

1986

Evaluation and Model of a Clinical Librarian Program

Elizabeth King Eaton

Follow this and additional works at: https://digitalcommons.library.tmc.edu/library_docs



Part of the [Library and Information Science Commons](#), and the [Medicine and Health Sciences Commons](#)

Recommended Citation

Citation Information: Eaton, Elizabeth King, "Evaluation and Model of a Clinical Librarian Program" (1986).

DigitalCommons@TMC, Texas Medical Center Library, *Library Faculty Publications*. Paper 13.
https://digitalcommons.library.tmc.edu/library_docs/13

This Article is brought to you for free and open access by the Texas Medical Center Library at DigitalCommons@TMC. It has been accepted for inclusion in Library Faculty Publications by an authorized administrator of DigitalCommons@TMC. For more information, please contact digitalcommons@library.tmc.edu.

U.S. copyright law (title 17 of U.S. code) governs the reproduction and redistribution of copyrighted material.

CHAPTER 1

LITERATURE REVIEW

I. Historical Basis

A. Proliferation of the Scientific Literature

Scientific journals first appeared in the 1600's and have proliferated steadily since their inception. Of the 60,000 journals of record, 30,000 continue to be published, and of this number, a recent survey indicates that approximately 4,500 are devoted solely to medicine (Price, 1963). Thus, over 220,000 medical articles, appearing in more than 20 languages, are published each year (Brodman, 1961-1962). Measured in terms of numbers of articles published, at the current rate, the medical literature will double approximately every ten to 15 years (Price, 1963).

In conjunction with the increasing number of vehicles for communicating medical/scientific information, scientific manpower has proliferated as well. In the United States today, approximately one million persons hold scientific and technical degrees, and in the last 50 years, there has been a 16-fold increase in the number of men and women of science in America alone (American Medical Association, 1981). Thus, the 20th century scientist faces the difficult problem of keeping pace with an ever-expanding body of literature. Innovations in handling, sorting, cataloging, identifying, and retrieving relevant articles have been aided by computer technology. Another solution to this problem has surfaced in the form of Clinical Librarian Programs. This thesis reviews the proliferation of medical and scientific

literature from the 17th to the 20th century; examines the development of Clinical Librarian Programs and published program evaluations at medical institutions in the United States; establishes a model for program development and evaluation; and presents the results of an evaluation of the Clinical Librarian Program conducted at the University of Texas Medical Branch at Galveston, Texas between 1978 and 1981.

1. Scientific journals from the 17th to the 19th century

Scientific journals were originally the public records of learned societies. Three scientific journals began in the 17th century. In France, the Journals des Scavans, edited by Denis deSalla, was published with only one interruption from 1665-1792 and greatly influenced the development of scientific periodicals. In Britain, the Philosophical Transactions of the Royal Society of London, edited by Henry Oldenburg, was first issued in March 1665 and became a model for publications of scientific academies. The first German scientific journal, Acta Eruditorum, edited by Otto Mencke, was published in Leipzig in 1682. Its main function was to announce new works of scholarship (Meadows, 1979).

During the 18th and 19th centuries, private companies began to publish scientific journals. The number of scientific periodicals also grew. In the 18th century alone, 74 new journals were created in Europe. In America, almost 250 journals were issued between 1779 and 1850 (Ebert, 1952).

2. Specialization into subject areas

Specialized journals began to appear as the sciences became more clearly differentiated. The Linnean Society, founded in England in

1788 for the study of biological classification, started a trend of specialization which has continued to the 20th century (Meadows, 1979). The earliest American medical journal, the Medical Repository, edited by three New York physicians, was issued in July 1797. Less than a decade later came the Philadelphia Medical Museum in 1804, and the New England Journal of Medicine and Surgery, which was first published in Boston in 1812 and survives to the present day, despite several title changes (Thornton, 1966).

3. Medical periodicals 1876-1980's

Examining nearly a century of medical publishing activity from 1876 to 1961, the growth in scientific documentation is clear (World Medical Periodicals, 1961). In the United States, medical periodicals increased from 46 to 839; in Great Britain from 29 to 326; in Italy from 31 to 498; in France and Algeria from 52 to 427; in Germany and Austria from 57 to 401; in the USSR from 6 to 115; and in Mexico 8 to 84. All told, medical periodicals increased from 229 to 2,690 over a span of 85 years (World Medical Periodicals, 1961).

Two major problems have resulted from this enormous growth and output: (1) large medical libraries are threatened by rising costs and shrinking storage space, and (2) researchers and clinicians are inundated with a vast literature and not the remotest possibility of being able to review all of the articles relevant to their discipline or subspecialty field.

In 1974, Science Citation Index (SCI) covered approximately 401,000 articles and communications in 2,443 scientific and technical journals, citing in all about 3.2 million different publications

(Garfield, 1980). However, a frequency-of-use study conducted in 1979 (Meadows, 1979) indicated a limit to the number of journals the scientist or physician finds useful. This study gave 10 as the maximum number of journals the average scientist can be expected to "keep up with" per year, 100 as the maximum number of journals that meet 90% of the needs of any reasonably specialized information center, and 1000 as the number of truly first class journals published in the world today.

B. Impact of Proliferation on Medical Profession

1. Life-long learning for physicians

How do physicians learn? What are their expectations in regard to continuing education? What role does the primary literature, including medical journals, have in maintaining the standard and quality of their practice of medicine? Much has been written about the learning habits of physicians. Motivating forces for the physician are the delivery of patient care, the quality of that care, and issues of institutional governance (Lloyd, 1979). Most physicians have inner standards for achievement and a need to validate their information and practice (Boissoneau, 1980). Thus, physicians participate in continuing learning experiences as much for their own satisfaction as for the influence of their peers or the need to comply with institutional regulations (Richards, 1980).

2. The three phases of medical education

Rapid increases in medical knowledge in the past two decades have caused the traditional concept of medical education, associated with a limited period of training, to wither in favor of a system that addresses the life-long needs of the physician for learning (Uhl,

1971). This so-called "life-long learning" concept has been emphasized and accepted by modern educational theorists. Lloyd and Abrahamson (1979) define the continuum of medical education to consist of three phases:

1. Undergraduate medical education (i.e., medical school)
2. Graduate medical education (i.e., internship, residency, specialty fellowship)
3. Continuing medical education (i.e., practicing physicians)

The third phase, Continuing Medical Education (CME), is a point of particular emphasis for modern educational theorists. It encompasses a wide variety of activities designed to maintain or improve performance in one of three areas: physician competence, physician performance, and patient health status. The majority of CME programs have focused on improving physician competence--what doctors can do. More emphasis is now being placed on physician performance--what physicians actually do--in efforts to improve the quality of patient care (Lloyd, 1979).

C. Approaches to CME--A Call for Reform

CME can be approached from several different levels of learning: individual, institutional, regional, and national. Four independent studies of CME, beginning with the Vollan Report in 1954, the Dyer Report in 1962, the Coggeshall Report in 1965, and the Millis Report in 1966, all concur that schools must assume institutional responsibilities for postdoctoral education as a continuum of the internship, residency, and lifetime career of the practicing physician. (Gunning et al., 1980).

1. The Vollan Report - 1954

Vollan defines postgraduate education as distinct from graduate medical education. According to Vollan, graduate programs prepare a physician for entrance into a specific field, whereas postgraduate education keeps the physician abreast in his or her chosen field. He describes five common ways in which physicians stay current in their field: reading, professional contacts, staff meetings, medical society meetings, and postgraduate courses. He also notes that, on the average, physicians spend 83, eight-hour days per year pursuing one or all of these activities. When physicians were asked to rank these activities in order of personal preference, reading was cited as number one; attending postgraduate courses was second.

2. The Dyer Report - 1962

Dyer proposes that a nationwide plan or partnership be implemented to organize the CME of physicians. Dyer suggests examination of the question, "What constitutes the true CME of a physician?" Further, he recommends that these ideas be translated into an administrative partnership. In Dyer's opinion, a serious gap exists between available knowledge and the application of that knowledge in medical practice.

3. The Coggeshall Report - 1965

This report initially focused on the problems and broader aspects of medical education, research, and service, as perceived and experienced by the Association of American Medical Colleges (AAMC). This report discussed the trends in medical education and implications for the AAMC. The report concluded that the university clearly needed

to assume increasing responsibility for CME, and identified the AAMC as the primary provider of guidance and leadership in that endeavor.

4. The Millis Report - 1966

The message of the Millis Report is that an effective system for medical education requires national direction. Millis states that the emphasis must shift from passive learning to self-directed learning, but in reality, the individual physician cannot discharge his or her responsibility for continued learning without garnering assistance from a system for postgraduate education (p. 109). He states that physicians seek CME opportunities for two reasons: (1) recognition that new information and technology have outstripped their formal medical training, and (2) an awareness of gaps or inadequacies in knowledge and skills because of gaps in basic training.

According to Millis, an almost limitless variety of teams, work groups, and partnerships exist to address the problems of health services and education of health professionals. Chief among them are the medical libraries, which can act as important partners to CME. Because of the wealth of their resources, Millis believed that libraries should serve as the acquisition point for materials provided by the medical school and as the distribution point of all such materials to local hospitals and societies. Moreover, designating the libraries as centers of learning would be a far more economic alternative to establishing and financing new centers.

