (1961) involved a mailed questionnaire to a nationwide random sample of pharmacies grouped according to the number of prescriptions dispensed per day. Pharmacists were asked to indicate the number of inquiries on drug information that they received from physicians per week. An eleven-point check list was provided enabling the pharmacists to check the information in which the physicians were particularly interested. He found that pharmacists were constantly receiving inquiries and questions from physicians for data on products. Physicians were found to be most interested in the name, dosage, and strength or potency of the product. However, this study appeared to be based on pharmacists' recall of physicians' requests for drug information, as pharmacists did not keep records of the requests they received from physicians. The grouping of pharmacies according to prescriptions dispensed per day gives no indication to the type of pharmacy, except for hospital pharmacies which were grouped together in the study.

Burkholder (1963) reported on his findings after interviewing physicians in a large teaching hospital. Physicians were asked to rank sources of drug information in the hospital based on frequency and helpfulness. He found that hospital pharmacists were second only to medical colleagues in this respect.

In the audit of pharmaceutical service in hospitals, which

was published in 1964 under the title Mirror to Hospital Pharmacy, it was found that hospital pharmacists were called upon to provide a wide range of information on drugs to physicians. The types of information requested most frequently were dosage, dosage forms, and pharmacological data. Side reactions, contraindications, and comparison of potency of products were also frequently asked questions. Those requests which were less frequently made concerned chemical data on drugs, comparison of costs and efficacy of products, and toxicological information (Francke et al., 1964). This study consisted of all hospitals in the United States with a full-time pharmacist. Pharmacists were asked to estimate the number of times they were called upon by physicians to provide drug information. A nine-point check list of types of requests was provided for them to indicate the order of frequency of the requests from physicians. This study was also based on the pharmacists' recall of physicians' requests, as no records were kept of requests from physicians. Also the nine-point check list restricted the recording of the type of requests from physicians, since certainly other types of requests were received from physicians than the nine on the list.

It was reported that 2,056 questions were received at the University of Kentucky Medical Center, Drug Information Center during 1963 and 1964; more than 75% of these were from physicians. Complete literature on a drug, toxicity and side effects, identification of drugs, drugs of choice, data on investigational drugs, and drug nomenclature accounted for more than 49% of the requests (Burkholder, 1966 and American Druggist, 1965b). These reports are unusual, since they pertained to the work of a pharmacist with the sole duty of providing

drug information to the hospital staff. Few, if any, pharmacists are providing this same service on a full-time basis. Nevertheless, this is a prime example of the capabilities of a pharmacist in providing drug information.

Greth et al. (1965), in a study in which a pharmacist was located in the ward area in the hospital, showed that the pharmacist in this setting received an elevenfold increase in drug information requests from members of the health team over those received in the hospital's central pharmacy. The dosage of drugs was found to be the most frequent request (26.2%), followed by identification (18.4%), drug of choice (18.1%), therapeutic use (11.2%), and side effects and contraindications (10.5%). This study was conducted on a 24-hour basis. The pharmacist was primarily responsible for dispensing unit dose medication for the ward and was available to the physicians and nurses as a source of drug information. The pharmacist kept records of the frequency and type of drug information requests he received.

3. Other Pertinent References

In reviewing the literature, there were no studies found of a pharmacist accompanying physicians on ward rounds. Only a few isolated publications were found in which there was mention of the practice of a pharmacist accompanying physicians on ward rounds. These have been particularly associated with hospital pharmacy residencies and were used as a training device. Parker (1957) and Zuich (1957) both stated that round sessions provide the graduate pharmacist with firsthand knowledge of the clinical application of drug usage. Susina et al. (1964), reported essentially the same thing, except

pharmacy students participated in ward rounds in lieu of regular pharmacology laboratory sessions. At the Aberdeen Royal Infirmary in Britain each ward has its own pharmacist. He is envisaged as a member of the ward team and is looked upon by the nursing and medical staffs as "their" pharmacist (American Professional Pharmacist, 1966). It was reported that pharmacists at Long Beach (California) Memorial Hospital will soon be making rounds with physicians (Rosenthal, 1966).

The recent nationwide study, "The Pharmacy as a Health Education Center," sponsored by the American Pharmaceutical Association (1964) was designed to evaluate the community pharmacy as a source of family health information. Pharmacies in this study were classified into three types: Exclusive Service Pharmacies--those in which 70% or more of their dollar volume was from prescription medications and related health items; General Pharmacies--those which 31% to 69% of their volume was yielded by prescription medications and related health items; and Retailing Complex Pharmacies--those with 30% or less of their dollar volume accounted for by prescription medications and related health items (p.13). As expected, results differed according to the type of pharmacy with Exclusive Service and General being essentially the same with more people seeing the rack of health pamphlets in them than in Retailing Complex pharmacies. This was a realistic grouping of pharmacies, except that hospital pharmacies were not included, and the above classification is a good one with the addition of hospital pharmacies.

In summary, the literature review has shown that the pharmacist is a readily accessible source of drug information. The studies have shown that physicians call upon pharmacists for a great deal

of drug information of varied types. Requests for dosage appear to be the type of request most sought by physicians. Marketing studies have pointed out that the pharmacist is not used as the first source of providing information on a new drug. But one can see that the pharmacist is yet to meet the goals predicted of him by authors in pharmacy. The pharmacist readily provides day-to-day routine information on drugs, but whether or not he can and does provide consulting services is another question. There is strong evidence that some pharmacists are capable of performing this duty; viz., Burkholder at the University of Kentucky Medical Center (Burkholder, 1966 and American Druggist, 1965b).

Francke (1966) has succinctly depicted the present state of the pharmacist in providing drug information services, "one must conclude that the profession (pharmacy) has not yet established the role of the pharmacist as a drug information specialist" (p.49).

B. Statement of the Problem

The literature review has revealed there is no unanimity of opinion in regard to the role of the pharmacist in the area of providing drug information. Many pharmacy authors and educators have predicted a consulting role for the pharmacist of the future, but in the many studies conducted this role has not been detected as yet.

Also revealed is the fact that there have not been any comprehensive studies conducted on the nature of the physician's reliance on the pharmacist as a source of drug information. The studies conducted thus far have dealt with only a segment of pharmacy practice. The author feels that the practice of pharmacy appears to be divided

into four types of pharmacies: community, discount, hospital, and professional.

In view of the above, a critical evaluation of the physician's use of the pharmacist as a source of drug information in various types of pharmacies and depth interviews with physicians of their reliance on the pharmacist as a source of drug information could reveal useful information. Therefore, this study was designed to answer the following questions.

1. To what extent do physicians request drug information from the pharmacist?
   a. Would the number of requests vary according to the type of pharmacy (community, discount, hospital, professional, or a pharmacist accompanying physicians on hospital ward rounds)?
   b. Would the quality of the pharmacy library be related to the number of requests the pharmacist in the various pharmacies receives?
2. What portion of the physicians' requests to the different pharmacies are pharmaceutical, pharmacological, and therapeutic in nature?
   a. Does the physician differentially request pharmaceutical, pharmacological, or therapeutic information from the pharmacists in the various pharmacies?
   b. Would the quality of the pharmacy library be related to the types of requests the pharmacist in the various pharmacies receives?

3. To what extent does the physician reportedly call upon pharmacists for pharmaceutical, pharmacological, therapeutic, and biopharmaceutic information compared to using other sources of drug information for obtaining the information?
4. Does the physician call upon a particular pharmacy and/or pharmacist for drug information?

It was anticipated that the resolution of these questions would lead not only to a greater understanding of the reliance of the physician on the pharmacist for drug information, but also would contribute to the knowledge of the role of the pharmacist in the area of providing drug information.

II. EXPERIMENTAL

A. The Pharmacist on Hospital Ward Rounds

I. Introduction

In teaching hospitals, ward rounds generally consist of an attending physician, a resident, an intern, and several medical students. Occasionally, members of other ancillary disciplines attend these rounds. Ward rounds are frequently divided into three sessions: a preliminary meeting of the medical team, a meeting of the medical team with the patient, and a meeting of the medical team following visitation of the patient.

During the preliminary meeting usually one of the medical students or the intern "presents" the patient. The presentor gives the verbal history, physical examination, and diagnosis of the patient. If the results of laboratory tests, reports of consultations, and x-ray films have been completed, they are also discussed. The team then visits the patient, re-examines him, and questions him further about his illness. Next, the team meets again to discuss the diagnosis, etiology, and prognosis of the patient's illness; at this time they also plan for subsequent laboratory tests, special diets, and drug therapy. On subsequent days, new patients are presented; the previously presented patients are reported on as to their condition and the results of additional laboratory procedures.

Presently the pharmacist has no role or duties to fulfill on ward rounds. One can conceive of many possible situations arising on ward rounds in which the expertise of the pharmacist could be

a valuable asset to the medical team.

In reviewing the literature no published reports could be found of studies conducted in which pharmacists accompanied physicians on ward rounds. The study of Greth et al. (1965) was an attempt "to improve the availability and thus expand the utilization of the pharmacist as a drug consultant to the physician and nurse" (p.558). However, in this study the pharmacist did not accompany physicians on ward rounds, but was located at a pharmacy substation on the nursing unit. There was no formal channel of communication between the pharmacist and the medical team, but the pharmacist was freely accessible to the physicians.

Since there have been no reported studies of pharmacists accompanying physicians on hospital ward rounds, a study was conducted in which a pharmacist accompanied physicians on various hospital ward rounds on a regular basis. The extent of utilization of the pharmacist as a source of drug information by the medical team was determined as well as the types (pharmaceutical, pharmacological, and therapeutic) of requests received by the pharmacist.

2. Methods

The pharmacist accompanied physicians (the medical team) on various ward rounds at The Ohio State University Hospitals, Columbus, Ohio, for an eight-month period (February 9 to October 1, 1965).

In January of 1965 the proposal to let a pharmacist accompany physicians on ward rounds was approved by the chief medical resident at the hospital. The chief medical resident presented the pharmacist to the medical team on ward rounds of various medical specialties as

a resident pharmacist in hospital pharmacy who was interested in obtaining clinical experience involving the actions of drugs. The pharmacist was also introduced as being present during ward rounds to attempt to answer questions that might arise concerning drugs.

