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Title: A STUDY OF PHARMACY EXTERNS' ABILITY TO RESPOND TO DRUG INFORMATION REQUESTS RECEIVED BY THE OREGON POISON CONTROL AND DRUG INFORMATION CENTER

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The possibility that some requests introduced to the Oregon Poison Control and Drug Information Center (OPCDIC) by practicing pharmacists were inappropriately referred was investigated. One hundred and fifty-six requests out of a total of 1,507 requests submitted between June, 1985 and June, 1986 were presented to pharmacy externs, and their answers were compared to the answers earlier formulated by the OPCDIC. Both answers were evaluated on the basis of correctness, appropriateness, completeness and presence of extraneous information. Statistical analysis of the data collected did not detect any difference between answers given by either group. The results suggest that the type of requests investigated in the study are inappropriately referred to the OPCDIC. Possible reasons for this inappropriate referral are suggested and discussed. Recommendations are made for reversing this trend. Implementation of these recommendations would result in approximately a 10 percent reduction of the center's work load.

A STUDY OF PHARMACY EXTERNS' ABILITY TO RESPOND TO DRUG INFORMATION REQUESTS RECEIVED BY THE OREGON POISON CONTROL AND DRUG INFORMATION CENTER

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INTRODUCTION

In discussing logistics of information Levison quoted Dr. John Shaw Billings:[1]

> "The geometric progression of publication leads to the absurd and impossible conclusion that there is coming a time when our libraries will become large cities and will require the services of everyone in the world not engaged in writing to catalog and to care for the annual output."

This startling observation made over a century ago should alert health professionals to the importance of organized services to efficiently collect, review, condense and disseminate the continuing generation of published scientific information. Drug information centers play a major role in this challenge.

The main responsibility of regional drug information centers is the provision of accurate and up-to-date information on the safe, efficacious and economic use of drugs that is not otherwise available from community or hospital pharmacies. Often this function may be inappropriately utilized as a number of drug information requests received by drug information centers could probably be answered by pharmacists who work in local community pharmacies or by staff pharmacists in hospitals. Improper utilization of drug information centers might then result in the neglect of more important responsibilities such as;

- maintaining the drug information library and files
- establishing and running an adverse drug reactions reporting program
- training undergraduate and graduate pharmacy students and residents
- providing current awareness on new drug therapy to physicians, nurses and pharmacists via continuing education lectures and bulletins or newsletters
- developing specialized consultative services dealing with teratogenicity, drugs excreted in breast milk or the legal aspects of drug use
- conducting research projects
- providing large-scale consumer education to organized societies for specific patient populations (ie. arthritics, diabetics, asthmatics, patients diagnosed with ileitis and colitis).

In a recent national audit of drug information centers Dombrowski and Visconti

reported that large work loads and lack of time were cited most often as factors limiting drug information center participation in the above responsibilities.[2]

Considering the preceding statement, it is essential that drug information centers examine their present work load in order to determine whether their available resources are being properly and efficiently utilized. The purpose of this research project was to determine whether certain drug information requests that are answered by the Oregon Poison Control and Drug Information Center (OPCDIC) can be as adequately answered by Oregon community or hospital pharmacists. Since a strong response rate was required to adequately test the research hypothesis, 24 senior pharmacy externs were presented with these requests rather than a random selection of licensed Oregon pharmacists. Their responses were then evaluated and compared to the answers initially provided by the drug information specialists at the OPCDIC.

Drug information specialists have discussed the possibility that community and hospital pharmacists refer their own drug information requests as well as others to regional drug information centers. A 1984 study done by Miller and Foster, determining if pharmacists in Fargo, ND and Moorhead, MN were effective and helpful in providing drug information over the telephone, supports the above observation.[3] Miller and Foster observed that when answers to questions couldn't be found in a common pharmaceutical reference such as Facts and Comparisons, pharmacists directly referred the caller to a drug information center without further investigation of the request on their own.[3]

Reports in the literature addressing the problem of inappropriately referred drug information requests are sparse. Cardoni, Palmer and Grover (1977) analyzed the drug information requests received from community pharmacists in Connecticut between the time period of September, 1972 and December, 1975.[4] Out of 677 requests received from community pharmacists, approximately 35 percent had been answered with references that could be readily obtained by community pharmacists. The pharmaceutical references identified as "readily obtainable" were mostly textbook references with which pharmacists should be reasonably familiar. This study was accurately and thoroughly executed. However, the approximation that 35 percent of the requests could have been answered with readily obtainable references by the pharmacists referring them is arbitrary. None of the so-identified requests were rechallenged by posing them to a group of pharmacists with similar backgrounds to the original requestors.

An article published in 1977 reported that the majority of questions referred by pharmacists to the Purdue University Drug Information Center concerned adverse drug reactions, drug interactions, and new product information.[5] When the answers provided by staff of this regional drug information center were reviewed it was discovered that most of these questions were answered by consulting familiar references such as Hansten's Drug Interactions; Meyler's Side Effects of Drugs; Goodman and Gilman's The Pharmacological Basis of Therapeutics; Facts and Comparisons; The Medical Letter on Drugs and Therapeutics; and PharmIndex.

In 1982 Mose and Morrison described community pharmacists' requests to drug information centers as being less complex to answer than other requests received.[6] Their study was based on a national survey of institutional drug information centers reported in 1982 which focused on the nature and extent of their roles relative to community pharmacists. Seventy-nine drug information centers were surveyed using written

questionnaires and 62 percent of those responded. Results revealed that drug information centers utilized textbooks and handbooks in order to respond to almost 50 percent of the requests from community pharmacists and no reference at all for 16 percent of the requests. Mose and Morrison suggested that community pharmacists' requests are less difficult to answer in comparison to the majority of other questions received by drug information centers. A similar survey done in 1976 by Rosenberg, Raina and Kirschenbaum revealed that 62 percent of all inquiries referred to drug information centers required "nonjudgemental answers".[7]

Later in a 1983 commentary, Rosenburg questioned the efficiency of drug information centers answering questions of a nonjudgmental nature and labelled the majority of community and hospital pharmacists' questions as being inappropriately referred.[8]

An obvious question which generates from the preceding discourse is: Why are hospital and community pharmacists not answering these requests themselves? In order to properly and ethically practice the profession of pharmacy all pharmacists must be capable and competent sources and advisors of drug information.[3,9,10,11] This view was recently emphasized at an invitational conference which focused on directions for clinical practice in pharmacy conducted by the American Society of Hospital Pharmacists (ASHP) and the ASHP Research and Education Foundation in 1985.12 Participants of this conference recognized that the fundamental purposes and goals of clinical pharmacy are indistinguishable from those of pharmacy and in respect to the provision of drug information the following statement was adopted:

> "In this information-service era pharmacists have an important obligation to other health-care professions, to patients, and to the public to provide authoritative, usable drug information. The provision of information should become a major focus of pharmacy practice."