D. CME Requirements and Assessment

1. Mandatory requirements--legislation

Subsequent to the publication of these reports, mandatory CME programs increased dramatically (Lloyd and Abrahamson, 1979). In 1970, no state required participation in CME for relicensure, but by 1977, 26 states had instituted such requirements. Many state medical associations today require CME for membership and 22 medical specialty boards require CME for recertification (Brown and Uhl, 1970; American Medical Association, 1981). However, this trend seems to have abated. Increases in mandatory professional education were noted between 1977 and 1979, but not in 1980.

As a legislative concept, "CME provides a handle on medical practice, and manipulation of that handle will result in direct and desirable effects on medical practice." (Stross and Harlin, 1978). The public demand for professional competence comes from an awareness of an increasing body of scientific knowledge, the possible obsolescence of the physician knowledge, and changing societal values. These concepts and demands are not substantiated in the literature; rather, CME is viewed to be poorly attached to medical practice and to have minimal impact on the practice of medicine (Stross and Harlin, 1978).

2. CME and quality of care

The debate continues over the values and cost benefits of mandatory CME. Mandatory attendance has been defined alternatively as an "Adventure in Pedagogy," a "Disaster in Pedagogy," or a "Cure for all Ills." The danger of mandatory CME is that the methods of teaching

will not be compatible with adult learning patterns or with identified physician and patient needs (Brown and Uhl, 1970).

A long-held concept that systematic exposure of physicians to new medical information will lead to increased physician knowledge is insufficiently documented (Berg, 1979). The evidence that CME assures quality is weak, but the association between CME and quality care or quality assessment is fairly strong. Eight research reports during the 1970's demonstrated that when physicians' learning activities were based on sound educational principles and participative methods, changes in performance were more readily documented. These studies also attempted to measure outcome in terms of patient care. The educational framework used in these studies stated the needs, goals, objectives, methods, and results of evaluation studies (Stein, 1981).

E. Changes in Medical Education

Thus, as medical educators began to emphasize the role of CME in postgraduate work and physicians began to perceive a need for continuing education, the medical library was viewed increasingly as a center and resource for learning. Too, the developing liaison between the library and the physician was a natural one, since reading was cited by most doctors as the preferred method of keeping abreast of the medical literature (Millis, 1971).

II. Clinical Librarian Program--A Response Toward Reform

A. The first CL Program--University of Missouri, Kansas City (UMKC)

In 1971, Dr. Gertrude Lamb asked the question, "Can the medical librarian with special skills and training in tested methods for approaching the medical literature serve as a valuable interface between the professional who is taking care of patients and the knowledge explosion in medicine wherein lies the key to better patient care?" (Lamb, 1975). With funding for a four-year demonstration research program from the National Library of Medicine, Dr. Lamb set forth to answer her question. She hypothesized that the clinical librarian can be an effective interface between the literature and the physician and that sharing the librarian's expertise with health professionals would serve to strengthen and focus the health professional's information-seeking skills (Lamb, 1975). The specific aims of her program were:

1. to be accepted as a working member of the patient teaching team;
2. to answer patient care questions quickly;
3. to affect, positively, the information seeking behavior of the health professional;
4. to deliver information to the health professional, and to develop a patient care information system.

Algermissen, who succeeded Lamb at the University of Missouri, Kansas City (UMKC), outlined three objectives of the UMKC Clinical Librarian Program (Algermissen, 1974):

1. to identify user information needs with 90% or better accuracy;
2. to judge, successfully, the pertinence of documents retrieved to the user's information needs;
3. to develop a usable document citation file.

B. Development and Diversity of CL Programs

A proliferation of programs appeared after Dr. Lamb's address at the 1973 Annual Medical Library Association Meeting at which she described the CL Program at UMKC. Among those institutions reporting initiation of CL programs were: Cook County Hospital, Chicago, 1973 (Roach, 1975); University of Washington Health Sciences Library, Seattle, 1973 (Schnall, 1976); and Cedars of Lebanon Hospital, Los Angeles, 1973-74 (Colaianni, 1975). The size of these institutions varied from the small teaching hospital, e.g., Cedars of Lebanon and Cook County Hospital, to the large multidisciplinary health science center, e.g., Yale (Greenberg, 1978), University of Washington, and UMKC. Most of the CL programs served only selected departments, with the exception of Lamb's program at UMKC, where all docent teams were served by the CL.

As the number of clinical librarian programs grew, the diversity among them also grew. In main, the differences were the type of institution, the time spent by the clinical librarian on the job (full-time vs. part-time), and the approach to the evaluation and assessment of individual programs.

III. Program Evaluations--A Literature Review

A chronological review of the literature illustrates the differences in approach taken at various institutions. Program evaluations were reported by some but not all of the libraries with clinical librarian programs. The procedures used for evaluation were similarly inconsistent. Table I (Appendix I) summarizes the evaluative findings of CL programs reported in the literature. These reports illustrate the relative ease and speed with which successful programs are documented, as well as the uniqueness of each program. A major difficulty, however, in making interprogram comparisons is the lack of standardization with respect to instruments used for measuring change and definitions of terms.

A. Stages of the Evaluation Model

Before discussing the process of program evaluation, standard definitions are required. Standardization insures that all persons engaged in the activity of evaluation have a common basis for communication. It also permits cross comparisons to be made of different evaluation studies.

Key concepts in any Program Evaluation are (Suchman, 1977):

1. a planned program of deliberate intervention, not an accidental incident;
2. an objective or goal which is desirable and has a positive value;
3. a method for determining the degree to which a planned project achieves a desired objective;

4. an attempt to find out "why" a program was or was not effective.

The Evaluation Design directly affects the credibility of the evaluation (Morris, 1978). Included in this design are the measures, or tests and questions, that will be used and a clear delineation of the group to whom they will be administered.

The Evaluation Model sets the limitations and the definitions. For example, the "goal attainment model" (Schulberg, 1977) forms the basis for many of the CL program evaluations reported in the literature (Appendix I). It can be described as a circular process comprised of: (1) goal setting, (2) determining measures of the goals, (3) collecting the data, (4), appraising the effects of the planned intervention on the goals, and (5) modifying the initial goal on the basis of the data gathered.

Morris, in 1978, proposed a model for program development and evaluation that is applicable to new or ongoing CL programs. According to Morris, program planning falls naturally into four stages: (1) Needs Assessment, (2) Program Planning, (3) Formative Evaluation, and (4) Summative Evaluation. The four stages represent a continuum of events, whose evolution is not necessarily distinct (Morris, 1978).

Morris's model presents program evaluation as the processing of selecting, collecting, and interpreting information for the purposes of keeping an audience, such as administrators, clinical librarians, and health care teams, informed about a program. Most reports describing evaluation of CL programs have used part or all of this model. The expanded model presented in Figure 1 (Appendix II) is designed around

CL program evaluation and illustrates the step-by-step approach to evaluation discussed in Chapter 3 of this thesis.

1. Needs assessment

The first stage of program planning, Needs Assessment, involves defining the target, stating the goals and objectives of the program, and establishing the criteria for success. In the case of the CL programs, the target definition may be derived from an observer's opinion or a formal survey of clinicians and house staff. Data regarding the information needs of the health care team, for example, are collected and then put in the form of a statement of needs. The literature gives numerous examples of such statements. For example, at UMKC, in her initial grant proposal, Dr. Lamb requested funds to "plan and evaluate a program to meet the biomedical communication needs of medical students, house officers, physicians, and health care team members in a representative general hospital." The planners of the Yale CL program were less formal with their intentions, stating simply that the CL program was "seen as the best extension service the library could provide in an effort to meet clinical information needs..." (Greenberg, 1978).

In setting the goals and objectives of a program, one must define the specific behavioral objectives. What behavior is to be changed? How is it to be changed? How long will it take to effect this change? What direction is the change to take, positive or negative?

Finally, by defining the criteria for success, e.g., meeting user information needs 90% of the time, future program comparisons can be made with other CL programs.

2. Program planning

The planning stage of our model concerns all of the administrative aspects of the program including developing an outline of the steps of the evaluation process. This is, in effect, the specific study design or plan of action. Included in this outline are the CL's work schedule and a complete accounting of the information, materials, personnel, and other resources required to accomplish the stated goals, as well as a time schedule within which to complete certain phases of the program. Procedures and policies also are formulated at this stage.

3. Formative evaluation

The third stage is really one of preliminary study, in which a pilot study is conducted to develop and test the study design. The goal of formative evaluation is to remedy the possible detrimental effects of fuzzy thinking on the part of the program planners.

During the "early stages" of the UMKC program (equivalent to the formative evaluation stage of our model), the CL worked closely with the health care team, but remained, for the most part, in the library. Gradually, as the health care team developed confidence in the CL, the CL began to attend rounds and conferences and to participate more actively in interactions with patients (Algermissen, 1974).

When possible, someone from outside the library or medical center is selected to be "the evaluator" during the formative evaluation, in order to prevent bias in the data and permit objectivity. The job of this individual is to monitor the effectiveness of the study design by collecting and sharing information with library administrators and the clinical staff. For example, the evaluator may select a target set of

characteristics and monitor them periodically through the use of tests or questionnaires. These data are then processed and the program altered to correct errors in conception, planning, or design.