The pharmacist participated in seven different ward rounds: four in general medicine, one in cardiology, one in endocrinology, and one in neurology. The pharmacist started on ward rounds on the first day the teams were formed and stayed with each team for a month. Ward rounds were generally held four times a week, but due to conflicts in schedules during the academic year the pharmacist could not be present at all sessions. However, he was present on a regular basis, that is, the same days each week.

In the study a total of fifty medical team members were accompanied on ward rounds by the pharmacist. Nine of these were attending physicians, nine were residents, eight were interns, and the rest (24) were medical students; in some cases the same physician participated on more than one ward round team.

All requests for drug information received by the pharmacist were categorized and recorded daily in a logbook. A modified manner of that suggested by Brodie and Meyers (1961, p.13) was used to categorize the requests (see Table 1). Requests were first classified as to general type: pharmaceutical, pharmacological, or therapeutic. Second, the requests were subclassified into the appropriate class within the general classification. All of these are self-explanatory except for "identification" which refers to the visual inspection of a preparation and an attempt to identify it, and

Table 1 --Manner of Classifying Drug Information Requests

Category

I-Pharmaceutical

1-Name of drug
2-Ingredients or strength
3-Storage or stability
4-Physical or chemical properties
5-Incompatibilities or compatibilities
6-Dosage forms or package sizes
7-Source of supply or availability
8-Cost
9-Identification
0-Characterization of a drug

II-Pharmacological

1-Dosage
2-Pharmacological actions or effects
3-Mechanism of action
4-Absorption, fate, or excretion
5-Contraindications
6-Toxicities or side effects
7-Antidote

III-Therapeutic

1-Use or indications
2-Equivalents or comparisons
3-Evaluation of new drug
4-Details of a clinical procedure
5-Method of administration

Requestor

A-Attending physician
B-Resident
C-Intern
D-Medical student
E-Registered nurse
F-Nursing student

Promptness of Answer

T-At time requested
S-After search

Manner of Answer

O-Verbal
M-Memorandum
P-Photocopy
R-Reference
N-Not answered

for "characterization" which refers to answers to inquiries such as, "What is Drug X?" The requestor's medical classification was then recorded along with the promptness and manner of answer by the pharmacist. For example, a request from a resident for the mechanism of action of a drug which required a search by the pharmacist and answered by memorandum would be classified in this manner, II3BSM.

3. Results

The pharmacist attended and participated in 85 ward round sessions. There were 45 (52.9%) sessions in which drug information requests were received, and 40 (47.1%) sessions in which no requests were received. In the ward round sessions in which there were drug information requests, the number of requests ranged from one to fourteen with an average of 3.18 requests per ward round session.

One hundred and forty-three requests for drug information were received by the pharmacist from members of the medical team on the different ward rounds during the study. These requests were classified as shown in Table 2. Pharmacological inquiries accounted for the highest number (66 or 46.1%) of the requests, while only 21 (14.7%) were of a therapeutic nature.

Table 2 --Drug Information Requests Received on Ward Rounds

	Number	Percentage
Pharmaceutical	56	39.2%
Pharmacological	66	46.1%
Therapeutic	21	14.7%
Total	143	100.0%

The 143 requests for drug information were classified in relation to the specific type of request as shown in Table 3. Requests for ingredients or strength, source of supply or

Table 3 --Drug Information Requests According to Specific Class and Requestor

Pharmaceutical	Attending	Resident	Intern	Med.Stu.	Total
1	4	1	1	--	6
2	10	1	1	--	12
3	--	2	--	1	3
4	--	3	--	--	3
5	--	2	1	--	3
6	--	2	--	--	2
7	5	--	2	--	7
8	2	1	2	1	6
9	1	--	8	1	10
0	1	1	--	2	4
Total	23	13	15	5	56
Pharmacological					
1	5	2	1	1	9
2	6	3	3	2	14
3	5	2	2	5	14
4	4	1	3	3	11
5	--	--	1	1	2
6	4	4	1	5	14
7	--	--	--	2	2
Total	24	12	11	19	66
Therapeutic					
1	3	4	--	--	7
2	3	6	1	1	11
3	--	--	--	--	--
4	1	--	--	--	1
5	2	--	--	--	2
Total	9	10	1	1	21
Cumulative Total	56	35	27	25	143

availability, and identification made up more than 50% of the 56 pharmaceutical requests.

The 66 drug information requests of a pharmacological nature consisted of approximately equal numbers for dosage; pharmacological actions or effects; mechanism of action; absorption, fate, or excretion; and toxicities or side effects.

In regard to the 21 therapeutic drug information requests, more than 85% were for use or indications, and equivalents or comparisons.

The 143 drug informations requests were then classified in relation to the medical category of the requestor as shown in Table 3. The largest number of requests, 56, were received from attending physicians, followed by residents (35), interns (27), and medical students (25).

As shown in Table 4, the requests for drug information were further categorized according to the promptness of the answer by the pharmacist. Most of the requests, 103 (72%) were answered at the time requested. Approximately the same percentage of requests of a pharmaceutical, pharmacological, and therapeutic nature were answered at the time of request. Forty (28%) requests were answered by the pharmacist after a search of the literature.

Table 4 --Drug Information Requests Classified According to Promptness of Answer

	At Time Requested	After Search	Total
Pharmaceutical	41	15	56
Pharmacological	49	17	66
Therapeutic	13	8	21
Total	103	40	143

Table 5 --Drug Information Requests Classified According to Type of Answer

	Verbal	Memo.	Photocopy	Ref.	No.Ans.	Total
Pharmaceutical	53	1	2	--	--	56
Pharmacological	61	3	--	1	1	66
Therapeutic	16	4	1	--	--	21
Total	130	8	3	1	1	143

Requests for drug information are shown in Table 5 according to the manner of answer provided by the pharmacist. Of the 143 requests received, 130 (90.9%) were answered verbally by the pharmacist, eight (5.6%) by means of a memorandum, three (2.1%) by providing a photocopy, one (0.7%) by providing a reference, and one (0.7%) was not answered.

4. Discussion

The data presented indicate that the pharmacist accompanying the medical team on ward rounds was used as a source of drug information by the team. The pharmacist was called upon for drug information in 52.9% of the ward round sessions he attended with an average of 3.18 requests per ward round session. A variety of requests was received with 46.1% being pharmacological in nature, 39.2% pharmaceutical, and 14.7% therapeutic. Since greater than 60% of the requests were other than pharmaceutical in nature, this indicates that the medical team sought drug information of a more sophisticated nature from the pharmacist.

However, in 47.1% of the ward round sessions, the pharmacist did not receive any requests for drug information. This finding

may be attributed to many parameters. When the pharmacist first attended the different ward rounds, generally he did not receive any drug information requests. The physicians were not accustomed to a pharmacist accompanying them on ward rounds; many of the physicians remarked that they had never heard of a pharmacist attending ward rounds. The medical teams at first were reluctant to request drug information from the pharmacist, because most were generally unaware of pharmacists' capabilities in providing drug information. (Both during and after the ward round sessions, the pharmacist discussed the education and training of pharmacists with the physicians; physicians, as a rule, were unaware of pharmacists' extensive pharmacological background).

Another factor which definitely contributed to the many ward round sessions in which the pharmacist did not receive any requests was the several circumstances in which the illness of the patient was definitely diagnosed. The medications used for such illnesses were often few in number and their uses well established. For example, on cardiology rounds, the use of digitalis preparations in heart failure associated with low cardiac output is well known.

Occasionally on ward rounds there were no new patients admitted and so consequently the rounds consisted of discussion of the conditions of patients. In this type of situation, the medical team was in no real need of drug information.

An interesting finding was that the number of requests for drug information from the members of the medical team increased

with increasing order of hierarchy on the medical team. In the study by Greth et al. (p.563) 70.2% of requests were received from residents and interns, whereas in this study only 43.4% were from residents and interns.

The 103 (72%) requests for drug information answered at the time requested indicate that the pharmacist's education and training adequately prepared him to provide drug information. This finding may indicate that many of the drug information requests received were routine in nature.

A verbal answer was provided to 130 (90.9%) of the requests. This also gives an indication that many of the requests were routine in nature. Those requests which were answered by memorandum were detailed and could not be answered verbally.

In summary, the pharmacist received 143 requests for a wide variety of drug information from all members of the medical team on ward rounds. The pharmacist was able to answer most of these requests at the time they were requested on rounds and most of the requests were answered verbally.

B. Drug Information Requests Received By the Different Pharmacies From Physicians

1. Introduction

In the previous experiment, a pharmacist accompanied physicians on hospital ward rounds and was readily available to provide drug information upon request. This was a unique situation unlike that of the typical situation in which the pharmacist and physician are physically separated, each in his own "work area." To request information from the pharmacist the physician must, by necessity, call him on the telephone or visit him. One has little indication of the extent to which the physician does this.

Pharmacy practice, in the author's estimation, appears to be divided into four types of pharmacies; community, discount, hospital, and professional. From previous studies one cannot ascertain the extent or scope of drug information provided by pharmacists in the different pharmacies. The studies conducted thus far have not dealt with pharmacies grouped according to the above classification, or even with all of these different types of pharmacies. Pharmacies have been grouped in earlier studies as retail and hospital in Newman's study (1961), or as retail alone (urban and rural) in the American Druggist studies (1958, 1960, 1962, 1964, 1965a, and 1966), or hospitals alone (Francke et al., 1964 and Greth et al., 1965), or all pharmacies grouped together (Benson and Benson, 1962).

Thus, a study was conducted in the different pharmacies (community, discount, hospital, and professional) in which the

pharmacies kept a record of all requests for drug information from members of the health team. The extent of utilization of the pharmacist in the different pharmacies as a source of drug information by physicians was to be determined as well as the types (pharmaceutical, pharmacological, and therapeutic) of requests received by the pharmacist. Also to be determined were two relationships; one, between the quality of pharmacy library and the number of requests received, and the other, between the quality of library and types of requests received.

In addition to supplying data on the types of pharmacies receiving requests from physicians for drug information, the pooling of requests should point out the types of drug information which are needed by physicians. The collecting, classifying, grouping, and analyzing of the drug information inquiries will certainly be beneficial to pharmacy educators and pharmacists alike.