One critical factor which determines accurate drug information provision is the existence of an appropriate reference library on the premises where pharmacists practice. A number of authors have discovered that such required libraries are often outdated, poorly equipped or totally inadequate.[3,4,9,10,13] Caldwell et al. observed that only 24 out of the 50 community pharmacies they surveyed had a complete set of current required references, as defined by Kansas State law.9 The majority of journals observed in these pharmacies were management oriented and only three pharmacies subscribed to recognized biomedical journals. In a survey of 143 community pharmacies done by Cardoni et al., five references found in at least 85 percent of these pharmacies were: United States Pharmacopeia, National Formulary, Red Book, Physicians Desk Reference and Blue Book. Cardoni et al. criticized these references due to the fact that two are required by law, one is usually obtained free of charge every year and the Blue Book and Red Book contain primarily cost information.[4]

In 1981, Kessler and Jacknowitz observed that most West Virginia hospital pharmacies were better equipped to answer questions dealing with availability, identification,

pharmaceutical calculations and to a lesser extent, drug interactions. References dealing with intravenous drug compatibilities, drug dosage, and adverse drug reactions were poorly represented. In addition, this study identified that references surveyed were not always the most current edition and that medical journals were rarely subscribed to by the hospital pharmacies.[10]

A province-wide study conducted in Quebec, Canada surveyed 3283 registered pharmacists. Six hundred and sixty-five (20.3 percent) pharmacists responded. Community pharmacists represented 69.6 percent of the responses while hospital pharmacists constituted 22.3 percent. The most frequently found reference text reported in community pharmacies was the Compendium of Pharmaceutical Specialties, which is the Canadian equivalent to the Physician's Desk Reference. The second reference most frequently found was Goodman and Gilman's The Pharmacological Basis of Therapeutics. However, this text was found in only 49 percent of the community pharmacies. The hospital pharmacists responding to the survey appeared to have more complete libraries compared to community pharmacists. Greater than 60 percent of the hospital pharmacies indicated that they had at least ten of the reference texts listed in the study's questionnaire. The ten references were:

- Compendium of Pharmaceutical Specialties
- Goodman and Gilman's The Pharmacological Basis of Therapeutics, 6th edition
- American Hospital Formulary Service Drug Information '84
- Martindale: The Extra Pharmacopoeia, 28th edition
- Evaluation of Drug Interactions, 2nd edition
- Remington's Pharmaceutical Sciences, 16th edition
- Applied Therapeutics for Clinical Pharmacists, 3rd edition
- Handbook of Poisoning: Prevention, Diagnosis, and Treatment, 10th edition
- AMA Drug Evaluations, 5th edition
- Handbook on Injectable Drugs, 3rd edition

Although it is not clearly stated by the authors one would assume the above editions were the most current editions of the references at the time that the questionnaire was released. Professional journals most frequently found in community pharmacies were the Canadian Pharmaceutical Journal (58.5 percent of the pharmacies) and Drug Intelligence and Clinical Pharmacy (10.6 percent of the pharmacies). Hospital pharmacies reported subscribing to five professional journals at a rate ranging between 47.3 percent to 81.8 percent for each journal. There was no provincial law or standard for drug information references to compare to. The authors concluded that the community pharmacies had insufficient drug information libraries. The significance of this study was perhaps weakened due to low individual response rates to the questionnaire, in particular that of the hospital pharmacists, which was 4.5 percent.[13]

Without updated and serviceable libraries, neither community nor hospital pharmacists can appropriately or accurately answer drug information questions directed to them.

Oregon pharmacists are legally required to have the following in their libraries:

1) Dispensing information from one of the following:
    a. United States Pharmacopeia Dispensing Information

b. Facts and Comparisons
c. American Hospital Formulary Service Drug Information

2) At least three references from the following categories:
   a. Drug Interactions
   b. Poison and Antidote Information
   c. Pharmacology
   d. Therapeutics
   e. United States Pharmacopeia/National Formulary

All reference books cannot be over five years of age from the date of publication.[14]

Other additional critical factors which may determine drug information provision are clinical experience, knowledge, confidence and lack of time. Also, pharmacists must be able to properly use references and interpret the data obtained from references.[10,11]

As previously stated, Cardoni et al. found that out of 677 requests received by the Connecticut Drug Information Center approximately 35 percent had been answered with references that could be readily obtained by community pharmacists.[4] If the readily obtained references defined by this study were redefined as those legally required of Oregon pharmacists, 32 percent of the 677 requests identified by Cardoni et al. could have been answered by Oregon pharmacists. This observation demonstrated that it seemed plausible to study Cardoni et al.'s conclusions further in Oregon. Therefore specific requests received by the Oregon Poison Control and Drug Information Center which were answered with references described by the Oregon State Board of Pharmacy's requirements were studied.

METHODOLOGY

Drug information requests received and answered by the Oregon Poison Control and Drug Information Center (OPCDIC) during the time period of June, 1985 to June, 1986 were examined by the investigator. The most recent one year time period was considered in order to reflect the OPCDIC's present work load. The examination of an entire year was necessary in order to avoid request load fluctuations which have been observed during different seasons. Procedural outlines for responding to drug information requests at the OPCDIC require that references used to complete the answer must be documented on the request form accompanying the written answer. Those requests which had been answered using references that met the description of the Oregon State Board of Pharmacy's Minimum Equipment and Stock Requirements with respect to pharmaceutical references were deemed as inappropriately referred and therefore chosen for the study (Appendix A). One hundred and fifty-six requests, approximately 10 percent of the total number of requests reviewed, were identified using the above criterion. The 156 requests covered the following subjects:

- product information (ie availability, description)
- biopharmaceutics
- drug interactions
- drug dosage
- drug therapy
- adverse effects

Every request received by the OPCDIC is chronologically numbered; to avoid complications, the requests entered into the research study were coded with their originally assigned number.

The requests were assigned to senior II pharmacy students during their externship at Oregon State University College of Pharmacy. In the summer of 1986, there were 24 pharmacy externs available to participate in this study. The pharmacy externs had completed all academic and practical requirements (including a drug information course) that are mandatory for graduating as a licensed pharmacist with the exception of eleven weeks of practical, on-site training. In order to ascertain whether this group of senior pharmacy students was a true representation of the entire senior II class, grade point averages were compared. The mean grade point average of the 24 externs was 2.487 ($\pm$0.444) while that of the entire senior II class was 2.482 ($\pm$0.486). Each pharmacy extern was assigned to four weeks (40 hr/week) of experience in both a community and a hospital pharmacy, and three weeks in a therapeutics setting (usually hospital-based). All pharmacies that participated in the Externship Program conducted by the College of Pharmacy had been carefully pre-selected by the College's faculty. Every extern was assigned a licensed, staff pharmacist as his/her preceptor who supervised him/her during each of the three rotations.

The research project was included as an official part of the pharmacy students' Externship Program. Permission to operate the research during the externship was obtained from the program's co-ordinator, Dr. Douglass Stennett. One week prior to the commencement of the Externship Program, while the pharmacy students were still attending classes at Oregon State University, the investigator addressed the 24 future externs in order to introduce herself and explain their involvement in the research project. The research

problem, hypothesis, objectives and goals were not presented at this time; however, all participants were encouraged to obtain any of this information as well as the research results once all data had been accumulated and analyzed. Specific instructions on how they were to research the drug information requests assigned to them were explained at this time.

The investigator randomly assigned by drawing the request numbers out of a container one request once a week to each extern in the hospital and community rotations. This continued until all of the 156 requests had been answered by an extern. The therapeutic rotation was not included as it occupied the majority of the externs' time and left little or no opportunity to complete answers to the drug information requests from the research project. Depending on the extern's rotation schedule, he/she received a total of six or seven requests during the entire 11 week externship.