4. Summative evaluation

The summative evaluation is based on information generated from the formative evaluation. It is a measure of the overall value of the program. The difference between the summative and formative evaluation is the audience to whom the information is directed and the evaluator's relationship to the program. The summative evaluation often is presented as a formal, written report to those who will judge the merits of the program and then determine whether to continue it, to abandon it, to expand upon it, to market it elsewhere, or perhaps whether even to fund it. Some of those who may judge the merits of such a program are the Library Director, Dean of Medicine, Library Board Members, Vice President, or Hospital Administrators.

Only established criteria are used during the summative evaluation. The summative evaluator must write a report showing what the program looks like and what has been achieved. The complete objectivity of the summative evaluator is reflected in his or her ability and freedom to report negative results if any have been found.

B. Levels of Evaluation and Data Requirements

Data can be divided into three basic categories, namely, INPUT, PROCESS, and OUTPUT/OUTCOME. INPUT data include the summary of all of the variables of the study, that is, the inventory of resources available, the job description of the CL, and the qualification criteria for selecting the CL, etc. PROCESS data consist of

information that is collected after the program (preliminary or actual study) has begun. PROCESS data can include information about the population exposed to the program, descriptions of actual transactions, monthly reports, accounts given in diaries and journals, and documentation of problems encountered. OUTCOME/OUTPUT data indicate the positive and negative results of the study.

Data used in the formative and summative evaluation can be described primarily as INPUT and PROCESS data. OUTPUT/OUTCOME data are not generated until the formal study is well under way, and cannot be analyzed until the study is complete.

C. CL Program Evaluation - Data and Conclusions

1. UMKC

The original UMKC Clinical Librarian Program (CL), directed by Dr. Gertrude Lamb, was funded by the National Library of Medicine (NLM). However, Dr. Lamb moved to Hartford Hospital in Connecticut, in 1974, before the program at UMKC was complete and subsequently received more monies from the NLM as well as from the U.S. Public Health Service to establish a second CL program at Hartford Hospital.

The UMKC CL program was continued by Ms. Virginia Algermissen. Under her direction, the three CL's worked closely with three docent units, teams similar to clinical care teams, which served a 22-bed inpatient unit and 15,000 to 20,000 outpatients. Four major hypotheses were tested at the end of the third grant year. The first three concerned the effectiveness of the CL, the fourth concerned identification of a core of quality journals. Statistics collected included total database searches, turnaround time, number of users,

circulation, and number of photocopies made. No outcome data were reported.

2. Hartford Hospital

At Hartford Hospital, three departments were served by a CL: Surgery, Pediatrics, and Medicine. Formative evaluation data (monies, personnel, initial acceptance, and time spent by CL on job and materials used) were collected. Each CL kept a diary with notes recording the expressed information needs of the clinical staff and personal impressions of the program's acceptance. The number of transactions and articles requested were tabulated. The summative evaluation included conclusions concerning acceptance, educational contribution, anecdotal data concerning the influence of the program on management of patient care problems, and documented ways in which health professionals sought information. Outside evaluators were not used; much of the information was anecdotal, taken directly from the CLs' logs and journals. No outcome data were reported (Lamb, 1975).

3. Cook County Hospital

The Cook County program, which commenced in 1973, was based on Dr. Lamb's NLM report. The stated purpose of this program was "to meet the patient care and educational needs generated by the program." The target audience was the diverse health care workers of the Department of Pulmonary Medicine. One medical librarian attended rounds and the special weekly seminar which oriented physicians to various topics in pulmonary medicine. The evaluation continued for one year. Data gathered included: number of searches performed, number of short bibliographies, and number of articles collected and on file. No

outcome data were reported. A survey of participating physicians was taken, and the conclusions of this survey, according to Roach (1975), indicated an increase in physician awareness of the library service. The librarian who provided services to the department also evaluated the services. No outside evaluators were used. The cost of the program was not reported (Roach, 1975).

4. Washington University School of Medicine

In the Washington University program (1974), conducted at the School of Medicine in St. Louis, Missouri, the CL attended residents' report and was responsible for gathering information for 39 residents. A generalized evaluation, including both formative and summative components, did take place. Data collected over a six-month period, mainly at the process level, included the number of subject searches, MEDLINES, and manual searches, and the cost of photocopying. Outside evaluators were not used. Time spent by the CL at residents' report was not stated, nor was the number of librarians involved given. The total cost of the program also was reported. Cost to the library for the service from January to March 1975 averaged \$661/month, or \$17.00 per month per resident. A questionnaire was sent out with the literature searches, but only 193 of 334 were returned (58%). The results of these were reported.

A more interesting aspect of the Washington University evaluation was an oral survey completed by 16 of the 39 residents involved in the program. These physicians were interviewed concerning the cost, perceived purpose, and future expectations of the service. Results of this survey showed that the residents used the service to help in the

preparation and presentation of papers. Library use increased only with those residents who had direct exposure to the CL. However, when asked if they would pay for this service, the residents responded negatively, indicating that the school should pay for such educational support services (Staudt, 1976).

5. Cedars of Lebanon Hospital

The Cedars of Lebanon Hospital program (1973), an affiliate of the Cedars-Sinai Medical Center in Los Angeles, modified Dr. Lamb's program to fit a small hospital setting. One librarian attended weekly teaching rounds in surgery, pediatrics, and obstetrics/gynecology. During rounds (1.5 hours), the CL noted 3-8 questions of a clinical nature and subsequently followed up with answers for the health care team in the form of an article, often within two hours. The librarian's total time spent as a clinical librarian was 3.5 to 4 hours a week. Clerical and photocopy support were allocated by the library. A formative evaluation, derived mainly from anecdotal information, was given regarding the benefits received by both librarian and physician. The evaluation consisted mainly of input and process data; other data were not published, nor were the actual costs reported.

The stated goal of this program was to seek "more meaningful ways in which to make its services available to health professionals." In this program, the "evaluations made by the physicians indicate that the program has immense educational benefits which cannot help but be reflected in improved patient care." (Colaizzi, 1975).

6. University of Washington

This program began in July of 1974. Two librarians from the reference department of the University of Washington Health Sciences Library began attending hospital rounds to provide specialized literature service. The CLs visited the Neonatal Intensive Care Unit (NICU) three times a week and the Department of Orthopedics twice a week. Eight months after the service began, a questionnaire, evaluating the effect of the program, was sent out to everyone who had attended NICU and Orthopedics rounds. Information elicited concerned the perceived clinical value of the CL literature service and whether it would be of value to have the CL service available at rounds or merely in the library. Guidelines for a limited CL service were developed from this (formative) evaluation. Photocopying and clerical support were deemed necessary. A detailed cost report also was presented in the 8-month report (Schnall, 1976). This service reported an increase in the users' "awareness of the Health Sciences Library."

7. Yale University School of Medicine

In the spring of 1974, Yale Medical Library adapted its CL program in response to user needs. The stated objectives were: (1) to rapidly provide documents to clinical librarians, (2) to influence clinical librarian information-seeking behavior for case-related information, and (3) to establish the clinical librarian's role as a member of the patient care team. Four librarians were assigned to the Pediatrics, Psychiatry, Internal Medicine, Neurosurgery, Orthopedics, and Surgery/Urology services at the Yale-New Haven Hospital. Data included both formative and summative information. Input data included a record

of time spent on the program (43 hours per week among the 4 CLs). Process data included the number of requests per month, the number of MEDLINE searches, and a record of the manual searches (Greenberg, 1978). The results of the questionnaire survey were used to justify the continuation of the CL service.

8. Beth Israel Hospital

At this community hospital in Boston, Massachusetts, a service called Clinical Information evolved from the CL service. The five components of this service were: (1) an automated clinical file, (2) a CL service, (3) a departmental librarian, (4) edited material for the patients, and (5) manuscript preparation service. This program is reported in the literature as a descriptive study, and gives no measurable variables at the input or process level. Thus, no real evaluation was performed for comparative purposes. However, the report contains interesting information and is worth reviewing (White, 1980).

9. McMaster University

McMaster University received a one-year grant from the Ontario Ministry of Health to "examine the role of the clinical librarian in providing information to patient and health professional." A pilot study was undertaken to test the methodology in 1975. This preliminary study was initiated in the gastroenterology program. Approximately 50 health professionals were involved. No "formal" or summative evaluation was made in the pilot program. The formative evaluation consisted of feedback from health professionals and patients concerning the program's usefulness. Comments and suggestions provided the only

guidelines for the formal program. The summative evaluation data were collected, starting in 1978 when a second grant was awarded.

This represents the first study which utilized an outside evaluator and attempted to validate the outcome measures. This group measured the information-seeking habits and skills of the health professionals after exposure to the clinical librarian. A control group was used. During the formative evaluation, the pilot study, input, and process evaluation were done. The summative evaluation was then undertaken. A final report of the data is pending (Marshall, 1979).

10. UCLA

In 1976, the University of California, Los Angeles instituted a CL program in which the CL served as a member of the patient care team in the department of obstetrics and gynecology (OB/GYN). The stated objective of this program was to "expedite information exchange between librarian and user." A before (1976) and after (1978) study attempted to measure the increase in the use of the library and library services by the members of the OB/GYN department. The study design intended to promote use of the library by supplying bibliographies (not photocopies of articles). Formative evaluation was reported at the input and process level, with output measures of increased consultation and MEDLINE services. No outcome evaluation data were collected. The authors of this report noted that the "effect of the program on the quality of care is difficult to assess." (Gunning, 1980).