2. Methods

Pharmacists in various pharmacies in Columbus, Ohio, recorded the requests for drug information which they received from members of the health team for a three-month period (thirteen weeks) during the months of June through October, 1965.

The pharmacists in the participating pharmacies were shown the prescribed manner of recording the requests on the form used in the study. The form, as shown in Appendix 1, p.70, had space provided for the date, name of the requestor, the requestor's category [physician (including specialty), dentist, nurse, pharmacist, etc.], the nature of the request, time of answer

(at time requested or after a search), type of answer (verbal, memorandum, photocopy, reference, no answer), reference(s) used in the search, requestor's satisfaction, and space for pertinent comments.

Completed forms were collected at weekly intervals; the requests were coded in the manner prescribed in the first part of the study, as shown in Table 1, p. 19. In order to preserve uniformity in the coding of the requests, the author classified all inquiries.

Sixteen pharmacies participated in the study; four were community, two were discount, six were hospital, and four were professional. The American Pharmaceutical Association in its recent study (1964) classified pharmacies according to dollar volume from prescriptions, but this information was not available from the pharmacies in the study. Hence, the pharmacies were classified on a relative basis suggested by Knapp (1965, p.11). Professional pharmacies were defined as those pharmacies being primarily prescription-oriented with emphasis on pharmaceutical services to the exclusion of almost everything else. This same definition applied to hospital pharmacies except for the obvious added criterion. Discount pharmacies were defined as those placing primary emphasis on price competition and sales volume, regardless of prescription volume. Community pharmacies consisted of those pharmacies not classified in any of the above groups.

The pharmacies were grouped into the four types, as defined above, for comparison of results. Since there were unequal numbers of pharmacies in the different groups, a method of representing the requests received per pharmacy was needed before any comparisons could be made. The diversity of the pharmacy operations which existed in the different pharmacies also further complicated the method of representing

requests. For instance, one of the hospital pharmacies had service on a 24-hour basis; the other hospital pharmacies were open up to 16 hours a day, as were the community and discount pharmacies. The professional pharmacies, however, were not open on Sundays and had fewer hours of service on other days. Also, the number of pharmacists employed in the pharmacies varied from two to nineteen. Therefore, in an attempt to equalize all of these factors, the requests were reported on the basis of requests per 1000 pharmacist man-hours.

Statistical analysis was performed using data represented as requests per 1000 pharmacists man-hours. It was noted that by doubling the figures, the results could then be reported according to a conservative estimate of the number of hours a pharmacist is employed during a year's time. Results were then expressed as requests per 2000 pharmacist man-hours or man-year and abbreviated as RPMY.

Analysis of variance (ANOV) for unequal cell frequencies was used in the statisitcal analysis of the data (Winer, 1962, p. 241). An example of the computational procedures performed is shown in Appendix 2, p.71.

Either the chief pharmacist or the pharmacist-manager of each participating pharmacy was interviewed concerning the drug information services provided by his pharmacy. The interviews were administered upon completion of the study; the questionnaire employed in the interview is exhibited in Appendix 3, p.73.

In conjunction with the interview, the reference materials in each pharmacy library were recorded and compared to a basic library for a drug information service which was developed by the author. According to their relative importance, the references listed in the

basic library were assigned different point values with total points serving as the basis of evaluation. The basic library including point values is shown in Appendix 4, p.74.

3. Results

a. The recorded requests

Nine hundred and eighty-seven drug information requests were recorded during the study. Six hundred and twelve requests were received from physicians; nurses, either registered or student, accounted for 330 and the remaining 45 were from dentists, medical technologists, pharmacists and veterinarians.

The classification of requests from members of the health team other than physicians may be seen in Table 6. Greater than sixty per cent were of a pharmaceutical nature. These requests were not categorized any further, since requests from physicians were of primary interest in the study.

Table 6 --Drug Information Requests Received by the Different Pharmacies from Other Members of the Health Team Excluding Physicians

	Number	Percentage
Pharmaceutical	230	61.3%
Pharmacological	93	24.8%
Therapeutic	52	13.9%
	375	100.0%

The requests for drug information from physicians were classified as shown in Table 7. Pharmaceutical requests accounted for a majority of the total number.

Table 7 --Drug Information Requests Received by the Different Pharmacies from Physicians

	Number	Percentage
Pharmaceutical	347	56.7%
Pharmacological	185	30.2%
Therapeutic	80	13.1%
	612	100.0%

The requests for drug information were converted as above to RPMY for each pharmacy as shown in Table 8. There was a wide range of RPMY in each of the classes of pharmacies except for the two discount pharmacies which had a difference of less than one RPMY. The mean RPMY for discount pharmacies was at least eight times less than that seen for the other classes of pharmacies.

Drug information requests were further classified in relation to the general types of requests as shown in Table 9. The pharmaceutical RPMY accounted for more than 50% of all mean requests seen in the different classes of pharmacies. All requests received in the discount pharmacies and two-thirds of those in the professional pharmacies were pharmaceutical in nature.

As shown in Table 9, requests were classified in relation to the specific types of requests; viz., Table 1, p.19. The mean values for all pharmacies show that ingredients or strength, source of supply or availability, dosage forms or package sizes of preparations were the most frequently sought pharmaceutical information. Inquiries on dosage accounted for nearly 75% of the pharmacological inquiries, while use or indications and equivalents or comparisons

Table 8 --Drug Information Requests Received by the Different Pharmacies from Physicians Expressed as RPMY

Pharmacy	Total Hours	Number of Requests	RPMY *
Community--1	1248	27	43.27
Community--2	660	28	84.85
Community--3	810	1	2.47
Community--4	1430	6	8.39
Community--Mean			34.74
Discount--1	1248	3	4.81
Discount--2	2080	4	3.84
Discount--Mean			4.33
Hospital--1	9880	174	35.22
Hospital--2	2249	49	43.57
Hospital--3	2860	34	23.78
Hospital--4	3640	40	21.98
Hospital--5	2080	31	29.81
Hospital--6	2171	57	52.51
Hospital--Mean			34.48
Professional--1	1105	5	9.05
Professional--2	780	21	53.85
Professional--3	2080	61	58.65
Professional--4	1898	71	74.82
Professional--Mean			49.10

* Represents requests projected as the number per 2000 pharmacist man-hours and abbreviated as RPMY.

Table 9 --Drug Information Requests Received by the Different Pharmacies from Physicians Classified According to Specific Class (Data are mean RPMY per type of pharmacy)

	Comm.	Disc.	Hosp.	Prof.	Mean for all Pharmacies
Pharmaceutical					
1	1.92	0.96	1.35	1.76	1.50
2	6.71	1.76	4.40	9.06	5.48
3	0.00	0.00	0.35	0.64	0.25
4	0.00	0.00	0.43	0.00	0.11
5	0.00	0.00	0.43	1.17	0.40
6	3.43	0.00	2.46	3.30	2.30
7	5.63	1.61	3.25	7.32	4.45
8	0.76	0.00	1.51	6.08	2.09
9	0.00	0.00	1.89	2.67	1.14
0	0.80	0.00	1.56	2.04	1.10
Total	19.24	4.33	17.63	34.04	18.82
Pharmacological					
1	8.46	0.00	8.92	5.29	5.67
2	0.80	0.00	0.85	0.77	0.61
3	0.40	0.00	0.53	0.24	0.29
4	0.76	0.00	0.44	0.50	0.43
5	0.40	0.00	0.15	0.74	0.32
6	0.80	0.00	0.78	1.01	0.65
7	0.00	0.00	0.22	0.00	0.06
Total	11.62	0.00	11.89	8.55	8.03
Therapeutic					
1	1.60	0.00	2.75	3.64	2.00
2	0.76	0.00	1.11	2.23	1.03
3	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.14	0.00	0.04
5	1.52	0.00	0.96	0.64	0.78
Total	3.88	0.00	4.96	6.51	3.85
Cumulative Total	34.74	4.33	34.48	49.10	30.70

accounted for about the same proportion of therapeutic requests.

Results of analysis of variance are shown in Table 10. The F tests demonstrated that significant differences ($p<0.05$) existed between the different types of pharmacies in the study; significant differences ($p<0.01$) also existed between the different types of requests received from physicians. No significance (at $p<0.05$) was seen for the interaction between types of pharmacies and types of requests.

The F comparison of means, as shown in Table 11, demonstrated that both community and hospital pharmacies received significantly ($p<0.05$) more requests than discount pharmacies; also, professional pharmacies received significantly ($p<0.01$) more requests than discount pharmacies.

As shown in Table 11, the F comparison of means showed that significantly ($p<0.01$) more pharmaceutical requests were received than either pharmacological or therapeutic.

The requests for drug information were categorized according to the promptness of answer by the pharmacist, as shown in Table 12. Results represent the totals for all the pharmacies. Only 262 (42.8%) of the total inquiries were answered at the time requested. Moreover, 87 of 265 (32.1%) of the pharmacological and therapeutic inquiries were answered at the time requested. Three hundred and fifty (57.2%) requests were answered by the pharmacists after a search of the literature.

Table 10 --F Tests Analysis of Variance for Types of Pharmacies and Types of Requests

Source of Variations	DF	SS	MS	F
Total	47	3411.69		
Treatments				
Pharmacies	3	304.41	101.47	4.09*
Requests	2	392.84	196.42	7.91**
Interaction	6	191.15	31.86	1.28
Error	36	893.65	24.82	

*p<0.05
**p<0.01

Table 11 --F Comparison of Means Analysis of Variance for Types of Pharmacies and Types of Requests

Comparison	Mean Comparison
A1 and A2	0.0003
A1 and A3	5.25*
A1 and A4	1.23
A2 and A3	5.33*
A2 and A4	1.18
A4 and A3	11.54**
B1 and B2	8.06**
B1 and B3	15.51**
B2 and B3	1.21

*p<0.05
**p<0.01

A1 --hospital pharmacies, mean 5.75
A2 --community pharmacies, mean 5.79
A3 --discount pharmacies, mean 0.72
A4 --professional pharmacies, mean 8.18
B1 --pharmaceutical requests, mean 9.41
B2 --pharmacological requests, mean 4.01
B3 --therapeutic requests, mean 1.92

Table 12 --Drug Information Requests Received at all the Pharmacies from Physicians, Classified According to Promptness of Answer

	At Time Requested	After Search	Total
Pharmaceutical	175	172	347
Pharmacological	56	129	185
Therapeutic	31	49	80
	262	350	612

Of the 350 requests for drug information requiring a search by the pharmacists, 163 (46.6%) were answered from information obtained in the manufacturers' package inserts.