The requests were individually mailed to each extern's work location. Every request was accompanied with a self- addressed, stamped envelope for its return to the investigator after it had been completed.

The College of Pharmacy's official time schedule of the 1986 Summer Externship was used to identify where each extern was each week of the program, who their respective preceptors were, and what the pharmacies' mailing addresses were.

Included in the first week's request was a detailed letter reviewing all pertinent instructions presented to them in person by the investigator one week prior (Appendix B). Each preceptor received a letter describing the research project and stressing the fact that the externs were to answer the requests by themselves without any consultation with their peers or preceptors (Appendix C).

To answer the requests mailed to them, the externs were directed to use only those pharmaceutical references outlined by the Oregon State Board of Pharmacy's administrative rules.

The requests were individually typed on the identical request forms that are used by the OPCDIC (Appendix D). The profession of the original requestor was indicated on the form as well as the date on which the request was issued by the investigator and the date on which the extern's written response was due. The externs were directed to write their answer to the drug information request on the same form as the request. Also, they were asked to specifically indicate in writing what reference(s) they used to answer the request.

All of the requests assigned were entered in a data book along with the extern's name, the date the requests were sent, and the date each was returned. This was done on a weekly basis so that new requests were mailed out every Saturday. Due dates were nine days later, allowing approximately one week for completion and mailing back the request with the answer. All externs who had answers that were one week overdue were contacted by telephone and reminded to mail in their completed requests.

As data were mailed back to the investigator, the answers formulated by the externs were paired to the corresponding answers completed by the OPCDIC. Each of the two answers were randomly coded with either the letters A or B and entered into a computer database with its matching request.

In order to determine what references were available to the externs in relation to the Oregon State Board of Pharmacy's standards during the research project a series of questions were posed to staff pharmacists from each of the 27 pharmacies involved in the Externship Program. The interviews were conducted by the investigator via telephone at the

end of the 11 week externship. A written questionnaire was used and answers were documented at the time of each interview (Appendix E).

Fifteen out of 27 pharmacies met the minimum reference requirements stipulated by the Oregon State Board of Pharmacy (Appendix A). Therefore, approximately 44 percent of the pharmacies involved in the Externship Program did not meet the legal standards for pharmaceutical references.

Fourteen of the pharmacies surveyed were community pharmacies and 13 were hospital pharmacies. Ten community pharmacies (71.4 percent) and two hospital pharmacies (15.4 percent) were noncompliant.

Seven of the 12 pharmacies failed to meet the standards because their references were outdated, while the remaining five failed since they did not have all of the references outlined.

All 27 pharmacies had at least one reference (in date) which covered dispensing information.

The final portion of the telephone interview requested the pharmacist to list the five most frequently used drug information references in that pharmacy. The five references cited most often by the pharmacists were:

1) Facts and Comparisons - 25 pharmacies (92 percent)
2) USP Drug Information - 14 pharmacies (52 percent)
3) American Hospital Formulary Services Drug Information - 14 pharmacies (52 percent)
4) Handbook on Injectable Drugs - 9 pharmacies (33 percent)
5) Hansten's Drug Interactions - 8 pharmacies (30 percent)

Other references were selected six times or less.

In all, 153 sets of requests were completed and entered into the computer. Three of the requests assigned to the externs were never returned.

The answers were judged by two recognized experts in the field of drug information. Both are present faculty members of the College of Pharmacy, Oregon State University. One judge teaches drug information skills to pharmacy students at the College of Pharmacy while the other judge is the Associate Director for Drug Information at the OPCDIC. Both individuals have been active in and reported on a number of research projects involving drug information.

The method of measurement used by the judges to evaluate the answers covered four characteristics which were rated on a scale of zero to five. Zero represented the poorest quality while five denoted the highest quality of the characteristic.

The characteristics employed in the evaluation were categorized as follows:

1) incorrect.....correct
2) inappropriate .....approriate
3) incomplete.....complete
4) extraneous material.....essential material

Written criteria for the evaluation of each category were provided to both judges (Appendix F). The judges were blinded as to which answers were completed by the externs and which were done by drug information specialists. Answers were presented to the judges in two separate sets. The first set was composed of all the answers which had been randomly coded with the letter "A" while the second contained all those randomly coded with

the letter "B". Therefore each of the two groups included answers completed by the externs and the OPCDIC.

Prior to the evaluation, 10 requests were chosen which were not included in the sample for the research study but matched the request selection criteria. The evaluation method was then tested by each judge using these 10 requests. The investigator reviewed the data resulting from the evaluation and also individually interviewed each judge to ascertain whether any complications or misunderstandings had occurred during the evaluation test period. No problems were identified at this time. Also, this method of measurement had been successfully used in rating answers to drug information questions which were assigned to pharmacy students enrolled in a practical experience course in drug information during the 1986 winter quarter at Oregon State University.

During the first stages of the evaluation the judges identified eight requests which violated the selection criteria and had been overlooked by the investigator. Also at this time it was noticed that the status of two requests had changed during the time period between completion by the OPCDIC and completion by the externs. These 10 requests were therefore withdrawn from the study.

Upon examination of the evaluations by both judges an unexpected number of disagreements were observed in the first category, incorrect - correct. Since this particular category represented the highest relevancy for the research project the evaluation criteria for the category were redefined more explicitly (Appendix G). Without any knowledge of the results from the first evaluation the judges were asked to re-evaluate the request with the new criteria for the first category. At this stage of the evaluation the investigator requested the judges to record and report any requests for which the answer could not be rated with complete objectivity or confidence. Thirty-two answers were reported to the investigator as a result. Once carefully examined by the investigator and reviewed with each judge separately it was concluded that these 32 requests would be excluded from the study for the following reasons:

A) The request was stated in a manner that was open to interpretation.
B) Various answers were possible according to professional opinion.
C) The information in the reference sources was open to interpretation.
D) Information found in equivalent reference texts conflicted.
E) The answer was not incorrect, but was irrelevant to the request.

The data collected from 111 sets of answers were analyzed using the Chi square test. The judges' evaluations were separately analyzed because correlation coefficients computed to demonstrate the strength of agreement between the two raters were low for three of the four categories (Appendix H).

TABLE I: DISTRIBUTION OF 32 REQUESTS WITHDRAWN FROM STUDY

REASON		NUMBER OF REQUESTS
A.	The request was stated in a manner that was open to interpretation.	6
B.	Various answers were possible according to professional opinion.	12
C.	The information in the reference sources was open to interpretation.	7
D.	Information found in equivalent reference texts conflicted.	4
E.	The answer was not incorrect, but was irrelevant to the request.	3
TOTAL WITHDRAWN REQUESTS		32

RESULTS

The research hypothesis was: Drug information requests that are predicted as being uneccessarily referred to the Oregon Poison Control and Drug Information Center (OPCDIC) can be answered by pharmacy externs as appropriately as OPCDIC drug information specialists.

Chi square values computed for each of the four evaluation categories showed no significant difference between the externs' scores and the OPCDIC's scores ($p \leq .05$). This was true for results from both judge A and judge B. Therefore, the research hypothesis cannot be rejected. Tables II - IX present the frequency of scores assigned to extern and OPCDIC answers by judges A and B for each of the four evaluation categories.