11. Framingham Union Hospital

A modified CL program was initiated in 1978 in a 309-bed community hospital in Framingham, Massachusetts. At this hospital the LATCH program (Literature Attached to Charts) was combined with the CL program. In the LATCH program, a forerunner to the CL program, the librarian delivers information to the patients' charts, where it is used by all for information and patient care.

At Framingham Union, the CL attended morning report of the medical service, but not rounds. Cases of newly admitted patients were presented at report. The librarian was given specific problem-oriented questions, and then retrieved, analyzed, and delivered pertinent information to the patients' charts. This approach facilitated information transfer quickly and effectively to patient care providers. The information was also useful to the patients and their families.

Evaluation data generated included the amount of time it took to collect information, the number of librarians involved, and although not specifically stated, baseline data and the amount of increase in requests since the program began (Clevesy, 1980).

12. Other reports

An interesting outcome study, perhaps adaptable to other CL programs, is the computerized medical information system developed at the Wishard Memorial Hospital in Indianapolis. A computerized medical record system was designed in the General Medical Clinic to note and remind the responsible clinician of clinical events that required corrective action. Test orders and treatments were adjusted more quickly as a consequence of this system. When medical literature

citations were added to the computerized message, however, the response rates of clinicians did not change, nor was the physician stimulated to read selected articles in the immediately available library of reprints. No effects on physician's practices or self-education were seen. The authors concluded that physicians have built-in sets of decision rules (imprinted decision pathways) that are not easily changed or influenced (McDonald, 1980).

One question arising from the Wishard study is whether the status level of the clinician (e.g., resident or intern versus attending) influences the use and effect of the CL programs. Do faculty or department chairmen have more inflexible, imprinted decision pathways? If so, will exposure of medical students to the CL programs yield better results with respect to improving information seeking behavior?

Farmer, at Guy's Hospital, London, attempted to document the extent to which clinical librarians influenced the information seeking habits of clinical teams and the teams' management of patient care problems. Farmer died before the final results were published (Farmer, 1977).

D. Evaluation Deficiencies

Some deficiencies or unsatisfactory features of an evaluation include: inconsistencies, or lack of a common framework and definitions; parochialism, in which the program planners know only their local system; relativism, or lack of evaluation of the stated goals; informalism, a casual acceptance of impossible or unreliable claims and other incidentals (Scriven, 1969). Referring again to the table of program evaluations in Appendix I, it is apparent that most of the CL

programs to date have suffered to some degree from each of these evaluation deficiencies. Although each CL program is by necessity unique due to the various educational and research requirements of individual institutions, these deficiencies can be minimized if data are collected and reported in similar ways at similar time intervals.

Parochialism: This is perhaps the most understandable deficiency in that the CL concept was new when each of these programs was initiated. Nevertheless, the program planners can, at least, follow a defined format for data collection and reporting.

Inconsistencies: This deficiency was rampant. Some programs recorded costs (Hartford Hospital, Washington University, McMaster, University of California, Los Angeles (UCLA), and so forth (INPUT column Table I, Appendix). Some programs did not report costs (Cedars of Lebanon, Yale, Texas Tech). Program evaluation length ranged from 6 months to 3 years. Yale did not state, specifically, the length of the evaluation period.

Relativism: Several programs did not evaluate their stated goals.

Informalism: This is a common feature of programs which have many variables. The objective of the CL programs, which fits the description of informalism, is that concerning the desired impact of the CL program on patient care. UMKC concluded that their program could not "quantify the impact on student learning and patient care." UCLA noted that "the effect of the program on quality care is difficult to assess."

E. Methodology

Methodology, especially in sampling, is another area requiring assistance and strict adherence to prescribed procedures. A statistician may be required if knowledge in the area of sampling techniques is lacking. Errors in sampling can give rise to study bias, one of the most important sources of error in all scientific research. For example, in the Yale CL evaluation, the librarian designed a questionnaire to elicit certain information to test the effectiveness of the original objectives. The questionnaire was distributed only to clinicians who agreed to participate in the in-depth evaluation. Only 53% of the clinicians who were eligible to participate actually participated (i.e., those who had had contact with the clinical librarians). Of those, only 74% returned the questionnaire. Two basic principles to avert bias in this evaluation were ignored: (1) they failed to use outside evaluators and (2) they did not use systematic sampling techniques. The librarians, themselves, contacted the clinicians and only those willing to participate were given a questionnaire. Because this sample represented only 53% of the eligible participants, the results were therefore biased and, most probably, an inaccurate representation of the total response to the CL service.

F. Summary

The underlying assumption of all CL programs is that physicians who are well informed make better patient care decisions. The literature concerning CME of physicians confirms this assumption and the need is perceived by physicians as well. Thus, the outcome criteria--to have better-informed physicians, to improve the

information-gathering habits of physicians, and to increase the physicians' exposure to the medical literature--are viable and important. However, the focus for outcome criteria should be placed on items that are measurable. Patient care improvement is difficult to measure due to the great numbers of variables that must be controlled. The CL programs are perceived by the health care team as important for the verification of diagnoses, for the confirmation of decisions on treatment, and for an aid in keeping abreast of the medical literature. To document these OUTCOMES of these programs at several different institutions could provide justification for more CL programs or for the continuation of existing programs. It is reasonable to assume that incremental progress in documentation can and will be achieved if all CL programs set and use standard criteria.

CHAPTER 2

PURPOSE AND GOALS OF THE RESEARCH

I. Purpose of the Study

The purpose of this study was to evaluate the effects of a clinical librarian program before and after the introduction of a clinical librarian (CL) to a clinical care team. The evaluation was based on a model developed expressly for CL program evaluation. The CL program evaluated in this thesis began in 1978 at the University of Texas Medical Branch (UTMB) Library at Galveston and followed the evaluation model and reporting of results.

The characteristics of CL programs, which began in the early 1970's in the United States, have been marked by great diversity, dependent in large part on the institution, hospital, or academic center served. The CL program has been perceived by many health care teams as a useful resource in the delivery of clinical-care information, whereas it has generally been considered a useful educational and informational resource by most librarians and administrators. Because each CL program has evolved in a unique setting, each also has developed a unique set of criteria for evaluating and reporting program results. This research was undertaken in response to an observed need to develop a model for CL program evaluation that would permit standardization and subsequent program comparisons.

II. Evaluation Process

Only nine CL programs have reported engaging in an evaluation process (Appendix I). The uniqueness of each particular health-care setting and the quantity and quality of available resources, such as the size and scope of the book and journal collections and allocated budgets, go far towards determining the structure of a particular CL program. Program evaluations subsequently are affected by these factors. In addition, the program evaluation is closely related to the nature of the initial program objectives and should be designed to assess the following questions.

- * What were the initial objectives?
- * Were the objectives stated in a measurable way?
- * Was it intended that the clinical librarian have a positive affect on the information gathering habits of the clinical team and on patient care?
- * How were the results of the program measured?

In the evaluations of CL programs reported in the literature, data for the input and process levels of evaluation are most complete (see below). These data include documented increases in services such as MEDLINE (the computerized bibliographic database from the National Library of Medicine), but the reporting is inconsistent. Definitions of terms vary widely; for example, a clinical librarian may be defined in one program as a person who spends forty hours a week in the clinical setting or hospital, whereas in other programs the position is divided equally between the library and the clinic. Standardized definitions are important if one is to make comparisons. Statements of

program objectives often are vague, non-specific, or non-existent, and much of the valuable or sought-after information regarding the effect of the program on patient care is anecdotal at best.

The evaluation method followed at UTMB (Appendix II, Model for Clinical Librarian Program Evaluation) consisted of four basic steps: (1) define the target, (2) state the specific objective, (3) define the outcome criteria, and (4) specify the study design. A preliminary study was performed before the full study and yielded a tight summative study to test the objectives of the CL program.

III. Goals and Objectives of UTMB CL Program

The following goals and objectives were established at UTMB for implementation and evaluation of the Clinical Librarian Program.

A. Hire, develop, and retain competent staff

- a. Recruit the best qualified persons within six months of announced opening, according to State and National standards, to serve full time in a specific clinical department.
- b. Orient all new Clinical Librarians to the library and library resources within one month of employment.
- c. Schedule the new CL on the approved clinical service after one month of in-house orientation.
- d. Provide continuing education opportunities to CLs.
 - * online database training, if needed in Dallas or Washington

- * local bibliographic on-line search course
 - * computer searching--in-house training sessions
 - e. Distribute clinical orientation packages for new CLs to read as a self-study guide.
 - f. Formally evaluate the CLs' performance 30, 60, and 90 days from the beginning date and twice yearly thereafter, with informal evaluation as the need arises.
- B. Identify information needs of the clinical care team.
- a. Attend rounds once a week.
 - b. Seek out the working environment of the potential user.
 - c. Attend scheduled conferences and grand rounds.
 - d. Record specific questions from team members.
 - e. Ask specific questions daily to determine unmet information needs.
 - f. Determine general information sources used by team members for their information needs within one month of their arrival at the unit.
 - g. Determine sources used by team members for specific patient care information needs.
- C. Meet the information needs of the clinical care team.
- a. Deliver information requests directly to hospital or clinic team member within 8-12 hours.
 - b. Search the literature and outline computerized bibliographic data bases daily.
 - c. Select appropriate materials to answer each question.