Requests for drug information from physicians were further classified according to the manner of answer provided by the pharmacists in the different pharmacies as shown in Table 13. Almost all (96.2%) the requests were answered verbally by the pharmacists. One of the hospital pharmacies was responsible for answering 9 of the 12 requests answered by memorandum; the same pharmacy provided all of the photocopies.

Table 13 --Drug Information Requests Received at all the Pharmacies from Physicians, Classified According to Type of Answer

	Verbal	Memo.	Photocopy	Ref.	No.Ans.	Total
Pharmaceutical	342	1	3	0	1	347
Pharmacological	173	8	2	1	1	185
Therapeutic	74	3	2	1	0	80
	589	12	7	2	2	612

b. The interview with pharmacists

The chief pharmacist or pharmacist-manager of each participating pharmacy was interviewed at the completion of the study. The questionnaire, as shown in Appendix 3, p.73, was used in the interview. The

first two questions, referring to whether the pharmacy received inquiries from physicians for drug information and; if so, did the pharmacy attempt to answer them, were answered in the affirmative by all pharmacists.

In reply to the question, "Are the requests answered solely on a verbal reply basis," 14 of the 16 pharmacists answered yes. Except in a few isolated instances, verbal answers were provided to the physicians' requests in the study.

All the pharmacists reported that they searched the literature, while 6 of 16 said they prepared written replies. In the study three actually prepared written replies to physicians' requests.

Three of sixteen pharmacists reported that their pharmacies prepared a bulletin or newsletter for distribution to physicians, while 13 of 16 reportedly follow up requests from physicians by sending literature such as package inserts to them.

While only one pharmacy reported detailing physicians, almost all (15 of 16) stated that they provided unsolicited drug information to physicians.

In reply to the question, "Does the pharmacy have an adequate library," only one reported that the pharmacy did not.

Half of the pharmacies reported that they provided health care information and pamphlets to their patients. A like number of the pharmacies also reported that educational opportunities and literature were provided for their pharmacists.

The list of references of each pharmacy library was compared to the basic library for drug information service shown in Appendix 4, p.74. The point totals for each pharmacy library are shown in Table 14.

Table 14 --Point-rated Evaluation of the Pharmacy Libraries

Pharmacy	Points	Rating
Community--1	73	Good
Community--2	46	Fair
Community--3	41	Fair
Community--4	40	Fair
Discount--1	14	Poor
Discount--2	23	Poor
Hospital--1	120	Excellent
Hospital--2	90	Good
Hospital--3	98.5	Good
Hospital--4	99	Good
Hospital--5	63.5	Fair
Hospital--6	52.5	Fair
Professional--1	36	Poor
Professional--2	14	Poor
Professional--3	51	Fair
Professional--4	50	Fair

Rating Scale:
Over 100 points--Excellent
70-99 points --Good
40-69 points --Fair
below 40 points--Poor

Only one pharmacy had an excellent rating; three hospitals and one community pharmacy received a good rating. Fair ratings were obtained by three community pharmacies, two of the hospitals and two of the professionals. Both of the discount and two of the professional pharmacies received a poor rating.

There were no positive relationships found between the quality of pharmacy library and the number of requests received by the pharmacies. The only pharmacy receiving an excellent rating for its library was ranked eighth in relation to the number of RPMY received. Pharmacies rated good in quality of library were ranked sixth, seventh, tenth, and eleventh in relation to the number of RPMY received. Those rated fair were ranked first, second, third, fifth, ninth, thirteenth, and sixteenth, while those rated poor were ranked fourth, twelfth, fourteenth, and fifteenth.

No relationships could be found between the quality of pharmacy library and the types of requests received by pharmacists in the various pharmacies.

4. Discussion

The data presented indicate that pharmacists in the different pharmacies were used as sources of drug information by physicians and other members of the health team. A variety of requests were received from physicians with 56.7% being pharmaceutical in nature, 30.2% pharmacological, and 13.1% therapeutic. Of the requests received from other members of the health team, approximately the same percentages were observed as those above.

It should be kept in mind that the numerical figures are not completely indicative of the total requests received in the pharmacies because not all drug information requests were logged. Failure to record all requests was due, in part, to the busy schedule maintained by the pharmacists in the various pharmacies. It was also possibly due to the routine nature of some of the requests or to physicians not directly asking a question. For example, when a physician calls a pharmacist he sometimes disguises a request for drug information in the course of dictating a prescription for a patient. (This subterfuge may not be intentional and may be due to various reasons). In instances such as the above the pharmacists inadvertently did not record the requests. However, the comparative data within the study are presumed to be a good representation of the drug information requests.

A considerably wide variation in the number of requests (2.47 to 84.85 RPMY) was found in the different pharmacies. Several pharmacies (5 or 31.3%) received fewer than 10 RPMY; this indicates that physicians did not rely upon these pharmacies to any extent for drug information. One professional, two community, and both discount pharmacies were included in this group. The other 11 pharmacies in the study (including all of the hospital pharmacies) received at least 21 RPMY and were used by physicians to a greater extent for drug information. Considering the pharmacy with the highest RPMY (84.85), the number of requests received amounts to less than 2 per pharmacist per week and indicates the pharmacist was relied upon for drug information

to a very limited extent by physicians.

Professional pharmacies, as a group, received the most requests on RPMY basis followed by community and hospital pharmacies, while discount pharmacies received by far the fewest requests. ANOV demonstrated that community, hospital, and professional pharmacies each received significantly more requests than discount pharmacies; community and hospital were significant at $p<0.05$ and professional at $p<0.01$. There were no significant ($p<0.05$) differences between the number of requests received by community, hospital, and professional pharmacies.

Significantly more ($p<0.01$) pharmaceutical requests were received than either pharmacological or therapeutic. This finding was certainly expected, but one would certainly have expected that the pharmacist might have received more pharmacological requests.

An interesting point noted was that the pharmacy (a community pharmacy) receiving the most RPMY was the only pharmacy that had its pharmacists detail physicians. Although analysis of this pharmacy's requests demonstrated that almost all were of a routine nature, it would appear that a great deal of rapport was established with the physicians detailed by the pharmacists. This same pharmacy received a fair rating for its library, but included among its references was a file of package inserts and a pharmacology text book from which needed information was found.

The pharmacy of the only osteopathic hospital in the study received more RPMY than other hospital pharmacies. A community pharmacy located adjacent to this hospital also received numerous RPMY. Analysis of

the requests of these pharmacies revealed that many were pharmacological and therapeutic in nature. These findings may be looked upon as presumptive evidence that osteopathic physicians may consider the pharmacist more as a source of drug information than their medical physician counterparts.

Both of the discount pharmacies and two of the community pharmacies received very few RPMY, and all of their requests were pharmaceutical and routine in nature. These observations indicate that physicians scarcely relied on these pharmacies for drug information other than occasional routine pharmaceutical inquiries.

The most frequently received inquiries from physicians were for dosage, followed by ingredients or strength, source of supply or availability, dosage forms or package sizes, cost, use or indications, and name of drug. These findings are in agreement with the results reported by the American Druggist studies (1958, 1960, 1962, 1964, 1965a, and 1966), Benson and Benson (1962), and Newman (1961). They are not in agreement with the findings of Francke et al., (1964), the American Druggist (1965b), Burkholder (1966), and Greth et al., (1965). The inquiries most frequently received in these latter studies were pharmacological in nature. The latter studies were conducted in hospitals and this possibly accounted for the differences, whereas the former studies were concerned essentially with other types of pharmacies.

Although most of the requests in the study were seemingly of a routine nature, judging from the number answered verbally, a surprising number required a search (especially those of a pharmacologic and therapeutic nature). Perhaps this was because the pharmacists wanted

to verify their own answers with those found in the literature.

The fact that nearly half (46.6%) of the answers to the requests requiring a search were found in the manufacturer's package insert may be indicative of the drug industry's compliance in "fully disclosing" information in package inserts. The value of the package insert is certainly brought forth through this finding.

Almost all (96.2%) requests were answered solely on a verbal basis; those answered by other means were nearly entirely performed by one of the hospital pharmacies. This undoubtedly denotes the routineness of most requests. Only two requests were not answered; this may be due to many factors. The pharmacists might well have been able to answer all but two of the requests they received, or the pharmacists might not have recorded the requests which they could not answer.

All but one chief pharmacist or pharmacist-manager felt that his pharmacy library was adequate, while evaluation of the libraries showed that seven were rated fair and four were poor. Pharmacists commonly remarked that their library was adequate considering the number and types of requests they received.

There were no positive relationships found between quality of library and the number or types of requests, indicating that quality of library is not the primary criterion for receiving requests.

In summary, pharmacists from all types of pharmacies received requests from physicians for a wide variety of drug information. Pharmacists from community, hospital, and professional pharmacies

received significantly more requests than those from discount pharmacies. More requests were received of a pharmaceutical nature than either pharmacological or therapeutic. The quality of pharmacy library did not appear to be related to the number or types of requests received.

C. The Physician Interview

1. Introduction

The previous two studies have shown that physicians used pharmacists as sources of drug information. The names of physicians requesting drug information were recorded in the studies; approximately two hundred physicians were involved. Since the identities of physicians requesting drug information from pharmacists were readily available, a sample of these physicians was selected to be interviewed. The general purpose of this study was to obtain physicians' attitudes of the pharmacist serving as a source of drug information.

A review of the literature showed that although many studies (American Druggist, 1958, 1960, 1962, 1964, 1965a, and 1966; Benson and Benson, 1962; Newman, 1961; Francke et al., 1964; Burkholder, 1966; American Druggist, 1965b; and Greth et al., 1965) were conducted to determine the frequency or types of physicians' requests, only one study specifically concerned physicians' attitudes toward pharmacists as sources of drug information. The study was conducted by Bugbee (1956) and he reported that physicians found the pharmacists most cooperative but helpful only to a limited degree in selecting new medications.