Not demonstrating any difference between the two groups does not provide clear-cut results; however, because of the reasonably large sample size and the fact that two independent evaluations produced similar results it is felt that the lack of difference is truly reflective of the problem stated.

It is possible that the lack of sensitivity present in this study's evaluation method may have resulted in failure to detect a difference between the externs and the OPCDIC. However, the distribution of data points was quite reasonable, attesting to the discriminatory power of the measuring instrument.

Low scores (≤ 2) obtained by either the externs or the OPCDIC were studied with respect to the nature of their requests (ie. product information, biopharmaceutics, drug interactions, drug dosage, drug therapy, adverse effects). The frequency of low scores observed in all four categories was low, thereby precluding any interpretation (Appendices I-P).

TABLE II: FREQUENCY OF SCORES ASSIGNED TO EXTERN AND OPCDIC ANSWERS BY JUDGE A FOR CATEGORY 1: INCORRECT-CORRECT

SCORES	0	1	2	3	4	5
EXTERNS' ANSWERS	8	0	1	0	1	101
OPCDIC'S ANSWERS	4	0	2	0	3	102

X^2 (5, N = 222) = 1.000, $p \leq .05$

TABLE III: FREQUENCY OF SCORES ASSIGNED TO EXTERN AND OPCDIC ANSWERS BY JUDGE A FOR CATEGORY 2: INAPPROPRIATE - APPROPRIATE

SCORES	0	1	2	3	4	5
EXTERNS' ANSWERS	4	1	2	13	19	72
OPCDIC'S ANSWERS	2	2	2	16	25	64

X^2 (5, N = 222) = 1.483, $p \leq .05$

TABLE IV: FREQUENCY OF SCORES ASSIGNED TO EXTERN AND OPCDIC ANSWERS BY JUDGE A FOR CATEGORY 3: INCOMPLETE - COMPLETE

SCORES	0	1	2	3	4	5
EXTERNS' ANSWERS	4	0	2	10	35	60
OPCDIC'S ANSWERS	3	1	3	10	35	59

X^2 (5, N = 222) = 0.0643, $p \leq .05$

TABLE V: FREQUENCY OF SCORES ASSIGNED TO EXTERN AND OPCDIC ANSWERS BY JUDGE A FOR CATEGORY 4: EXTRANEOUS - ESSENTIAL

SCORES	0	1	2	3	4	5
EXTERNS' ANSWERS	5	1	5	6	1	93
OPCDIC'S ANSWERS	4	7	5	6	3	86

X^2 (5, N = 222) = 3.7595, $p \leq .05$

TABLE VI: FREQUENCY OF SCORES ASSIGNED TO EXTERN AND OPCDIC ANSWERS BY JUDGE B FOR CATEGORY 1: INCORRECT-CORRECT

SCORES	0	1	2	3	4	5
EXTERNS' ANSWERS	9	1	0	1	0	100
OPCDIC'S ANSWERS	4	1	1	0	3	102

X^2 (5, N = 222) = 3.069, $p \leq .05$

TABLE VII: FREQUENCY OF SCORES ASSIGNED TO EXTERN AND OPCDIC ANSWERS BY JUDGE B FOR CATEGORY 2: INAPPROPRIATE - APPROPRIATE

SCORES	0	1	2	3	4	5
EXTERNS' ANSWERS	4	0	0	3	26	78
OPCDIC'S ANSWERS	1	0	0	2	27	81

X^2 (5, N = 222) = 0.8252, $p \leq .05$

TABLE VIII: FREQUENCY OF SCORES ASSIGNED TO EXTERN AND OPCDIC ANSWERS BY JUDGE B FOR CATEGORY 3: INCOMPLETE -COMPLETE

SCORES	0	1	2	3	4	5
EXTERNS' ANSWERS	4	0	1	6	15	85
OPCDIC'S ANSWERS	1	0	1	6	9	94

X^2 (5, N = 222) = 2.2832, $p \leq .05$

TABLE IX: FREQUENCY OF SCORES ASSIGNED TO EXTERN AND OPCDIC ANSWERS BY JUDGE B FOR CATEGORY 4: EXTRANEOUS - ESSENTIAL

SCORES	0	1	2	3	4	5
EXTERNS' ANSWERS	4	0	3	3	14	87
OPCDIC'S ANSWERS	1	1	0	4	11	94

X^2 (5, N = 222) = 2.4908, $p \leq .05$

DISCUSSION

Drug information requests which were suspected as being inappropriately referred to the Oregon Poison Control and Drug Information Center (OPCDIC) were answered as adequately by pharmacy externs from Oregon State University as by drug information specialists at the OPCDIC. These requests represented approximately seven percent of the total number of requests received by the OPCDIC over the time period between June, 1985 and June, 1986.

The initial goal of this research project was to investigate whether certain referred requests could be answered as satisfactorily by community or hospital pharmacists as by drug information specialists at the OPCDIC. Since externs were used in the study rather than pharmacists practicing in the state of Oregon, the results obtained can only be applied to pharmacy externs from Oregon State University. These externs have didactic preparation about drug information sources, and the methods involved in the selection, evaluation and provision of information regarding drugs and drug therapy. The opportunity to apply the above material received from a three credit hour course given during the junior year is provided throughout the subsequent academic preparation. With this minimal amount of formal training in drug information skills the pharmacy externs performed as adequately as drug information specialists. These results were not unexpected as appropriate answers to all of the requests could be found in general drug information reference texts described by the Oregon State Board of Pharmacy. In view of this finding the requests identified in the research problem can be classified as being inappropriately referred. Based on these results it would be expected that future OSU pharmacy externs with the same background in drug information as the externs involved in this study should be able to competently answer such factual requests. As a result a decrease in the OPCDIC request work load would also be expected. However, even though this research demonstrates the potential of near-graduating pharmacy students it is obvious that drug information skills obtained in school are not always utilized in the practical setting; otherwise the research problem would not have been identified. Some pharmacy practitioners may have done their own requests; however, this would not come to the attention of the OPCDIC.

The reasons behind not exercising drug information skills in the community or hospital setting have not been accurately determined. The literature has discussed that possible contributing factors could be the pressure of pharmacists' work loads and their attitude in assuming this responsibility. Contributing to this attitude is a perceived lack of knowledge of sources, lack of confidence in their own ability, and their lack of experience in this area.[3,4,10,11,13]

The study showed that the ability to answer certain drug information requests exists in present-day pharmacy graduates from Oregon State University. Therefore, specific measures must be taken to ensure that this ability is maintained and applied. Pharmacists' attitudes concerning drug information must also be affected in order to encourage them to answer their drug information requests. One very practical method would be requiring senior II pharmacy students to participate in a one month drug information clerkship at the OPCDIC. The clerkship is already in existence as an elective and offers an excellent learning experience in the practical skills of drug information. It is also a strong confidence builder.

This could be offered to practicing pharmacists as well in a condensed format involving a one week rotation at the OPCDIC. Such an experience could be presented as a continuing education program in conjunction with the Oregon State Board of Pharmacy. Continuing education credits are mandatory in the State of Oregon.

Continuing education programs on drug information sources could also be offered in more formalized presentations at organized meetings and lectures or as correspondence courses. Each of these programs would entail a written test at its conclusion for the pharmacist to pass before being awarded credits.