- d. Review materials for difficult or comprehensive topics to select the most appropriate material.
 - e. Trace earlier literature through reference lists in current articles.
 - f. If needed, reformulate search with more information or better understanding of problem within 24 hours of first search.
- D. Supply documents and deliver information.
- a. Deliver articles within 24 hours--single photocopies--no duplicate articles.
 - b. Update files with new information weekly.
 - c. Check out materials (not able to be copied) from library and deliver to user or instruct user to do so.
 - d. Supply bibliography, if needed, to enhance search.
 - e. Arrange transfer points and make backup arrangements (mail boxes, current literature files, secretaries).
- E. Evaluate the information service.
- a. Request informal, immediate verbal or written feedback from the team members.
 - b. Disseminate questionnaire forms to determine baseline information-gathering behavior of new users--collect completed questionnaires within a week.
 - c. Distribute a form to evaluate articles delivered to new users, to be collected within a day of receipt.

- d. Request periodic meetings with the heads of clinical units served to provide direction and suggestions for improving services.
 - e. Conduct periodic formal interviews by an outside evaluator with the groups served by the CL.
 - f. Keep track of events occurring each month and pass along significant progress or changes to the Chief Clinical Librarian for inclusion in a monthly report to the library administration.
 - g. Collect data each month to indicate specific level of service and specialized projects. Statistics are gathered separately for each group served by CL.
 - h. A monthly narrative describing specific progress is written by the CL for each group served.
- F. Publicize the CL service.
- a. CL fact sheets describing the service and business cards are distributed to all users.
 - b. Articles and news notes are published in the library campus publications.
 - c. CLs strive to make their presence and functions known in the clinical and hospital environment.
 - d. Assure quality service to users, as this will bring the most publicity.

- G. Educate the users and positively affect their information-seeking behavior.
 - a. CLs determine the level of library skills for their medical/surgical division with the cooperation of faculty and administration upon first arriving.
 - b. CLs teach formal library use training sessions regularly and enlist assistance and support of divisional administration to guarantee attendance before conducting formal instruction.
 - c. CLs give informal one-on-one or small group training on a daily and weekly basis.
 - d. Semi-monthly training programs are conducted by the library education coordinator.

IV. Desired benefits of CL Program

- 1. The information needs of the health care team will be identified.
- 2. The information-gathering habits of the health care team will be identified.
- 3. An information service (CL) will be developed which will meet items 1 and 2 above.
- 4. A core list of divisional documents and sources will be established from the documents collected and filed.
- 5. An easily retrievable cumulation of problem-oriented, patient-care documents will be established and kept in close proximity to those who require access to it.

6. Education courses and specific library orientation will be presented to members of the health care team to assist them to perform their own literature search and material retrieval.
7. Specific cost estimates and guidelines for resources to support the CL program will be established.
8. The program will gain full acceptance by the library staff and the medical care team served.
9. The time required for patient-care information will be identified and met by the CLs.
10. An evaluation model of this program will be established which can act as a model for other CL programs.
11. An attempt will be made to establish what use the health care team makes of the information provided by the CL.
12. The program will measure the impact of this information on patient care. What impact does this information have on patient-care outcome?
13. The process of the CL activities will be documented.
14. The cost effectiveness of the program will be determined.

V. Research Questions and Hypotheses

Based on the goals and objectives listed above, the present program evaluation addressed the following questions and hypotheses as they applied specifically to the UTMB Clinical Librarian Program.

1. What is the attitude of the health care team toward the clinical librarian who services their information needs?

H_0 No attitude difference is observed between those health care team members exposed to the CL and those not exposed to the CL.

H_1 The attitude of the health care team toward the CL is more positive after exposure to the CL for measured periods than before.

2. Does the presence of the CL in any way influence the information-gathering habits of the health care team?

H_0 The information-gathering habits of the clinical care team members are not influenced by the CL.

H_1 The information-gathering habits of the clinical care team members are more positive after exposure to the CL than before.

3. Does the presence of the CL affect the availability of information to the clinical care team members?

H_0 The quality and availability of information to the clinical team members for patient-care problem evaluation is not measurably affected by the CL.

H_1 The quality and availability of information to the clinical care team members is greater after exposure to the CL.

4. An easily retrievable pool of problem-oriented, patient-care documents is established by the CL for use by the clinical care team.

Is this pool of information satisfactory? Do the health care team members find it useful?

H_0 The retrievability and usefulness of problem-oriented patient-care documents delivered to the patient-care team do not increase or improve after exposure to CL service.

H_1 The retrievability and usefulness of problem-oriented, patient-care documents delivered to the patient-care team are greater after exposure to the CL than before.

5. The clinical librarians use the library as a resource to answer clinical care questions. Does this increased use of the library add or detract from the physician's use, knowledge, or appreciation of the library?

H_0 Personal use of the library by the clinical care team members does not change after exposure to the CL.

H_1 The personal use of the library by the clinical care team members is greater after exposure to the CL than before.

6. An important aspect of the clinical librarian's job is to assist and educate the clinical care team to perform their own literature searches, retrieve relevant materials, and become better informed and efficient users of the library.

H_0 The clinical care team members knowledge of current literature and library resources is unaffected by exposure to the CL.

H_1 The personal use of the library by the clinical care team members is greater after exposure to the CL than before.

7. Another impact or consideration of extreme importance is cost effectiveness. The amount of change can be compared with the total cost of the program, staff, materials, supplies, and other costs. A prediction for many CL programs is that there will be a positive change relative to cost.

H_0 The cost of delivering information retrieval services is not affected by the role of the CL.

H_1 The cost of delivering information retrieval service is positively influenced by the role of the CL. Costs are decreased.

8. Does the CL program have an impact on patient care?

H_0 Patient care is not affected by the presence of the CL.

H_1 Patient care is positively affected by the presence of the CL.

H_2 Patient care outcome measurement is at best inferential.

VI. Summary

By far the most challenging question asked of this research is whether the CL program at UTMB had a measurable effect on the quality of patient care. For all CL programs, the underlying assumption has been that the better informed the physician, the better the patient-care decisions he/she will make. However, attempts to measure this effect of CL programs have been few and the results inconclusive, due largely to the many variables that must be controlled and the anecdotal reporting of program results. The CL program is perceived by the health care team as an important tool for verifying diagnosis, confirming treatment decisions, and aiding the physician and other

health care team members to keep abreast of the medical literature in their specialty area. Documenting these outcomes at several different institutions would provide justification for the continuation of existing CL programs and the implementation of new ones.

CHAPTER 3
METHODS AND PROCEDURES

I. Variables

The following major variables were identified in the program evaluation model.

Independent variable: The independent variable was defined as the exposure of the clinical care team member to the clinical librarian. The date when the CL was first introduced to a particular clinical care team was controlled. The dependent variables were thus measured both before and after exposure to the CL.

Intervening variable: As much as possible, other intervening variables were controlled. As with all experiments, however, there were extraneous or nuisance variables, which could not be controlled, including prior exposure of a clinical care team member to a CL program elsewhere during training or at another institution; colleague influence, positive or adverse; and the rank of the clinical team member (the positive attitude of a higher ranking member of the clinical care team member might be an intervening variable).

Dependent variables:

1. Attitude toward the CL as a non-M.D. or other health care professional, i.e., attitude toward the librarian attending rounds.
2. Frequency of use of information resources used by clinical care team member for general information purposes.
3. Frequency of use of information resources used by members of the clinical care team for patient-care-related questions.

4. Availability of documents needed to address specific clinical care questions to clinical care team members.

5. Knowledge of library resources needed for answers to clinical care questions.

6. Use of library resources by clinical care team members.

7. Changes in reading habits as identified by individual journal subscriptions.

8. Subject areas of importance as perceived by clinical care team members (to ascertain if CLs are subject prepared).

9. Frequency of use of UTMB library for patient care and other relevant information needs.

10. Frequency of computer database searches performed by the librarian.

11. Impact on patient care by clinical care team members.

II. Operational Definitions

Qualifications of the CL participants, makeup of the health care team, and descriptions of the library staff, facilities, and structure are defined below.

Clinical Librarian: a person with a B.A., preferably in the sciences, an M.L.S. from an ALA accredited library school, and experience (1 to 3 years) in a medical reference service. MEDLINE training or familiarity with online bibliographic searching preferred. The CL works full-time in a hospital with an assigned health care team as an information service specialist, and reports directly to the Department Head of the Clinical Librarian Services, who in turn reports to the Associate Director.

The Physician and Health Care Team: those members of the University of Texas Medical Branch staff who attended to patients on a particular clinical service. Typically, a clinical team consisted of the attending physician, a member of the UTMB Faculty of Medicine, the resident currently assigned to that service, often the chief resident; the interns, two to four UTMB medical students (each assigned to a particular patient on the clinical service), the nursing staff, and, occasionally, occupational therapists, physical therapists, physician's assistants, and often a consulting physician. The total number of individuals per team was approximately 15. Each clinical service had its own team similar to that described above.