A number of marketing studies (Caplow, 1952; Caplow and Raymond, 1954; Menzel and Katz, 1955-56; Ferber and Wales, 1958; Coleman et al., 1959; and Winick, 1961) were concerned with obtaining physicians' attitudes toward advertising by various means. Attitudes toward pharmacists were not expressed to any extent in these studies. Pharmacists were found to be ranked poorly as the first source of information on new drugs.

In light of these reports, the present study was designed to show the physician's reported reliance on the pharmacist as a source of drug information in terms of the number and types of requests (pharmaceutical, pharmacological, therapeutic, and biopharmaceutical) in comparison with other sources for the information. The study also attempted to show whether or not the physician called upon a particular pharmacy and/or pharmacist for his drug information needs.

2. Methods

Thirty physicians located in Columbus, Ohio were interviewed during the winter of 1966; sixteen of these were selected from a list drawn up from those requesting drug information from pharmacies participating in the previous study (Part B). The physicians were selected on the basis of most number of requests. The sample consisted of six other physicians located in areas adjacent to participating pharmacies, but they were not listed as requestors of drug information. The remaining eight physicians were selected from those who participated on ward rounds with the pharmacist in the first experiment.

Twenty-two of the interviews were conducted by the author and eight by another interviewer. In order to curtail possible physician bias to the study, the true purpose of the interview was not disclosed. The physicians were not aware that one of the interviewers was a pharmacist.

The following introduction was used by the author in the initial encounter with the physicians via the telephone:

> I am _____ _____ and I am associated with The Ohio State University Hospitals. The hospital is conducting a study on drug information among physicians in the Columbus area. You have been randomly selected in the sample of practicing physicians

> to be interviewed. Your answers to the interview questions are most important to the accuracy and completeness of the study. They will be confidential, and used only together with those of other physicians in Columbus. The interview will take 15-30 minutes. I would be most grateful for your cooperation.

Since the other interviewer interviewed physicians from The Ohio State University Hospitals who appeared on ward rounds with the pharmacist, he told them he was from the Columbus Hospital Federation.

The questionnaire used in the interview is shown in Appendix 5, p.75. The first page of the form pertained to demographic information about the physician and thirty-eight questions made up the remainder of the questionnaire. During the interview a card listing sources of drug information was given to the physicians to aid them in answering several questions. The card is shown in Appendix 6, p.82.

The eight physicians who were accompanied on ward rounds by a pharmacist were interviewed, in addition, with a supplementary questionnaire concerning the pharmacist. The questionnaire used is seen in Appendix 7, p.83.

3. Results

To obtain thirty interviews, it was necessary to call forty physicians; thus a refusal rate of 25 per cent was seen. Each interview took approximately 30 minutes to conclude.

Physicians were asked to rate sources of drug information on a 10-point scale of usage. As shown in Table 15, the total sample of 30 physicians rated the pharmacist eighth on the list. The physicians who were not recorded requestors of drug information rated the pharmacist tenth, while those physicians who were on ward rounds with a pharmacist rated the pharmacist sixth.

The physicians were presented four hypothetical situations

Table 15--Rating of Sources of Drug Information by Physicians According to Usage

Source	RANKING*										
	1	2	3	4	5	6	7	8	9	10	Tot.Pts.
Detailmen	4	3	4	-	5	1	3	4	2	1	163
Direct Mail Ads.	1	1	1	3	-	3	3	4	5	1	98
Med. Colleagues	6	5	6	2	4	5	-	2	-	-	222
Pharmacists	1	-	1	1	7	4	5	2	5	4	127
Prof. Journals	6	6	5	4	2	2	1	3	-	-	217
Prof. J. Ads.	1	1	1	4	4	1	2	1	4	7	110
Prof. Meetings	2	4	1	6	3	3	1	1	1	3	158
Reference Books	8	5	3	2	1	4	3	2	1	-	209
Seminars	-	1	4	4	4	5	4	2	3	1	147
Text Books	1	4	4	4	-	1	3	3	4	2	143

* 10 points were given for each 1 rating; 9 points were given for each 2 rating; and so on to 1 point for each 10 rating.

requiring information on drugs and asked how they would go about obtaining the needed information. The first situation pertained to pharmaceutical information (question 8 in Appendix 5, p.77). As shown in Table 16, 28 (93%) physicians indicated they would call upon the pharmacist for this information. The pharmacist was the first choice --nine times and the second choice --17 times, whereas reference books were the first choice --16 times and the second choice --five times.

In the pharmacological situation (question 9 in Appendix 5, p.77), 22 (73%) physicians indicated they would call upon the pharmacist for the needed information. Five cited the pharmacist as their first choice, and 13 their second choice. Reference books received the most first choices (18).

Medical colleagues were the first choice in the therapeutic situation (question 11 in Appendix 5, p.77), 12 times and the second choice seven times. Pharmacists were only the first choice of one physician and the second and third choices of four physicians; only 9 (30%) of the physicians mentioned the pharmacist.

With respect to the biopharmaceutical situation (question 10 in Appendix 5, p.77), the first choices were almost evenly dispersed among the sources listed with the pharmacist receiving four and professional journals the most with 7. The pharmacist was only selected by 5 (16.7%) in this situation.

The average number of professional journals received by the physicians was 5.6. An average of 3 were saved and permanently filed and less than one (0.7) was read from cover to cover.

Table 16 --Rating of Sources of Drug Information by Physicians in the Hypothetical Situations

SOURCE	RATING		
A. Pharmaceutical Situation	First Choice	Second Choice	Third Choice
Detailmen	2	4	-
Colleagues	1	1	2
Pharmacists	9	17	2
Prof. Journals	1	-	-
Prof. J. Ads.	1	1	-
Reference Books	16	5	-
B. Pharmacological Situation			
Detailmen	1	-	3
Colleagues	5	2	1
Pharmacists	5	13	4
Prof. J. Ads.	2	2	1
Reference Books	18	6	-
C. Therapeutic Situation			
Detailmen	1	1	-
Colleagues	12	7	-
Pharmacists	1	4	4
Prof. Journals	2	-	1
Reference Books	5	3	1
Text Books	9	3	-
D. Biopharmaceutical Situation			
Detailmen	6	2	-
Colleagues	6	6	-
Pharmacists	4	-	-
Prof. Journals	7	2	1
Reference Books	4	-	-
Patients	3	-	-

Physicians reported an average of 58.2 calls a year to pharmacists for drug information. The range was from once a year to 300 times a year.

Twenty-two (73.3%) of the physicians reported that they called on a particular pharmacy for drug information and the rest called on two, three or more pharmacies for information. Fifteen (50%) of the physicians in the study called upon a particular pharmacist for drug information; the same pharmacist, a manager of a professional pharmacy, was called upon by six of the physicians.

Convenience was the reason most often given for requesting drug information from the same pharmacy or pharmacist. Other reasons mentioned were that the physician had confidence in the pharmacist; that the pharmacist was reliable, cooperative, and qualified. The physicians also indicated that the pharmacist was either a friend, or an acquaintance, or provided other essential supplies and services.

Twenty-six of 30 physicians stated that the pharmacies they called upon did not provide unsolicited drug information. Those receiving unsolicited drug information reported that it was usually information on new products.

More than 50% of the questions which physicians reported asking pharmacists were concerned with dosage, cost, and availability. Slightly less than one-third of the questions were for package size, contents, side effects, identification, forms available, and drug class.

The types of drug information which physicians reported having the most difficulty obtaining were drug identification, untoward

effects, efficacy of drugs, contents, drugs of choice, and information on new drugs. Six (20%) of the physicians reported they had no real difficulty obtaining any drug information.

All but one physician expressed satisfaction with the responses provided by pharmacists to their drug information inquiries. A like number reported receiving immediate and generally accurate responses. Pharmacists' responses were reportedly checked or verified by one-third of the physicians. This was further reported to occur most frequently in situations when the pharmacist was not absolutely sure or when the inquiry concerned dosage. In the latter situation, this was especially true of the pediatricians interviewed.

When physicians were asked to suggest further services or drug information that pharmacists could provide, approximately two-thirds (19) reported they were well satisfied with present conditions. Five reported they would like more up-to-date information on new drugs; several related they would like the pharmacist to make his services better known to them. Others wanted to know standard prices of prescriptions. One-half of the physicians reported they would welcome a newsletter on new drug entities or new developments from a pharmacist.

More than two-thirds of the physicians discerned the different types of pharmacy practice, with the distinction generally between hospital (professional included) and retail practice. Approximately one-half of the physicians stated that hospital and professional pharmacists were more capable than the others. They were also of the opinion that hospital and professional pharmacies attract more qualified and motivated pharmacists.

None of the physicians indicated that they recommended that their patients obtain prescriptions from the pharmacies from which they obtain their drug information. Many physicians reportedly recommended certain pharmacies which stocked special items and those which the physician thought had cheaper prices.

Each of the physicians who was accompanied on ward rounds by a pharmacist recalled the pharmacist's presence on rounds. Each one had requested and remembered requesting drug information from the pharmacist. They were satisfied with the promptness and accuracy of the responses given.

Five of the eight physicians reported that the pharmacist could fill a need (i.e., the area of drug information) or have a place on rounds. They welcomed the addition to ward rounds of the pharmacist with his body of knowledge and felt this was a good liaison between the pharmacy and the medical staff. Since there were many sessions in which the pharmacist was not utilized on rounds, they suggested that the pharmacist occasionally rotate on the different rounds or be available at stated times for consultation.

4. Discussion

The interviews demonstrate that the pharmacist was rated rather poorly by the total sample of physicians as a source of drug information on a quantitative basis according to usage. Bugbee's (1956) findings were in agreement with the data reported herein, as he reported only 16% of the physicians used the pharmacist as a source of drug information. These results were also supported by those found in the various marketing studies (Caplow, 1952; Caplow

and Raymond, 1954; Menzel and Katz, 1955-56; Ferber and Wales, 1958; Coleman et al., 1959; and Winick, 1961).