To attain a universal level of performance in drug information practice in Oregon the OPCDIC could provide written standards and guidelines on the methods of research and provision of drug information to all Oregon pharmacies. These standards would parallel those practiced at the OPCDIC and guide pharmacists in answering questions which can be adequately answered using general information textbooks.

Finally, the OPCDIC drug information specialists should prepare recommendations for a drug information library which could be depended on to provide general, updated, and factual drug information. The Oregon State Board of Pharmacy could then require these as minimum standard equipment for both retail and institutional drug outlets. Periodic review of these requirements to ensure the library's accuracy and efficiency in relation to present-day pharmacy practice could be the OPCDIC's responsibility.

Such a required reference library would give pharmacists clearer direction as to the specific need of drug informaiton references in contrast to the general requirements presently issued by the Oregon State Board of Pharmacy. It would also solve the problem of depending on one reference only rather than having several references available for the necessary substantiation of information. Such a need was demonstrated during the evaluation phase of the study. The introduction of the preceding recommendations would encourage pharmacy practitioners' confidence in providing drug information and as well strengthen that of new graduates. Additionally, each time a pharmacist answered a drug information request it would generate greater self-confidence.

At this point the OPCDIC could screen for inappropriate requests by asking pharmacists which references they had checked prior to calling and what type of background information had been found. This would remind pharmacists of their own responsibilities with regards to drug information questions. Ideally, pharmacists should be capable of answering the majority of the factual questions directed to them and referring only those requests needing unique references, clinical literature or specialized consultations. The end result of these recommendations would be the generation of new time for the OPCDIC to concentrate on decreasing mean response time to appropriate drug information requests and increasing time spent on patient-care, educational, quality assurance and research activities. One must also recognize the potential significance of community and hospital pharmacists' active participation in patient care as a result of their increased role in disseminating drug information.

The requests involved in this research study were all of the requests received by the OPCDIC during a one year time period between June, 1985 and June, 1986 which agreed with the selection criteria for inappropriately referred requests. Therefore they were the best possible representation of what is presently being answered by the OPCDIC. As well, the distribution of the types of requests (eg. product information, adverse effects, drug

interactions, etc.) was proportional to what is normally received by the OPCDIC over a one year period.

However, one deficiency with respect to the requests' answers does exist. The OPCDIC answers were retrospective data. The drug information specialists had no knowledge at the time of answering the requests that the answers would be later evaluated for their written part only. In contrast, the externs were fully aware that it was specifically their written answer which would be evaluated. Thorough documentation of the complete answer provided over the telephone does not always occur in poison and drug information centers when staffing may be at a minimum while work load is at a premium. In fact, it is acknowledged in the literature discussing quality assurance of drug information centers that request forms are rarely complete enough to determine everything that has been relayed verbally.[15] Without recordings of the verbal responses, evaluations of the answers provided by the OPCDIC may not reflect the deserved rating of the entire response (verbal and written). This situation may have contributed to lower ratings for the OPCDIC answers. Future studies should use concurrent data rather than a mixture of retrospective and concurrent data.

The evaluation phase of the study demonstrated some difficulty with the evaluation tool. Lack of inter-rater agreement was the primary drawback of the scoring technique. This was especially observed in the first category judged, incorrect-correct. The implausible number of disagreements recorded between the two judges in this category was a strong indicator of the weakness of the evaluation tool. Since Category I represented the greatest relevance to the project the judging criteria for it were re-defined much more specifically. Instead of a statement defining the endpoints of a zero to five range, specific statements were made for each of the six possible scores, each describing what should or should not be in the answer in order to assign that particular score (Appendix G). By introducing these criteria into the second evaluation the number of disagreements in the first category was reduced by greater than 50 percent and the correlation values between the judges' evaluations changed from $r = .427$ and $r = .282$ to $r = .916$ and $r = .752$ for extern and OPCDIC scores respectively.

More detailed criteria eliminated or greatly decreased the possibility of subjectivity entering into the judges' evaluations. The less subjectivity involved in the evaluation the more dependable the measuring tool became.

The remaining three categories also exhibited disagreement between the two judges; however, their criteria were not redefined even though there was a potential for subjectivity to enter the evaluation process. Criteria for this calibre of an evaluation tool lacks precedence in the literature. The ASHP Special Interest Group on Drug and Poison Information Practice is presently developing in-depth quality assurance guidelines for assessing written drug information responses which may solve some of this study's problems with respect to evaluation criteria. Future studies evaluating written drug information answers may benefit from using the above guidelines as a starting point for creating more specifically defined critera.

The 24 externs in the research study were considered as a representative group of the entire 1986 graduating class of pharmacy students. This is supported by the fact that the average GPA for the entire class is approximately the same as that of the 24 externs. Therefore the results from this research study may be extrapolated to the 1986 class of

senior pharmacy students.

Even though the extems had approximately all of the formal training that licensed Oregon pharmacists have and the externs' professional skills were current and updated, the results of this study cannot be extrapolated to practicing Oregon pharmacists. The practical experience possessed by licensed Oregon pharmacists is the major factor contributing to the difference between these two groups.

The advantage of testing the pharmacy externs instead of a randomly selected group of Oregon pharmacists was the assurance of participation and response to the research project. The response rate to this study was 98 percent. It is unlikely that busy practicing pharmacists would have provided as high a return of answers. It would be advantageous in the future to do a study using practicing pharmacists.

The pharmacies' low compliance with the reference standards is disturbing in the sense that they are institutions which participate in training and educating pharmacy students. It points out that there is need for continuing education regarding drug information references and their importance in daily pharmacy practice. Relating legal requirements to specific texts rather than categories of texts might improve this situation. Since the sample of pharmacies for the telephoned reference survey is by no means random or large enough to represent all pharmacies in the state no other inferences can be made.

The 32 requests dropped from the study are important to discuss as they may represent potential problems in future studies or quality assurance programs. The issues differentiating these 32 requests from the entire request sample fall into five main classifications.

1) The request was stated in a manner that was open to interpretation. - This issue presented itself a number of times where the question was ambiguous and lacked the required information necessary to fully understand the request. The request "Is atropine methylnitrate commercially available in the USA?" for instance, does not specify whether it is the chemical grade or the refined product for human use that is desired. Another example is the request "Is there a glucose-electrolyte solution for women with morning sickness?". It is not stipulated whether the product being sought is for prophylaxis of nausea (ie Cal-X^{R}, Eazol^{R}, Emetrol^{R}, Nausetrol^{R}, Esperol^{R}) or for the treatment of the consequences of morning sickness (ie. Infalyte^{R}, Lytren^{R}, Pedialyte^{R}, Pedialyte RS^{R}).

2) Various answers were possible according to professional opinion - When evaluations were based on professional opinion and unnecessarily integrated with appropriately referenced answers conflicting evaluations occurred. Professional judgement also produced conflicting evaluations when none of the references specifically answered the question but only provided facts to support an opinion.

A request which illustrated this problem asked for recommendations on how to switch a patient on Dyazide^{R} therapy to Diuril^{R}. Clearly no reference accurately addresses this situation, therefore one would rely on professional opinion and experience in order to resolve it. Another request which showed conflict in professional judgement dealt with the minimum time that penicillin IV (3 million units per dose) could be administered. One judge's opinion was considerably more conservative than the other. Clinical experience contributed to the more aggressive approach.