Library Resources: the holdings of the Moody Medical Library (i.e., books, journals, and audiovisual software). Also included in this definition were those materials not available in the library but obtainable through the local, regional, and national network lending programs (Interlibrary Loan). Library resources also included ancillary facilities, such as the photocopy center and computer terminals for bibliographic online data base searching. During the UTMB program evaluation, all online data base searching for current data indexed by the National Library of Medicine (MEDLINE) was conducted free of charge.

Library Organization and Administration: The organization of the library and administrative structure was hierarchical. The Associate Director for Public Services (ADPS) hired the CLs and acted as the "outside" program evaluator. The head of the CL Department reported to the Associate Director (PS) for general library policies and procedures

and general administrative functions. The head CL supervised the other CLs and support staff. The CLs had offices within the library as well as in the clinical departments. The CL used the library resources and facilities, including the computer terminals and photocopy machines, continually while fulfilling their job responsibilities. The CLs worked closely with the Library's Reference Department Data Base coordinator, who arranged the scheduling of the data terminal facilities and the coordinator of data terminal ID assignment and machine maintenance contracts. The reference librarians assisted the CLs if needed and worked closely as backup for the CL staff. The CL also assisted the Reference Staff by accepting occasional weekend duties.

Evaluation Model: the fixed format derived for the examination of this and other clinical library programs. The evaluation conducted at UTMB was continuous. A protocol and time schedule within which to perform the objectives was prearranged. The evaluation forms were distributed prior to program initiation and collected within a week.

The Evaluator: The evaluator was responsible for questions, results, and analyses of the CL program. The Evaluator was a non-participant in the CL program, in this case, the Associate Director of Public Services. Although ideally this person should come from outside the library altogether to avoid bias in data collection and interpretation, financial constraints determined this choice of evaluator.

Clinical Departments: The clinical departments were those departments in the hospital and medical school directly involved with

patient care. The departments and staff were under the administration of the Dean of Medicine and the Associate Vice President for University Hospitals. Some departments were divided into Divisions, for example, the Urology Division of the Department of Surgery. Clinical departments were chosen arbitrarily. Departments participating in this program evaluation were: Pediatrics, Internal Medicine, Surgery (Division of Urology), and Family Medicine. The chief of the Urology Division, Dr. Michael M. Warren, participated in the pilot program for CLs at UTMB. The Urology Division was selected for the preliminary study, not only because of its smaller staff size and patient load, but also for the enthusiasm of the Division Chief.

Information Needs: the set of facts or figures or relevant details perceived by the individual to be determining pieces of information needed to answer questions or express outcome. These information needs were satisfied or supplied from documents or other literature or special subject reports. They were also satisfied by consultation with experts of other persons knowledgeable in the area.

Information Gathering Habits: the methods of approach an individual uses to satisfy his or her information needs. The places visited and the material or persons contacted are part of the individual's information-gathering habits.

Core List of Journals: a compact listing of titles of journals, which together provide most of the information needs.

Documents: printed items used to provide information, such as original articles, abstracts and indexes, directories and handbooks, and so forth.

Library Education and Orientation: instructions and other explanations given to individuals so that they understand what resources are available and how to use them. This library education and orientation was designed specifically for the users of the Moody Medical Library at the University of Texas Medical Branch.

Patient-Care Information Needs: information needed to answer questions concerning patient care.

General Information Needs: information used by the clinical care team member to answer questions indirectly related to clinical responsibilities or research interests. These general information needs do not consist of hobbies or outside interests.

III. Research Design

This study was designed as a prospective pre/post test time series. Due to the small sample size, random sampling was not possible. All the data were enumerated for final analysis. The initial data (independent variable no. 1) were collected before the clinical librarian was introduced to the clinical care team unit (dependent variable). After the CL had become a part of the team and a specified period of time had elapsed, the post-set data were collected (independent variable no. 2). This procedure was followed for each participating Department or Division. Table I shows the timing of the pre and post data collections in the four participating departments. Because introduction of the CL (dependent variable) was staggered, one group acted as a control group for the next. That is, Pediatrics (oo^b) served as the control for Internal Medicine (oo^c), Internal Medicine served as the control for Family Medicine (oo^d), and so on. In this

TABLE 1
PRE AND POST DATA COLLECTION
DEPARTMENTS TESTED AND CONTROL GROUP EFFECT

Department	Time 1	Time 2	Time 3	Time 4	Time 5
Urology	00	01			
Pediatrics		00	01		
Internal Medicine			00	01	
Family Medicine				00	01

Pre = 00; Post = 01. Pre test scores (00) of the Pediatrics Department served as the control values for the Internal Medicine Department.

way, learning experience, or other intervening variables, could be compared with the baseline data of the control group. The time sequence is shown in Table 1.

In addition, other measurements for library use and cost accounting were made. The daily and weekly use statistic sheets were cumulated monthly. Costs incurred for clinical library services were kept and reported annually. These costs included librarian and staff salaries, MEDLINE and other data base charges, the cost of equipment, supplies, and operating resources. These instruments provided data for determining changes in attitude toward library use, as well as the health care team's perceptions of the CL program.

IV. Instruments

A questionnaire was used as the instrument to collect the pre- and post-test data (Appendix III). Initially, all of the participants in the UTMB CL program were requested to complete the questionnaire. These data were collected by the program evaluator before the clinical librarian began working with the CL. After a specified period of time, post data were collected using the identical questionnaire. The questionnaire (Appendix III) was comprised of three sections: a general introduction; a data sheet for the respondents name, department, and the date administered; and thirteen questions. These questions were formulated to elicit information to evaluate the hypothesis statements (see Chapter 2), with the exception of question 1, which was intended to retrieve data relevant to one of the intervening variables, namely, prior exposure to a CL. A combination of fill-in-the-blank, Likert Scale responses, and multiple choice questions was used. Although

questionnaires from other CL programs were available, none was specific enough to meet the UTMB program evaluation needs and thus, a specific questionnaire was designed. All respondents were given a unique identification number. The data sheets showed only the ID number during the data analysis to protect respondent anonymity.

Although the questionnaire was the main instrument used to collect data, the pre- and post-data for the Pediatric Nephrology Department and the post-data for the Urology Division were gathered in an oral interview. The first 9 questions of the oral interview were identical to the written questionnaire. Questions 10-24 were open-ended questions, designed to elicit information regarding the participants' opinions and perceptions of both the CL program and the CL's role in providing information to the health care team. Chapter 4, Part III addresses the oral questionnaire results.

Daily and monthly statistics to determine and confirm library usage were collected on a standardized form (see Appendix IV) called the Statistics Work Sheet. This was completed daily by the CL and is reported by Department.

V. Subjects

The individual participants were the clinical care team members from four UTMB departments. The Division of Urology team consisted of one chief resident, three residents, and four faculty members: a professor, an associate professor, a clinical specialist, and an assistant professor.

The Department of Pediatric Nephrology team was composed of a research associate, a clinical nurse specialist, four fellows, and four

faculty members (one professor, two associate professors, and two assistant professors).

The Department of Family Medicine team was comprised of six first-year residents, seven second-year residents, six third-year residents, a professor, two associate professors, three assistant professors, and two faculty associate instructors.

The Department of Internal Medicine had two teams, the red and the brown. Each was composed of an associate professor and three third-year residents.

The clinical librarians attended clinical rounds and conferences in their assigned divisions and conducted informal visits in offices, hallways, and other educational settings. The clinical librarians all carried beepers and thus could receive messages during the day from faculty, staff, and students, both in the office or at the hospital. The setting and clinical care team remained fairly stable over the six months to one-year period of evaluation. Many of the residents and interns were on a three-year program. Turnover among faculty and staff was low. Data collected and compared for changes included only those questionnaires from persons present at the beginning of the program.

VI. Setting

The study was carried out in the clinical care divisions of the University of Texas Medical Branch (UTMB). UTMB is an acute tertiary care facility. A sophisticated health care complex, UTMB currently houses the nation's tenth largest school of medicine. UTMB's multiprograms include six major hospitals, a major medical library,

classroom buildings, specialty centers, extensive research laboratories, plus other support services.

VII. Population

The population of inference consisted of the members of the clinical care team of each of the specified divisions. The populations of inference or the specific clinical divisions were compared with each other to determine trends and test the stated hypotheses.

VIII. Statistical Methodology

The Wilcoxon Test, a signed rank test, was used in place of the t-test for paired samples. The Wilcoxon test can be used for both a priori and a posteriori (pre and post) comparisons among treatment populations. The signed rank test is thus a substitute for the t-test in paired samples. The null hypothesis held that the frequency distribution of the original measurements would be the same for the exposed and nonexposed members of the clinical care team. The pre- and post-data were compared. Variables to be examined have been described in this chapter (Section II).

IX. Evaluation Model and Data Collection Strategy

The evaluation model (Appendix II) was used as a guide to program planning, data collection, and program analysis. Three types of data were collected, as described in Chapter 1. Input, process, and output/outcome data. Data from the process and input stages included:

1. Diaries, daily check lists, monthly reports

The disadvantage of the diary is that it is difficult to analyze unless specific criteria are stated before recording begins. The

personality and writing style of the person recording the entries also can make comparisons difficult.