The "non-requesting" physicians rated the pharmacist poorest of all sources of drug information. This finding would be expected, since the physicians were not listed as requesting drug information from pharmacists, and yet their offices were adjacent to participating pharmacies. Perhaps these physicians have found in the past that pharmacists perform rather poorly. Then again, these physicians may believe that pharmacists are not qualified or adequately trained to provide drug information. The author in his experiences has found the latter reason to be particularly true.

The physicians who were accompanied on ward rounds rated the pharmacist (in general, not the ward pharmacist) much higher than the entire sample of physicians or the "non-requestors." Their relationship with a pharmacist on ward rounds may possibly have influenced their rating of pharmacists. If this were so, then possibly better communications between physicians and pharmacists would significantly alter physicians' use of pharmacists as sources of drug information.

The pharmacist was rated much higher by physicians in the hypothetical situations. During this portion of the interview, several physicians changed their quantitative rating of the pharmacist to a higher standing. Some remarked that they didn't realize that they called upon the pharmacist as often for drug information.

In the hypothetical pharmaceutical situation, the pharmacist was rated higher than the other sources of drug information. This was

expected as the requests most frequently seen from physicians in the previous experiment (Part B) were pharmaceutical in nature. Physicians reported a high frequency of pharmaceutical inquiries to pharmacists, as shown by the interviews. This finding was also seen in the American Druggist studies (1958, 1960, 1962, 1964, 1965a, and 1966); Benson and Benson (1962); and Newman (1961).

Pharmacists were rated second only to reference books in the pharmacological situation. The results obtained in the first experiment (Part A) support this finding as 46.1% of the requests received were of a pharmacological nature. A high frequency of pharmacological inquiries was also seen in the studies of Francke et al. (1964); Burkholder (1966); American Druggist (1965b); and Greth et al. (1965).

Physicians rated pharmacists rather poorly in the therapeutic situation. This fact was revealed later in the interview when physicians related the types of information they generally sought from pharmacists; there was little mention of therapeutic information. Pharmacists received comparatively few therapeutic inquiries in the previous two studies (Parts A and B), as well as in the many other studies conducted thus far. However, physicians need this information, since in the interviews they reported having the most difficulty obtaining certain types of therapeutic information.

In the biopharmaceutical situation, pharmacists were rated below medical colleagues, professional journals and detailmen. Six different sources of drug information were almost evenly cited as the first choice for this type of information. This finding possibly suggests that physicians have difficulty obtaining bio-

pharmaceutical information and are not in agreement in the method of obtaining it. This finding also points out that physicians were unaware of pharmacists' training in this area. Detailmen received a high rating in this situation, but the information provided by them would be biased to a great extent because biopharmaceutical considerations are major promotional factors.

One may conclude from the hypothetical situations that the pharmacist was rated quite highly when qualitative drug information was needed by the physician. With the establishment of better rapport and communications between pharmacists and physicians, the pharmacist would be rated much higher.

Another interesting result concerned the high percentage of physicians calling a particular pharmacy and/or pharmacist whenever they sought drug information from a pharmacist. Convenience was the most common reason given. One may argue that each pharmacy is as convenient by telephone as any other within a given locale, but several of the physicians were located in hospitals and they may have only known the hospital pharmacy's telephone number, or the other physicians may have only known the telephone number of one pharmacy. If this was the case, then convenience would be a legitimate reason. The author suspects that some of the other reasons given (reliable, cooperative, and qualified) more truly depict the real reasons.

It is important to point out that virtually all the physicians were satisfied with the performance of pharmacists in answering their drug information inquiries. Both promptness and accuracy were criteria. This was also shown by the high percentage of physicians who were well satisfied with the drug information and service provided by pharmacists.

Most of the physicians stated that they did not receive any unsolicited drug information from pharmacists; yet, many reported that they would welcome a newsletter on new drug entities and new developments. Physicians reported they have the most difficulty obtaining drug information on identification, untoward effects and efficacy of drugs; these might be areas which could be highlighted in newsletters.

The reports from physicians who were accompanied on ward rounds by a pharmacist were most encouraging. Since more than half the physicians reported the pharmacist could fill a need (providing drug information) on ward rounds, this should certainly be explored further.

In summary, the pharmacist was poorly rated quantitatively by physicians, but found to be highly rated qualitatively. Most physicians were found to call upon a particular pharmacy and/or pharmacist for drug information, and most were well satisfied with the drug information and service provided by pharmacists.

III. GENERAL DISCUSSION

The data presented in this study indicate that physicians use pharmacists as sources of drug informtion; physicians reported an average of 58.2 calls a year to pharmacists for drug information. With respect to the hypothesis that physicians would use hospital pharmacists to a greater extent for drug information than pharmacists in community, discount, or professional pharmacies, ANOV demonstrated that this hypothesis was not true. However, pharmacists in community, hospital, and professional pharmacies each received significantly (professional at the .01 level of probability and the others at the .05 level) more requests than pharmacists in discount pharmacies. As shown in Table 8, p.32, pharmacists in professional pharmacies received more RPMY than pharmacists in community and hospital pharmacies, but the differences were not significant at the .05 level of probability.

Results of the physicians' interview also tend to point out the differential use of the pharmacist in various pharmacies. About one-half of the physicians interviewed inferred that discount pharmacies attracted less desirable pharmacists who were poorly motivated and were not interested in the professional practice of pharmacy. This finding may partially account for the few RPMY received in the discount pharmacies.

The pharmacist accompanying physicians on ward rounds received far more RPMY than any of the other pharmacists in the study; statistical tests were not performed with these data, as only one pharmacist was involved on rounds and there was, of course, no

variability exhibited. The pharmacist on rounds received 2110.7 RPMY, whereas the pharmacists in the hospital pharmacy in which this part of the study was conducted received only 35.2 RPMY, while the highest RPMY received by pharmacists in any of the pharmacies was 84.9 RPMY. In more vivid terms the pharmacist on rounds received more than one request per hour as compared to less than two per week received by pharmacists in the pharmacy which had the highest RPMY. This indicates that pharmacists in their traditional environment, be it community, discount, hospital, or professional pharmacy, were only used to a limited extent by physicians for drug information and that a pharmacist in a unique situation, such as hospital ward rounds, was used in comparison to a much greater extent.

Physicians were queried on the reasons for calling upon pharmacists for drug information. Convenience was the reason most often given by them for requesting drug information from pharmacists. Other pertinent reasons given were that the pharmacists were reliable, cooperative, and qualified, and that physicians had confidence in the pharmacists they called upon for information.

The pharmacist on rounds was certainly convenient for the physicians he accompanied and undoubtedly the pharmacist received requests because of the close relationship. However, in addition to convenience, the pharmacist was able to demonstrate his capabilities and qualifications, and to establish rapport and communication with the physicians in the close relationship that existed during these sessions. This led to more requests, especially those of a pharmacological and therapeutic nature. Evidence for the above is seen from the data obtained from the interview with the physicians who had been accom-

panied by the pharmacist on rounds. The majority (62.5%) of these reported that the pharmacist could fill a need on rounds (providing drug information) and they also suggested that the pharmacist be available for consultation at stated times. A poor performance by the pharmacist on rounds would not have warranted the foregoing statements.

As reflected by the low number RPMY received by pharmacists in the various pharmacies in the study, it is more difficult for the pharmacist in his traditional environment, regardless of his capabilities and qualifications, to establish the same degree of rapport as the pharmacist in the unique situation on rounds. Certain pharmacists have established some degree of rapport with physicians, as 22 of the 30 (73.3%) of the physicians interviewed reportedly called upon a particular pharmacy for drug information and 50% called upon a particular pharmacist. One pharmacist, a manager of a professional pharmacy, was reportedly called upon by 20% of the physicians interviewed. These observations may suggest that physicians seek out pharmacists who provide accurate drug information, since physicians reported that reliability, being qualified and cooperative, and imparting confidence were the reasons for calling upon pharmacists for drug information. These findings strongly confirm the hypothesis that physicians call upon a particular pharmacy and/or pharmacist for drug information.

The contrasting situation existing between the number of requests received by the pharmacist on rounds and the number received by pharmacists in traditional pharmacies can also be interpreted in view of the situation above.

A confusing situation existed in that pharmacists, in traditional pharmacies, received a small number of RPMY and, at the same time, all but one of the physicians interviewed expressed satisfaction with the responses provided by pharmacists to their inquiries. A like number of physicians also reported receiving immediate and generally accurate responses from pharmacists. Since the pharmacists adequately provided drug information to physicians' satisfaction, one would have expected more inquiries than were noted. Analysis of the types of requests received by pharmacists showed that the majority of requests were pharmaceutical and relatively few were of a qualitative nature [see Tables 1 (p.19), and 9 (p.33)]. Most of the requests were of such a nature that they could have easily been answered satisfactorily by any pharmacist using one of the more common reference books available. On the basis of the author's experience, one may conjecture that physicians did not call upon pharmacists in traditional pharmacies for drug information of a qualitative nature to a greater extent because physicians are generally unaware of the extensive education (especially pharmacological) that modern day pharmacists receive. The pharmacists' known lack of clinical experience undoubtedly contributes to the undesirable circumstance. It would be of great interest in future studies to attempt to investigate the reasons physicians do not call upon pharmacists, in their traditional pharmacies, to a greater extent for more qualitative drug information.

With respect to the hypothesis that physicians call the different pharmacies for drug information with the same proportion of requests of a pharmaceutical, pharmacological, and therapeutic nature, analysis of the types of requests received by pharmacists

in the different pharmacies showed that significantly ($p<0.01$) more requests were pharmaceutical (56.7%) than either pharmacological (30.2%) or therapeutic (13.1%). On the other hand, the pharmacist on rounds received more requests of a pharmacological nature (46.1%) than pharmaceutical (39.2%) and therapeutic (14.7%).