3) The information in the reference sources was open to interpretation. - This situation was most clearly illustrated in the request "Is there a drug interaction of any

significance between calcium channel blocking drugs and oral calcium supplements for osteoporosis?". Depending on how one interprets proposed patient management statements from varying references regarding this interaction a differing opinion may result for the answer. Hansten's handbook on Drug Interactions states that one should be alert for this type of interaction while Drug Interaction Facts simply states that calcium supplementation should be used with caution in patients taking calcium channel blockers.

4) Information found in equivalent reference texts conflicted - A request asking whether penicillin and sulfamethoxazole - trimethoprim preparations interact illicited incongruous information from varying texts. The American Hospital Formulary Service Drug Information 1986 and Drug Interaction Facts support the answer that there is no documented problem with this type of combination. USP Drug Information for the Health Professional '86 and Facts and Comparisons contradict the above by explaining that sulfamethoxazole-trimethoprim products may decrease the efficacy of the penicillin indirectly by slowing bacterial cell turnover where penicillins work most proficiently when cells are rapidly proliferating. This in one example of conflicting references. Other illustrations in this sample involved drug half-lives, dosing regimens (bid vs. qid), and timing of administration of propylthiouracil before and after radioactive iodine therapy.

5) The answer was not incorrect, but was irrelevant to the request - This problem presented most often when the answer itself was a correct statement but it did not relate to the issue proposed in the request. For instance, the request "Is triazolam contraindicated in patients with MS?" elicited a response which discussed the adverse effect benzodiazepines can have in patients with myasthenia gravis.

The five problems illustrated in the preceding discussion indicate that difficulties in evaluating answers to drug information requests arise not only from the content of the answer but from the format of the request, the scope of the references, the lack of consistency between equivalent references (i.e. Facts and Comparisons vs American Hospital Formulary Service DI '86 vs. USP Drug Information) and the bias introduced by professional judgement. It is the opinion of the investigator that judgemental questions create the most difficult type of answers for evaluation in drug information quality assurance programs. Judgement is extremely subjective and captures only one person's experiences, knowledge and thought processes in the formulation of a final opinion.

CONCLUSION

This research study showed that the Oregon Poison Control and Drug Information Center is inefficiently used because it answers inappropriately referred requests. Suggestions are made in order to re-direct practicing pharmacists to assume the responsibility of doing these requests. Education offering experience in the provision of drug information and knowledge of drug information references would be expected to improve pharmacists' attitudes and abilities. Guidelines requiring specific references would correct some of the deficiencies in source materials.

Future research studies should consider the use of a random sample of practicing pharmacists and specific drug information references. Concurrent data collection and a measuring tool with more detailed criteria would also benefit future studies.

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APPENDIX

APPENDIX A: Oregon Administrative Rules, Chapter 855, Division 41 - Board of Pharmacy

(2) The individual pharmacy's security plan shall be available for approval by the board's inspector at the pharmacy's regularly scheduled inspection.

Stat. Auth.: ORS Ch. 475
Hist.: IPB 5-1982, f. & ef. 8-6-82

Loss of Pharmacy Certificate of Registration (Both Retail and Institutional)

855-41-030 In case of loss of certificate of registration, the Board may require a sworn statement before a notary public to be filed in the Board office before duplicate certificates of registration can be issued.

Stat. Auth.: ORS Ch. 689
Hist.: IPB 2-1979(Temp), f. & ef. 10-3-79; IPB 2-1980, f. & ef. 4-3-80

[ED. NOTE: The text of Temporary Rules is not printed in the Oregon Administrative Rules Compilation. Copies may be obtained from the adopting agency or the Secretary of State.]

Operation of a Double Set-Up Pharmacy in a Retail Drug Outlet

855-41-035 A double set-up is an establishment having both a retail drug outlet registration and a proprietary drug outlet registration. In a double set-up:

(1) The retail drug outlet (pharmacy) must be a separate operation, completely contained by an enclosure which assures safe storage. This area is to be easily distinguished by the public. When the retail drug outlet (pharmacy department) is closed, then as a proprietary drug outlet the establishment is subject to the provisions of OAR 855-35-020.

(2) When a pharmacist is not in attendance, a closed sign shall be posted at the entrances stating the hours of the pharmacy's operation. All entrances to the retail drug outlet shall be closed off and securely locked. The key to the retail drug outlet (pharmacy) shall remain in the possession of the pharmacist, except where other arrangements may be necessary to meet fire regulations, if the retail drug outlet (pharmacy) is closed while the proprietary outlet (shopkeeper) remains open.

Stat. Auth.: ORS Ch. 689
Hist.: IPB 2-1979(Temp), f. & ef. 10-3-79; IPB 2-1980, f. & ef. 4-3-80

[ED. NOTE: The text of Temporary Rules is not printed in the Oregon Administrative Rules Compilation. Copies may be obtained from the adopting agency or the Secretary of State.]

Disposal of Drugs

855-41-036 Drug outlets are responsible for removal of expired drugs from stock. Drug outlets shall dispose of expired, deteriorated, or unwanted drugs by returning them to the manufacturer or wholesaler, destroying them by introduction to the sewer system, or by incineration or by other means that will assure protection against unauthorized possession or use.

Stat. Auth.: ORS Ch. 475 & 689
Hist.: IPB 2-1984, f. & ef. 3-7-84

Reporting Drug Loss

855-41-037 (1) The owner or pharmacist in charge shall upon discovery notify the Board within three (3) business days after any drug loss or possible drug damage due to heat, smoke, fire, rain, flood, burglary, robbery, theft, or other means. The pharmacist shall provide the amounts and strengths of the controlled substances which were lost or a copy of the form required by the federal Drug Enforcement Administration within thirty (30) calendar days after the discovery of such an event.

(2) Such claims for loss of controlled drugs shall be substantiated by a copy of the police report, if requested, of loss due to burglary or robbery. In the event of any other disaster, it shall be substantiated by a report from the appropriate source.

Stat. Auth.: ORS Ch. 475 & 689
Hist.: IPB 2-1981, f. & ef. 8-20-81

Minimum Equipment and Stock Requirements (Both Retail and Institutional Drug Outlets)

855-41-040 The minimum equipment and stock requirements to open and operate a retail drug outlet and institutional drug outlet (except as otherwise provided in OAR 855-41-125(2)) in the State of Oregon shall consist of not less than the following:

(1) Pharmaceutical reference books shall include one recent edition (not over five years from publication date) from at least four of the following categories, one of which must include dispensing information:

(a) Dispensing Information from one of the following:
(i) United States Pharmacopeia Dispensing Information;
(ii) Facts and Comparisons;
(iii) American Hospital Formulary;
(b) Drug Interactions:
(c) Poison and Antidote Information;
(d) Pharmacology;
(e) Therapeutics;
(f) United States Pharmacopeia/National Formulary.

(2) ORS Chapter 689 and ORS 435, 453, and 475, and OAR Chapter 855.

(3) Official Poison and Exempt Narcotic Register.

(4) One base prescription balance capable of weighing 120 mgm.

(5) One set of accurate metric weights from 50 mgs. to 20 gms.

(6) Graduates — capable of accurately measuring volumes from 20 minims to at least one pint and from 1 ml. to at least 500 ml.