2. Working relations, critical incidence reports, problems encountered, rewards or examples of acceptance

The advantages again are the immediacy and the continuity of the data. This information is important for formative evaluation. If monitored, these comments can bring changes to the program as needed to correct problems and reinforce positive rewards. The disadvantages are difficulties in analyzing the data, and nonsimilar or noncomparable data.

3. Number of requests, clinical medicine questions per specified time period

4. Number of MEDLINE bibliographic computer data base searches per specified time period

5. Number of other data base searches

6. Number of research-related questions

7. Number of interlibrary loan requests

8. Number of circulation checkouts

The number of requests, searches, questions, and checkouts represents important process level evaluation information. These can be collected to illustrate baseline data and measure subsequent increases or decreases in use. Moreover, this information can be linked to costs of the program and thus assist in planning future needs and budgets.

The difficulties inherent in this data collection were inconsistency of data collected and varying time periods over which data were

collected. Each institution may collect data over varying time spans. However, if the time span is at least specified, extrapolations to other programs are possible.

9. Special training, direct costs

Examples of special training costs incurred include the online bibliographic training costs for MEDLINE. These training expenditures are necessary to assure competent use of the system and must be included in the overall budget. Complete information in this area will give a more accurate portrayal of the program. In some cases, individuals who have already acquired these skills and knowledge will be available. Thus, reporting these data has the advantage of fixing a cost to a particular program that may not be applicable across all programs.

10. Information Sources Utilized

Two sources of information were utilized: core list journals, and core list books. Identifying information sources utilized gives insight into the minimum resources a library must have to maintain a similar program. However, each program is unique and will differ according to the needs of the clinical care team.

11. Number of photocopy pages--who pays, department or library?

In principle, this is an issue decided by the individual institution; often it is an institutional or departmental policy. However, as photocopy remains a major method of distributing journal articles cited in the literature, this information should be reported as part of the process and methods.

Output and outcome data were used to describe changes that resulted directly from the program. Generally speaking, the output

measures whether the goals of the program have been met. For example, services offered at the end of the program, not available prior to the start of the program, represent the output. The outcome of the clinical librarian program may be the knowledge acquired by clinical teams about library use, the expressed satisfaction, the quality of the clinical information, or changes in information-seeking behavior of those exposed to the program. A further outcome might be the improved quality of care for patients or better informed physicians.

Baseline data can be utilized to demonstrate the overall growth of services. Data gathered before and at some point in time after the program is under way can indicate changes in information-seeking behavior by the clinical care team members or an increase in their use of the library.

1. Data for output criteria include:

- a. files generated for the clinical care team;
- b. library usage, i.e., documents checked out by the clinical care team or use of the interlibrary loan office;
- c. changes in MEDLINE searches;
- d. changes in other computer database searches;
- e. number of educational or library instruction seminars given, reported in numbers, hours, and topics.

2. To determine outcome, pre and post comparative data are needed.

Some examples of outcome data include:

- a. knowledge of the user,
- b. expressed satisfaction/dissatisfaction,

- c. changes in library usage,
- d. changes in information seeking-behavior.

U.S. copyright law (title 17 of U.S. code) governs the reproduction and redistribution of copyrighted material.

CHAPTER 4

RESULTS--CLINICAL LIBRARIAN EVALUATION STUDY

PART I. Formative Evaluation

Before the Clinical Librarian (CL) program was undertaken, several marketing strategies were used to test whether such a program would be favorably received at UTMB. First, a demonstration was conducted featuring role playing between CLs from another program and several UTMB clinicians. Particularly positive feedback was received from members of the UTMB Urology Division. The Dean of the Medical School was sent a brief description of the CL program objectives and projected costs and he, too, was favorably impressed. Therefore, in August of 1978, a Clinical Librarian program was initiated at the University of Texas Medical Branch at Galveston. The results of the evaluation study of this CL program are reported in this chapter.

Initially, three clinical departments were selected to participate: Surgery, Pediatrics, Internal Medicine. Family Medicine was added to the service in the fourth year of the program (1981) (Table 2). On the basis of their enthusiasm for the program, the Urology Division of the Department of Surgery was selected to participate in a pilot study that lasted for one full year (1978). The CLs were hired in 1978, 1979, 1980, respectively. Only one of the CLs was replaced prior to the completion of the program (Division of Endocrinology). All of the CLs fulfilled the criteria for selection stated in Chapter 3 (Methods and Procedures). With the exception of the Division of Endocrinology, each CL remained with his or her original team throughout the course of the evaluation.

TABLE 2.
DEPARTMENTS AND DIVISIONS SERVED BY THE CL PROGRAM AT UTMB

1st CL	1978	Department of Surgery: Division of Urology
2nd CL [*]	1979	Pediatric Department: Division of Nephrology Division of Immunology/Allergy Division of Perinatology
3rd CL ^{**}	1980	Internal Medicine Department: Division of Endocrinology
1st CL	1981	Other Clinical Teams Family Medicine

* The CL servicing the Pediatric Department worked with only one Division initially. The others divisions were added once a routine had been established.

** The CL for the Division of Endocrinology was replaced in 1981.

Instruments used for the program evaluation were the pre and post test questionnaire, administered in both written and oral form (see Section IIA, IIB, and Appendix). Supporting data from the library's monthly statistical reports were also used. Table 3 shows the dates of the tests, the type of questionnaire given, oral versus written, and the numbers of participants (in parentheses). The time sequence of test administration varied in this repeated measure design.

The following stages of formative evaluation were completed before the CLs were hired: (a) developmental planning and administrative decisions, and (b) definitions of specific behavioral objectives. To provide checks throughout the formative evaluation stage, a target set of characteristics was monitored periodically. For example, the library staff's monthly statistic reports were collected to measure program impact on library facilities and CL activities. The CL also submitted a monthly narrative progress report summarizing the program's major focus. As journal articles were provided in response to requested information needs, article evaluation sheets were distributed. The percentage of returns and the evaluation results were monitored to assess the relevancy of the articles selected by the CLs.

Input and process data included: daily and monthly CL checklists, worksheets and standard statistical information, article evaluation forms, library usage and statistics, letters and other written comments from the participants concerning the CL service. These data formed the baseline from which increases or decreases in program services and activities were measured. As the process level data were collected, the

TABLE 3
ADMINISTRATION OF PRE AND POST TEST INSTRUMENTS

Date Administered	11/78	12/79	4/80	12/80	4/81	12/81	12/82	6/82
Clinical Team	<u>Instrument</u>							
Urology	Pre (12) Question- naire	Post (8) Oral Interview						
Pediatric Nephrology		Pre (14) Oral Interview		Post (8) Oral Interview				
Pediatric Perinatology			Pre (3) Question- naire		Post (3) Question- naire			
Pediatric Immunology/ Allergy			Pre (5) Question- naire		Post (5) Question- naire			
Endocrinology *				Pre (12) Oral Interview				
Internal Medicine						Pre (12) Question- naire	Post (8) Question- naire	
Family Medicine							Pre (25) Question- naire	Post (18) Question- naire

* Due to an interruption in staffing, neither a post questionnaire nor interview were given to the Endocrinology Division.

outside evaluator and the CL made readjustments to bring the program closer to the pre-defined behavioral objectives.

In December, 1979, a year after the program began, the library statistical sheet was revised to reflect usage of automated bibliographic database services and to identify the user. Monthly CL reports were continued. However, because the article evaluation sheet return rate was less than 40%, these were used only as an occasional check and with new CLs, to ascertain whether the article delivered met the information needs of the health care team member (Appendix IV).

During the formative evaluation, changes were made in the pre and post questionnaire to clarify its meaning. Further, because the questionnaire was initially designed for the Urology Division, it was revised before the second year so that the same forms could be used for all departments.

PART II. Summative Evaluation

This section reports the results of the summative evaluation, or the analysis of the output and outcome data. As stated in Chapter 3, the output data include: files generated for clinical care use, library usage by the clinical team members, increases in MEDLINE and other computerized databases, and library structure. The outcome data consist of documentation of the knowledge of the users, expressed satisfaction with the program, changes in library usage, and changes in information-seeking behavior. Data were collected by means of several different instruments, including the statistical work sheets (output) and the pre and post questionnaire (outcome).

The data from the questionnaire (Appendix III) are reported first. The pre and post test data are analyzed and reported as follows:

1. Pre and post data for Urology, Pediatrics, and Internal Medicine are reported both collectively and separately as summary data.
2. Pre and post data for Family Medicine are reported separately and collectively as summary data.
3. Pre data for the Endocrinology Division are reported separately. Interruptions in the CL service for this division precluded post data collection.

Both the outcome and output data are used to support or reject the null hypothesis.

A. Written Questionnaire (Appendix III)

The written questionnaire consisted of 13 questions of varying types and complexity. Questions 1 through 3 were designed to elicit background and baseline information regarding prior CL exposure, membership in professional organizations, and personal journal subscription. If a member had had prior CL experience (#1), this might be considered an intervening variable. Questions 2 and 3 elicited personal information gathering habits and techniques. Question 5 was not used in the final data analysis.

QUESTION 1: Prior Exposure to CL?

No one responding to the written questionnaire had had prior exposure to the CL Program.

QUESTION 2: To What Professional Organizations Do You Belong?