The types of requests observed in the different pharmacies were in agreement with those reported in other studies (American Druggist 1958, 1960, 1962, 1964, 1965a, and 1966; Newman, 1961; and Benson and Benson, 1962). In the physicians' interview, more than 50% of the questions physicians reported asking pharmacists were concerned with dosage, cost, and availability. Slightly less than one-third of the questions were for package size, contents, side effects, identification, forms available, and drug class. Review of the specific types of requests received by pharmacists as well as the low RPMY suggests that the pharmacists in the different pharmacies were for the most part performing as "drug informants" as defined by Miller (1959), Brodie and Meyers (1961), and Francke (1962).

Requests received by the pharmacist on ward rounds were similar to those seen by Burkholder (1966), American Druggist (1965b), and Greth et al. (1965). Since the pharmacist on rounds received more than 60% of requests of a pharmacological and therapeutic nature (more than one-half of the therapeutic requests were for evaluation or comparisons of products), this would indicate that he was performing as a "drug consultant", as defined by Miller (1959), Brodie and Meyers (1961), Francke (1962), and Autian and Berman (1962), as well as a "drug informant."

Although the physician desires to possess qualitative therapeutic

information concerning drugs, it may well be that there is only an occasional need in day-to-day situations for this type of information, as opposed to a greater need for pharmaceutical and pharmacological drug information. (There was no attempt in the interview study to quantitate the frequencies of physicians' requirements for specific types of information in the study).

The low percentage of therapeutic inquiries may also be due indirectly to the general lack of clinical experience by pharmacists in observing the actions of drugs; physicians are undoubtedly aware of this fact and may be reluctant to call upon the pharmacist for this type of information. An invaluable amount of clinical experience was gained by the author during his many sessions on ward rounds; much of this knowledge was of a nature that could not have been revealed as well by any other means. Therefore, it is strongly recommended that pharmacists be subjected to this dynamic experience during their academic years as part of their pharmacology training. This concept has been employed in conjunction with hospital pharmacy residency programs for a number of years as reported by Parker (1957) and Zugich (1957). This is presently being employed at one College of Pharmacy with pharmacy students participating in ward rounds in lieu of regular pharmacology laboratory sessions, as reported by Susina et al. (1964).

It was hypothesized that the quality of pharmacy library would be related to the number and types of requests received by pharmacists. There were no positive relationships found between the quality of pharmacy library and the number of requests received or between the quality of library and the types of requests received. Analysis of

the specific types of requests received in the different pharmacies during the study revealed that the answers to most of the requests could have been obtained with the use of a very minimal pharmacy library. An organized file on package inserts and a pharmacology text book would have been adequate for the answers to the majority of the requests.

It was hypothesized that physicians would reportedly call upon pharmacists for information of a pharmaceutical, pharmacological, therapeutic, and biopharmaceutical nature to the same extent as they would use other sources for this information. The data concerning these hypotheses were obtained from the physicians' interview in which physicians were asked to rank sources of drug information on a quantitative basis according to usage. In this respect pharmacists were rated eighth out of 10 sources, see Table 15, p.48.

The physicians were then presented four hypothetical situations concerning the four types of information: pharmaceutical, pharmacological, biopharmaceutical, and therapeutic (questions 8, 9, 10, and 11 respectively in Appendix 5, p.77). As shown in Table 16, p.50, pharmacists were rated quite high in the pharmaceutical and pharmacological situations and would have been reportedly used to the same extent as reference books for these types of information; both of these sources were rated much higher than detailmen, colleagues, professional journals, and professional journal advertisements. These results concur with the actual types of requests received by all pharmacists in the study, as more than 85% of requests from physicians were pharmaceutical or pharmacological in nature. The other published studies listed above concerning tabulation of the types of requests

received from physicians revealed similar results.

In the hypothetical therapeutic situation, pharmacists would have been used by physicians approximately to the same extent as reference books and text books and to a greater extent than professional journals and detailmen for the information; but, physicians would have used medical colleagues far more than any of the above sources for this information. This finding agrees with the results obtained in Parts A and B of this study as less than 15% of the inquiries from physicians were therapeutic in nature. Also concurring with this was the fact that, among the types of questions physicians generally ask of pharmacists, therapeutic inquiries were not reported to any extent.

In the biopharmaceutical situation, pharmacists were rated below medical colleagues, professional journals, and detailmen, and at the same level as reference books. Physicians indicated that unbiased biopharmaceutical information was difficult to obtain. It would appear from the poor rating pharmacists received that physicians were unaware of the extensive training modern day pharmacists receive in this area. If this fact were made known to physicians, pharmacists might be able to render valuable information.

In future studies it would be interesting to determine the accuracy of pharmacists' responses to inquiries for drug information, since, other than physicians' general satisfaction, there were no attempts to determine this in the present study.

Other studies involving pharmacists accompanying physicians on hospital ward rounds should be conducted, especially since physicians reported that the pharmacist could fill a need during these sessions.

The role of the pharmacist in this capacity, if he is to have such a role in the future, would have to be delineated in order to formulate adequate academic course work and clinical experience to prepare individuals for this role. This can only be achieved through further research of a similar nature.

IV. SUMMARY AND CONCULSIONS

Studies were undertaken to determine the extent of utilization of the pharmacist as a source of drug information to the physician. Pharmacists in different types of pharmacies (community, discount, hospital, and professional) and a pharmacist on hospital ward rounds recorded the requests received from physicians for drug information. The requests were categorized as pharmaceutical, pharmacological, or therapeutic in nature. A sample of physicians was interviewed concerning their attitudes toward pharmacists providing drug information.

The first experiment consisted of a pharmacist accompanying physicians on hospital ward rounds. The pharmacist was used extensively as a source of a wide variety of drug information by all members of the medical team. There were more requests of a pharmacological nature than either pharmaceutical or therapeutic. Inquiries for mechanism of action, pharmacological actions or effects, and toxicities or side effects were the most frequent followed closely by those for ingredients or strength, equivalents or comparisons of products, absorption or fate or excretion, and identification.

The second study consisted of pharmacists in community, discount, hospital, and professional pharmacies recording the requests received from physicians for drug information. Pharmacists from community, hospital, and professional pharmacies were used to a limited extent by physicians, but were used to a significantly greater extent than pharmacists in discount pharmacies. Significantly more pharmaceutical

requests were received than either pharmacological or therapeutic across all groups. Requests for dosage, ingredients or strength, and source of supply or availability were the most frequent followed by dosage forms or package sizes, cost, and use or indications. The quality of pharmacy library was not related to either the number or types of requests received by the pharmacists in the different pharmacies.

The third study consisted of interviews with physicians. Pharmcacists were ranked poorly as sources of drug information on the basis of usage, but in the hypothetical situations of a pharmaceutical and pharmacological nature they were rated first and second respectively. In hypothetical therapeutic and biopharmaceutical situations, pharmacists were rated higher than that observed on the usage basis. Many physicians reported that they called upon a particular pharmacy and/or pharmacists for drug information.

On the basis of other published reports on the drug information provided by pharmacists to physicians and on the basis of results obtained in this study, it may be concluded that, except in isolated instances, pharmacists in community, discount, hospital, and professional pharmacies are only used to a limited extent for drug information by physicians and serve essentially in an "informant" capacity. Results of the pharmacist accompanying physicians on hospital ward rounds show that the pharmacist was used to a great extent by physicians as a source of drug information: serving in an "informant" capacity and tending to serve in a "consultant" capacity. Further studies will have to

be conducted before reaching any definite conclusions regarding the role of the pharmacist on hospital ward rounds.

Appendix 1 -- Form for Recording Drug Information Requests

Date	Requestor (Name)	Requestor's Category	Nature of the Request	Time of Answer	Type of Answer	Reference(s) Used	Requestor's Satisfaction Yes or No	Comments

Appendix 2 --Analysis of Variance of Drug Information Requests

A1--Hospital Pharmacies
A2--Community Pharmacies
A3--Discount Pharmacies
A4--Professional Pharmacies

B1--Pharmaceutical Requests
B2--Pharmacological Requests
B3--Therapeutic Requests

Observed Data:

	B1	B2	B3
A1	9.31, 11.12, 8.04, 5.22, 8.17, 11.06	6.28, 7.56, 2.10, 3.85, 5.29, 10.59	2.02, 3.11, 1.75, 1.92, 1.44, 4.61
A2	1.23, 8.81, 24.24, 4.20	0.00, 9.61, 13.64, 0.00	0.00, 3.21, 4.54, 0.00
A3	2.40, 1.92	0.00, 0.00	0.00, 0.00
A4	2.71, 21.80, 18.27, 25.29	0.00, 2.56, 7.69, 6.85	1.81, 2.56, 3.37, 5.27

Cell Data:

		B1	B2	B3
A1	Nij	6	6	6
	ΣX	52.92	35.67	14.85
	ΣX^2	491.29	255.95	43.82
	SSij	24.53	44.89	7.07
A2	Nij	4	4	4
	ΣX	38.48	23.25	7.75
	ΣX^2	684.35	278.40	30.91
	SSij	314.17	143.26	15.89
A3	Nij	2	2	2
	ΣX	4.32	0.00	0.00
	ΣX^2	9.45	0.00	0.00
	SSij	0.12	0.00	0.00
A4	Nij	4	4	4
	ΣX	68.07	17.10	13.01
	ΣX^2	1455.95	112.61	48.96
	SSij	297.57	39.51	6.64

$$SS = \Sigma X^2 - \frac{(\Sigma X)^2}{N}$$

$$\bar{n}h = \frac{pq}{\Sigma\Sigma(1/Nij)} = 3.43$$

$SSw.\ cell = \Sigma\Sigma SSij = 893.65$

Cell Means:

	B1	B2	B3	Total
A1	8.82	5.94	2.48	17.24
A2	9.62	5.81	1.94	17.37
A3	2.16	0.00	0.00	2.16
A4	17.02	4.28	3.25	24.55
	37.62	16.03	6.67	61.32

$p = 4$
$q = 3$
$\Sigma B's = \Sigma A's = G$

Computational Formulas:

(1) $= G^2/pq = 313.35$
(2) $= \Sigma\Sigma X^2 = 3411.69$
(3) $= \Sigma\Sigma A^2/q = 402.10$
(4) $= \Sigma\Sigma B^2/p = 427.88$
(5) $= \Sigma(\overline{AB})^2 = 572.36$