(7) Metric graduates — three: 25 ml., 100 ml., and 500 ml.

(8) Apothecary graduates (ordinary) — four.

(9) Single scale — 60 to 120 minims.

(10) Single or double scale — 1/4 to 1 oz.

(11) Single or double scale — 4 oz.

(12) Single or double scale — 16 oz.

(13) Double scale equivalent graduates may be used, in which case each one will suffice for the corresponding two graduates, except 4 drams or less.

(14) Spatulas — three stainless steel assorted sizes and one nonmetallic or equivalent, medium sized.

(15) Funnels — three, glass: 2 oz., 8 oz., and 16 oz.

(16) Stirring Rods — at least one, glass or rubber.

(17) Ointment slab or parchment — regulation size, at least one 10" square.

(18) Prescription files.

(19) One sink, suitably located, with running water (hot and cold) and proper sewage disposal.

(20) Refrigerator — storage, biologicals and thermolabile products.

(21) Proper storage facilities for stock.

(22) Miscellaneous equipment — a sufficient quantity of consummable material, such as:

(a) Empty capsules;
(b) Ointment jars;
(c) Bottles;
(d) Capsule, pill, powder boxes or vials;
(e) Filter papers;
(f) Powder papers;
(g) Labels, including poison labels;
(h) Mortars and Pestles.

APPENDIX B: Letter to Senior Pharmacy II Externs

THE OREGON HEALTH SCIENCES UNIVERSITY

Oregon Poison Control and Drug Information Center
Administration: (503) 225-7799
Poison Inquiry: (503) 225-8968

3181 S.W. Sam Jackson Park Rd. Portland, OR 97201

June, 1986

Dear

Thank you for agreeing to participate in a joint research project between the College of Pharmacy and the Oregon Poison Control Drug Information Center. With Dr. Douglass Stennett's approval and co-operation, I am enclosing your first drug information request which I would like you to answer and return to me.

The subject of my thesis entails the Oregon Drug Information Center and the questions which are referred to it. Each week, during your community and hospital rotation one of these questions will be randomly assigned to you. All of the questions you will receive are straight forward and should not require more than 15-20 minutes of your time to complete.

In order to answer your drug information request you may use references from the following list which appears in the Oregon Administrative Rules, Chapter 855, Division 41 - Board of Pharmacy.

Minimum Equipment and Stock Requirements (Both Retail and Institutional Drug Outlets)

855-41-040 The minimum equipment and stock requirements to open and operate a retail drug outlet and institutional drug outlet (except as otherwise provided in OAR 855-41-125(2) in the State of Oregon shall consist of not less than the following:

(1) Pharmaceutical reference books shall include one recent edition (not over five years from publication date) from at least four of the following categories, one of which must include dispensing information:

(a) Dispensing Information from one of the following:
(i) United States Pharmacopeia Dispensing Information,
(ii) Facts and Comparisons,
(iii) American Hospital Formulary;
(b) Drug Interactions;
(c) Poison and Antidote Information;
(d) Pharmacology;
(e) Therapeutics;
(f) United States Pharmacopeia/National Formulary.

(This list provides you with a few more references than those described to you during our meeting on June 5.)

It is important that you respond to the request as if it were being directed to you at the present time. Please do not check your answer with your preceptor, a fellow classmate or any other references that are not included in the previous list. If you cannot find an answer to the request, simply indicate as such in writing in the space reserved for the response. Return the form with the drug information question and your answer in the self-addressed stamped envelope provided.

In conclusion:

- Please answer each request promptly and clearly.
- If you have difficulty understanding anything concerning this research, call me.
- You can contact me at the Oregon Poison Control Drug Information Center.
  Phone Numbers: 225-8968 (Portland local)
  1-800-452-7165 (WATS line).
- A sample request form has been included with this letter which will help orientate you to the actual form with which you will be tested.

Thank you for your cooperation. I believe that you will find this to be an interesting portion of your externship. If you are interested in the results of this research, please contact me and I will be happy to discuss them with you.

Sincerely,

Donna Wheeler-Usher, BSc Pharm.

DWU:cr

Enclosures

APPENDIX C: Letter to Preceptors of Senior Pharmacy II Externs

THE OREGON HEALTH SCIENCES UNIVERSITY

Oregon Poison Control and Drug Information Center
Administration (503) 225-7799
Poison Inquiry (503) 225-8968

3181 S.W. Sam Jackson Park Rd. Portland, OR 97201

June, 1986

Dear Preceptor:

My name is Donna Wheeler-Usher and I am a graduate student from the College of Pharmacy, Oregon State University. This summer, with the cooperation of Dr. Douglass Stennett, I will be working on the research component of my thesis which will involve the college's pharmacy externs.

The subject area of my thesis focuses on the drug information requests that are answered by the Oregon Drug Information Center. One drug information question will be randomly assigned to the pharmacy extern once a week during the extern's pharmacy rotation. Each question will be sent by mail with a self-addressed, stamped envelope for its prompt return once the extern has answered it. References that can be used to answer the drug information request are those described by the Oregon Administrative Rules, Chapter 855, Division 41 - Board of Pharmacy.

> **Minimum Equipment and Stock Requirements (Both Retail and Institutional Drug Outlets)**
>
> 855-41-040 The minimum equipment and stock requirements to open and operate a retail drug outlet and institutional drug outlet (except as otherwise provided in OAR 855-41-125(2)) in the State of Oregon shall consist of not less than the following:
>
> (1) Pharmaceutical reference books shall include one recent edition (not over five years from publication date) from at least four of the following categories, one of which must include dispensing information:
>
> (a) Dispensing Information from one of the following:
> (i) United States Pharmacopeia Dispensing Information;
> (ii) Facts and Comparisons;
> (iii) American Hospital Formulary;
> (b) Drug Interactions;
> (c) Poison and Antidote Information;
> (d) Pharmacology;
> (e) Therapeutics;
> (f) United States Pharmacopeia/National Formulary.

The pharmacy extern is asked not to use references outside of this list nor can he/she obtain assistance from you, their preceptor. All the questions which are to be tested are straight forward and should not require longer than 15-20 minutes to answer completely.

Should any problems or questions arise concerning this research, please do not hesitate to contact me at the Oregon Poison Control Drug Information Center where I am conducting my thesis work. The phone numbers are: 255-8968 (Portland local)
1-800-452-7165 (WATS line).

Thank you for your cooperation. Please feel free to contact me if you are interested in the results of this research.

Sincerely,

Donna Wheeler-Usher

Donna Wheeler-Usher, BSc. Pharm.

DWU:cr

APPENDIX D: Request Form

Requestor:_____ DDS
Department:_____ DVM FAC LAY
Institution:_____ LIB MD
Address:_____ RN RPh-C
City, State:_____ RPh-H
Telephone:_____ Other:

The Oregon Health Sciences University
Oregon Poison Control and Drug Information Center
Drug/Tox Information Consult Form
(HSU-6402-Rev. 5-6/85)

Request Number:

Date:_____ Time:_____

Request Received By:

Request:

Response Will Be: Written ( ) Verbal ( )

Date Response Needed:

Response:

Request Category:

___ Adverse Effect
___ Biopharmaceutics
___ Compatibility/Stability
___ Dose
___ Drug Interaction
___ Miscellaneous
___ Product Information
___ Therapeutic Use

Most Useful Reference:
___ Clinical Literature
___ Drugdex
___ Expert
___ No Reference
___ Old Request
___ Text

___ Comp Med Lit Srch
___ Comp Tox Lit Srch

Message Left?
(Date, Time, Message, Name Message Left With)

Date:_____
Time:_____
Initials:_____

On Time? Yes No

Delay Time:
___ < 1 Hour
___ 1 Hr–1 Day
___ 1–7 Days
___ > 7 Days

Index:

APPENDIX E: Questionnaire for Preceptors

QUESTIONNAIRE FOR PRECEPTORS

Aug.1986

1) Does your pharmacy have any of the following references?

- USP Drug Information
- American Hospital Formulary Service Drug Information
- Facts and Comparisons

2) Does your pharmacy have a separate reference text on any of the following topics?

__ drug interactions

__ poison and antidote information

__ pharmacology

__ therapeutics

__ US Pharmacopeia or __ National Formulary

3) What are the five most frequently used drug information references in your pharmacy?

CODE #_____

APPENDIX F: Evaluation Criteria

Category 1: Incorrect - Correct
Mark zero if any part of the response is wrong. (ie erroneous) Otherwise mark the scale proportionate to the correctness of the answer.

Category 2: Inappropriate - Appropriate
Consider the language of the response and the depth of the response in relation to the nature of the requestor. (ie. physicians, dentists, veterinarians, and pharmacists should receive background information explaining or supporting the answer while with other health professionals such information is not mandatory.)

Category 3: Incomplete - Complete
Consider whether a solution to the problem is provided. If not, mark the scale down by the percentage of the request that remained unanswered.

Category 4: Extraneous - Essential
Consider any material extraneous if it is not required by the recipient of the information. Mark the scale downwards in proportion to the number of extraneous statements that are made.

Note: If the answer given states "cannot find any information on this subject and there actually is information available from the references*, score each category zero.

* Only those references described by the Oregon State Pharmacy Board's administrative rules.

APPENDIX G: Redefined Criteria for Category I: Incorrect-Correct

1. An answer is judged incorrect if any of the stated information is incorrect, even if that information was extraneous; but not if information is missing (which would make it incomplete).

2. The degree of correctness, 0-5, is assigned on the basis of the hazard attached to the use of the information:

   0 = A categorical statement that is incorrect
   e.g. there is no information (when there is)
   there is no interaction (when there is)
   or a numerical fact that is incorrect
   e.g.Benadryl is available as 500 mg caps. (actually 50 mg)

   1 = Information that appears to be established, but is not (only one of two conflicting facts)
   e.g. nortriptyline causes less sedation than amitriptyline.

   2 = Information that has language that can be misunderstood in the absence of definition.
   e.g. maximum dose.

   3 = "Slipped" terminology (technical language)
   e.g. CNS depressant =/ sedative;
   no psychological dependence reported =/ established.

   4 = Unsupported conservative recommendation in contrast to presented facts
   e.g. There is no interaction reported or theoretical but don't take them together.

APPENDIX H: Judges' Agreement* for Scores Assigned to Externs' and OPCDIC's Answers

Category	Extern's Answers	OPCDIC's Answers
I Incorrect-Correct	.916	.752
II Inappropriate-Appropriate	.448	.455
III Incomplete-Complete	.578	.289
IV Extraneous-Essential	.513	.322

* Pearson's r

APPENDIX I: Classification of Answers Evaluated by Judge A with a Score of (≤2) in Category I: Incorrect-Correct

	Externs	OPCDIC
Product Information (ie. availability, description)	4	4
Biopharmaceutics	2 (both judgmental)	0
Drug Interaction	1	0
Drug Dosage	1 (judgmental)	1 (judgmental)
Drug Therapy	1	0
Adverse Effect	0	1
Total	9	6

[identical question ≤2 occurring on both sides once (ie. dosage)]

APPENDIX J: Classification of Answers Evaluated by Judge A with a Score of ($\leq$2) in Category II: Inappropriate-Appropriate

	Externs	OPCDIC
Product Information (ie. availability, description)	2	1
Biopharmaceutics	2 (both judgmental)	0
Drug Interaction	0	1
Drug Dosage	1 (judgmental)	1 (judgmental)
Drug Therapy	1	1 (judgmental)
Adverse Effect	1	2
Total	7	6

[identical question $\leq$2 occurring on both sides once (ie. dosage)]

APPENDIX K: Classification of Answers Evaluated by Judge A with a Score of (≤ 2) in Category III: Incomplete-Complete

	Externs	OPCDIC
Product Information (ie. availability, description)	3	2
Biopharmaceutics	2 (both judgmental)	1 (judgmental)
Drug Interaction	0	1
Drug Dosage	1 (judgmental)	1 (judgmental)
Drug Therapy	0	0
Adverse Effect	0	2
Total	6	7

[identical question ≤ 2 occurring on both sides twice (ie. biopharmaceutics, dosage)]

APPENDIX L: Classification of Answers Evaluated by Judge A with a Score of (≤2) in Category IV: Extraneous-Essential

	Externs	OPCDIC
Product Information (ie. availability, description)	1	5
Biopharmaceutics	2 (both judgmental)	3 (2 x judgmental)
Drug Interaction	0	2
Drug Dosage	2 (1 x judgmental)	1 (judgmental)
Drug Therapy	2	3
Adverse Effect	4	2
Total	11	16

[identical question ≤2 occurring on both sides four times (ie. dosage, drug therapy, biopharmaceutics x 2)]

APPENDIX M: Classification of Answers Evaluated by Judge B with a Score of (≤ 2) in Category I: Incorrect-Correct

	Externs	OPCDIC
Product Information (ie. availability, description)	3	2
Biopharmaceutics	2 (both judgmental)	0
Drug Interaction	1	1
Drug Dosage	2 (1 x judgmental)	1 (judgmental)
Drug Therapy	1	0
Adverse Effect	1	2
Total	10	6

[identical question ≤ 2 occurring on both sides three times(ie. adverse effect, dosage, drug interaction)]

APPENDIX N: Classification of Answers Evaluated by Judge B with a Score of ($\leq$2) in Category II: Inappropriate-Appropriate

	Externs	OPCDIC
Product Information (ie. availability, description)	2	0
Biopharmaceutics	2 (both judgmental)	0
Drug Interaction	0	0
Drug Dosage	0	1 (judgmental)
Drug Therapy	0	0
Adverse Effect	0	0
Total	4	1

APPENDIX O: Classification of Answers Evaluated by Judge B with a Score of (≤ 2) in Category III: Incomplete-Complete

	Externs	OPCDIC
Product Information (ie. availability, description)	2	1
Biopharmaceutics	2 (both judgmental)	0
Drug Interaction	0	0
Drug Dosage	0	1 (judgmental)
Drug Therapy	0	0
Adverse Effect	1	0
Total	5	2

APPENDIX P: Classification of Answers Evaluated by Judge B with a Score of (≤ 2) in Category IV: Extraneous-Essential

	Externs	OPCDIC
Product Information (ie. availability, description)	4	0
Biopharmaceutics	2 (both judgmental)	0
Drug Interaction	0	1
Drug Dosage	0	1 (judgmental)
Drug Therapy	0	0
Adverse Effect	1	0
Total	7	2