Appendix 2 --Continued

$SS_A = \bar{n}h\,[(3) - (1)] = 304.41$

$SS_B = \bar{n}h\,[(4) - (1)] = 392.84$

$SS_{AB} = \bar{n}h\,[(5)-(3)-(4)+(1)] = 191.15$

Summary of Analysis of Variances:

Source of Variation	DF	SS	MS	F
Total	47	3411.69		
Treatments				
Pharmacies	3	304.41	101.47	4.09*
Requests	2	392.84	196.42	7.91**
Interaction	6	191.15	31.86	1.28
Error	36	893.65	24.82	

* $p<0.05$
** $p<0.01$

F Comparisons of Means:

A1 = 17.24/3 = 5.75 B1 = 9.41
A2 = 17.37/3 = 5.79 B2 = 4.01
A3 = 2.16/3 = 0.72 B3 = 1.92
A4 = 24.55/3 = 8.18

$$F = \frac{(Ai-\bar{A}i)^2}{\frac{2MS\ w.\ cell}{\bar{n}h\ (p)}} = \frac{(Ai-A'i)^2\,\bar{n}h(p)}{2\ MS\ w.\ cell}$$

Comparison	Mean Comparison
A1 and A2	0.0003
A1 and A3	5.25*
A1 and A4	1.23
A2 and A3	5.33*
A2 and A4	1.18
A4 and A3	11.54**
B1 and B2	8.06**
B1 and B3	15.51**
B2 and B3	1.21

* $p<0.05$
** $p<0.01$

Appendix 3 --Drug Information Interview Questionnaire for Chief Pharmacist or Pharmacist-Manager of the Different Pharmacies

1. Does the pharmacy receive requests for drug information from physicians?

2. Does the pharmacy attempt to answer these requests?

3. Are the requests answered solely on a verbal reply basis?

4. Does the pharmacy search the literature and prepare a written reply when the requests are of such a nature?

5. Does the pharmacy follow up requests from physicians with literature in addition to their original reply? e.g., send a package insert.

6. Does the pharmacy prepare a bulletin or newsletter for distribution to physicians?

7. Does the pharmacy detail physicians on new products or developments?

8. Does the pharmacy provide unsolicited drug information?

9. Does the pharmacy have an adequate library?

10. Does the pharmacy provide health care information and pamphlets to its patients? e.g., A.Ph.A. and A.M.A. programs.

11. Does the pharmacy provide educational opportunities and literature for its pharmacy staff?

Appendix 4 --Basic Library for a Drug Information Service with Assigned Point Values

Reference	Point Value
1. Organized file of package inserts of drug products	15
2. One of the following*: Facts and Comparisons, Modern Drug Encyclopedia, Pharm. Index, Physicians' Desk Reference	14
3. The Medical Letter	13
4. One of the following*:	
(a) Pharmacology: The Nature, Action and Use of Drugs (Beckman, H.)**	
(b) Pharmacology in Medicine, (Drill, V.)**	
(c) The Pharmacological Basis of Therapeutics, (Goodman, L. and Gilman, A.)**	
(d) Pharmacology and Therapeutics, (Grollman, A.)**	
(e) The Pharmacologic Principles of Medical Practices, (Krantz, J. and Carr, C.)**	12
5. American Hospital Formulary Service	10
6. Clinical Toxicology of Commercial Products, (Gleason, M., Gosslin, R. and Hodge, H.)***	10
7. Clin Alert	10
8. Journal of Clinical Pharmacology and Therapeutics	7
9. Remington's Pharmaceutical Sciences, (Martin, R. and Cook, E.)	7
10. New Drugs	7
11. Merck Index of Chemicals and Drugs	4
12. A Medical Dictionary	4
13. Merck Manual of Diagnosis and Therapy	4
14. International Pharmaceutical Abstracts	1
15. Usual Doses for Infants and Children	1

* - If more than one present, no additional points given.
** - If an old edition is present, give one-half credit.
*** - If Clinical Toxicology (Polson, C.J. and Tattersall, R.N.) present instead, give 5 points.

Note:
1. One point given for additional beneficial reference, e.g., Journal of American Medical Association.
2. No points given for N.F. XII or U.S.P. XVII, as both are required by state law.
3. No points given for The Red Book of The Blue Book, since all pharmacies must have one of these for business purposes.

Appendix 5 --DRUG INFORMATION STUDY INTERVIEW QUESTIONNAIRE

Physician's Name_____Address_____Date_____

Age_____ Years in Practice_____

Medical Training: U.S._____Foreign_____Both_____

Type of Practice: General Practitioner, Partial Specialist, Specialist (Specify)

If a specialist, are you boarded? Yes___ No ___

Type of Office Practice: Own Office_____Partnership_____
Shares Office_____Group Practice_____
Clinic_____Not in Private Practice___ (Explain)

Hospitals in which you are a member of staff and / or having visiting privileges:

Number of prescriptions written last week_____.

Requestor_____

Non-requestor_____

1. What medical journals do you receive?

2. Which of these do you save and permanently file?

3. Do you read these from cover to cover?

4. Do you obtain drug information from these medical journals?

5. Do you obtain drug information from the article in the journals?

6. Are the journal advertisements a source of drug information for you?

7. (Hand M.D. card) This card lists 10 sources of drug information which I'd like to have you rate on a 10-point scale of usage. Please do not give the same rating to 2 or more sources: it's important to rate each one differently, so rely on your first inclinations and feel free to judge a source on the basis of whatever impressions you may have; indicate those sources you do not use.

Detailmen
Direct Mail Ads.
Medical Colleagues
Pharmacists
Professional Journals
Professional Journal Ads
Professional Meetings
Reference Books
Seminars
Text Books
Other (Specify)

8. Doctor, if you were confronted with the following situation, how would you go about obtaining the information?
   You have recently heard of a new drug and you want to prescribe it for a patient, but you are not sure of its ingredients or contents, its cost to the patient, or the strength of the tablet.

9. If you were confronted with this situation in drug therapy, how would you obtain the information?
   You want to prescribe a new drug which is indicated for a particular condition (e.g., an infection) but you are not familar with its dosage, contra-indications, or side effects.

10. How would you go about obtaining information on the efficacy of one type of sustained-release medication vs. another (e.g., repeatabs vs. spansules) or sustained-release medication vs. the conventional type.

11. When confronted with a situation such as the following, how would you go about obtaining detailed information on it?
   You have been treating a patient for a particular condition and the patient is not responding to his medication as he has in the past; and you want to change his medication but you are not as familiar with other drugs for this condition.

12. (If the R.Ph. is mentioned above and rated as a good source of drug information ask this question).
(if the R.Ph. is not mentioned to any extent above or is poorly rated as a source of drug information, skip to question #13.)
   Doctor, you have said that you call on pharmacists for drug information. How often do you call on them for drug information? (Skip to question #17)

13. Doctor, a few minutes ago you classified pharmacists poorly as sources of drug information, and in the different situations you have not mentioned the pharmacist to any extent as a source of drug information.

    Do you ever call upon pharmacist for drug information?

    If yes, how often?
    (If answer here is no, then ask question #14)
    (If answer is yes, skip to question #17)

14. Have you ever received drug information (unsolicited on your part) from a pharmacist-be it when you called in a prescription or by any other means?

15. Do you think you might try calling on a pharmacist for different types of drug information?

16. Why haven't you used the pharmacist as a source of drug information? (Skip to question #27).

17. When was the last time you called upon a pharmacist for drug information?

18. Which pharmacy did you call last for drug information? (Probe for a name here)

19. Have you called this same pharmacy previously for drug information?

20. (If no to previous question, skip to question #23).
Do you, in fact, usually call this same pharmacy for drug information?

21. Do you call a specific pharmacist for drug information?

22. Why do you usually call this same pharmacy or pharmacist for drug information?

(Skip to question #26)

23. Have you called any other pharmacies for drug information? (Probe for names).

24. Do you call on specific pharmacists for drug information at these different pharmacies?

25. Why do you call on these pharmacies and/or pharmacists for drug information?

26. Does the pharmacy(s) you call upon provide unsolicited drug information? (e.g., detailing, newsletter, etc.).

27. When you call upon pharmacists for drug information, what kinds of questions do you ask?

28. Are you generally satisfied with the responses pharmacists have given to you when you have sought drug information from them?

29. Are most pharmacists able to supply your desired drug information immediately?

30. Do you feel that pharmacists' responses to your drug information requests are generally accurate?

31. Have you ever checked or verified pharmacists' responses to your inquiries on drug information?

32. What types of drug information do you generally have the most difficulty obtaining? (Probe).

33. Some people have classified pharmacists according to the type of pharmacy (i.e., community, discount, hospital, professional) they work in. Do you think there are different types of pharmacy practice?

34. Do you feel that the pharmacists who practice in one of these pharmacies (i.e., community, discount, hospital, professional) are any more capable than one who practices in any of the other pharmacies?

35. Do you feel that these different pharmacies attract different kinds of pharmacists?

36. Do you recommend that your patients have their prescriptions dispensed or filled at the pharmacy(s) from which you obtain your drug information?

37. One last question, doctor: In what additional manner could pharmacists provide drug information and/or be of further service to you?

38. Assuming a new drug or development were to come about, would you like to receive a newsletter from a pharmacist about it?

Appendix 6 --Card used in the Interview with Physicians Listing Sources of Drug Information

Detailmen

Direct Mail Ads.

Colleagues

Pharmacists

Professional Journals

Professional Journal Ads.

Professional Meetings

Reference Books

Seminars

Text Books

Other (Specify)

Appendix 7 --Supplementary Questionnaire used in Physician Interviews

1. Has a pharmacist ever accompanied you on rounds in the hospital?

2. Did you request drug information of any nature from this pharmacist?

3. When you called this pharmacist for drug information what kinds of questions did you ask him?

4. In what manner did the pharmacist respond to your requests for drug information? (verbal, written memo, reference, photocopy).

5. Were you generally satisfied with the responses the pharmacist gave to you when you requested drug information from him?

6. Was the drug information supplied immediately by the pharmacist?

7. Did you feel the responses were accurate?

8. Would the presence of a pharmacist on rounds in the hospital fill a need (i.e., the area of drug information) or have a place on rounds?

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