Individual responses to this question ranged from none to 5 to 10 memberships in professional organizations. Most respondents belonged

to two or three organizations within their sphere of interest. The American Medical Association (AMA) and American Association of Nursing (AAN) were highly represented, and often journal subscriptions were directly related to membership (see Question 3). Many respondents did not answer this question in the post questionnaire, or wrote in "same," indicating little change in personal subscription habits post exposure to the CL program.

QUESTION 3: To Which Journals Do You Personally Subscribe?

Question 3 attempted to identify the journals subscribed to by individuals participating in the program and the frequency to which particular journals were subscribed. A total of 73 different journals were cited by the respondents. A core list was compiled from the responses: any journal cited 2 or more times was eligible for the core list (see Table 4). Lists generated by individual departments tended to be unique. With the exception of the New England Journal of Medicine (NEJM), the Journal of the American Medical Association (JAMA), and Science, the titles were related to the specialty field of the individual health care teams. Thus, there was little overlap among departments. Individuals subscribed to anywhere from 0 (a dietician) to 15 (a full professor) journals. Most subscribed to between 3 and 6. Several respondents also indicated that they received and often read drug literature and related journals, which are freely distributed. Departmental journal lists are given in Table 5.

No appreciable change was observed in the core list of individual subscriptions to journals after exposure to the CL. This finding does not necessarily indicate an absence of change in reading habits;

TABLE 4. CORE JOURNAL SUBSCRIPTION LIST

PRE		POST	
Journal Cited	Frequency	Journal Cited	Frequency
1. NEJM	14	1. NEJM	11
2. J Pediatr	10	2. J Pediatr	9
3. J Virol	7	3. J Urol	7
4. J Urol	8	4. Urology	7
5. Urol Clin North Am	4	5. Med Lett Drugs Ther	7
6. Med Lett Drugs Ther	4	6. Am Fam Physician	8
7. Psycho Som Med	4	7. JAMA	5
8. Tx Acad Fam Prac	4	8. Urol Clin North Am	4
9. Kidney Int	3	9. Urology	3
10. Invest Urol	2	10. Am Fam Physician	3
11. Urology	2	11. J Med Educ	2
12. JAMA	2	12. Ann Intern Med	2
13. Pediatrics	2	13. J Behav Med	4
14. J Med Educ	2	14. J Fam Prac	2
15. Ann Intern Med	2	15. J Am Diet Assoc	2
16. Arch Intern Med	2	16. STFM	2
17. J Am Diet Assoc	2	17. Pediatr Res	2
18. Pediatr Res	2		
19. Am Fam Physician	2		

TABLE 5.
DEPARTMENTAL SUMMARY OF MOST FREQUENTLY CITED JOURNALS
BEFORE (PRE) AND AFTER (POST) CL EXPOSURE

<u>Department</u>	<u>Pre Titles</u>	<u>Post Titles</u>
Perinatology	J Pediatrics (2) N Engl J Med (2) Pediatrics (1) Pediatric Res (1)	J Pediatrics (2) Pediatrics (2) N Engl J Med (1) Pediatric Res (1)
Pediatric Nephrology	N Engl J Med (5) J Pediatr (4) Kidney Int (3) Diabetes (2) Pediatrics (2)	J Pediatrics (5) Kidney Int (3) N Engl J Med (3) Pediatrics (2) Science (1)
Pediatric Immunology/ Allergy	J Pediatrics (4) N Engl J Med (3) Science (1) J Immunol (1)	J Pediatrics (2) N Engl J Med (2) Science (1) J Perinatal Med (1)
Family Medicine	N Engl J Med (9) JAMA (5) Am Fam Phys (6) J Fam Pract (4)	N Engl J Med (5) Med Lett Drug Ther (5) Am Fam Phys (6) Ann Intern Med (2)
Urology	J Urol (7) Urology (7) Urol Clin North Am (4) N Engl J Med (3) Invest Urol (1)	J Urol (7) Urology (7) JAMA (2) Invest Urol (1) N Engl J Med (1)

however, it does indicate a strong preference for subject-specific journals, and the information is useful as it provides a core list of divisional journals.

QUESTION 4: Attitude of Health Care Team Members Toward Specific CL Tasks.

Question 4 used a Likert-type scale to rank 6 opinion items on a scale of 1 to 5, 5 being the most favorable. This opinion section was intended to measure the attitude of the health care team before and after exposure to the CL. The health care team members were asked their opinion or attitude toward the CL with respect to presence on rounds, at departmental seminars, and at staff meetings. Team members' opinions regarding the CL's activities, such as generating bibliographic files and selecting appropriate articles, were also gathered.

The six Likert-type scale opinion items can be subdivided into the more traditional and less traditional views of a librarian and a library service. The more traditional outlook is reflected in item 5 (OPN 5), accumulating bibliographic files, and item 6 (OPN 6), selection of articles appropriate to needs. By definition, a clinical librarian performs in a non-traditional manner by leaving the reference desk and stepping into the clinical care setting as a member of the clinical care team. These non-traditional functions of the librarian are reflected in opinion 1, attending rounds; opinion 2, attending seminars; opinion 3, attending staff meetings and opinion 4, functioning as a member of the health care team.

TABLE 6. QUESTION 4.

RANK ORDER AND MEANS OF CL TASKS. DATA CUMULATED PRIOR TO
INTRODUCTION OF THE CL.

PRE DATA Rank Order	CL Tasks	Opinion No.	Mean
1	Generating bibliographies	5	4.65
2	Selecting appropriate titles	6	4.61
3	Attending department seminars	2	4.45
4	As a member of health care team	4	4.05
5	Attending staff meetings daily	3	3.51
6	Accompanying members on rounds	1	3.17

Question 4 was an opinion question. Opinion 5 represents the most favorable response, opinion 1, the least favorable response, pre introduction of the CL.

TABLE 7. QUESTION 4.

RANK ORDER AND MEANS OF CL TASKS. DATA CUMULATED AFTER
INTRODUCTION OF THE CL.

POST DATA Rank Order	CL Tasks	Opinion No.	Mean
1	Attending department seminars	2	4.70
2	Selecting appropriate titles	6	4.68
3	Generating bibliographies	5	4.63
4	As a member of health care team	4	4.33
5	Accompanying member on rounds	1	3.78
6	Attending staff meetings daily	3	3.45

Question 4 was an opinion question. Opinion 2 represents the most favorable response, opinion 3, the least favorable response, post introduction to the CL.

TABLE 8. WILCOXON ANALYSIS--QUESTION 4.
SIGNIFICANCE OF CHANGES BETWEEN PRE AND POST DATA

Rank Order	CL Tasks	Opinion No.	Change
1	Accompanying members on rounds	1	+
2	As a member of health care team	4	+
3	Attending department seminars	2	+
4	Selecting appropriate titles	6	+
5	Attending staff meetings daily	3	-
6	Generating bibliographies	5	-

Rank order and direction of change (+ or -) between pre and post data with respect to Opinion Question 4, assessing health care team member's attitude toward CL tasks. Summary data from all divisions.

The means of all responses to Question 4, before and after exposure to the CL, are reported in Table 6 and 7, respectively. The results of the pre-program questionnaire (Table 6) showed that the respondents favored a traditional role for the CL; opinions 5 and 6, generating bibliographic files and selecting appropriate titles, ranked highest and opinion 2, attending departmental seminars, ranked lowest. After the introduction of the CL (Table 7), response toward the less traditional roles was more favorable. The mean scores for opinions 1, 2, and 4 (less traditional roles for a CL) were higher overall. Opinion 5 and 6, more traditional roles, showed little change. Opinion 3, attitude toward CL attending daily staff meetings, remained approximately the same.

The Wilcoxon matched-pairs signed rank test was used to assess the significance of the changes between the pre and post study data (Table 8). The most significant, positive changes occurred with respect to opinions 1, 2, and 4 (non-traditional). Opinion 6 (traditional) was slightly more positive and opinion 3 (nontraditional) and 5 (traditional) showed a negative change.

Table 9 compares and contrasts the means, standard deviations, and direction of changes between the pre and post test responses of participating health care teams reported by individual opinion items. Urology, Perinatology, and Internal Medicine showed the greatest change in opinion 1 (nontraditional); and moderate change in opinions 2, 5, and 6. Urology and Perinatology showed significant changes in opinion 2 (nontraditional). Opinions reflecting traditional roles of the

TABLE 9. OPINION QUESTION 4. COMPARISON OF PRE AND POST DATA

OPINION ITEM	HEALTH CARE TEAM	MEAN AND STANDARD DEVIATION		Pre	Post	CHANGE	
		N					
Opn 1	Urology	7	3.285	4.142	1.253	0.899	+
	Int. Med.	8	4.000	4.625	1.069	0.744	+
	Ped. Immun.	5	3.000	3.600	1.870	0.894	+
	Fam. Med.	17	2.760	3.110	1.678	1.268	+
	Ped. Perin.	3	3.330	4.660	2.886	0.577	+
	Endo.	9	3.100	-	1.450	-	-
Opn 2	Urology	7	4.142	4.857	0.690	0.377	+
	Int. Med.	8	4.625	4.625	0.744	0.744	+
	Ped. Immun.	5	4.200	4.800	0.836	0.447	+
	Fam. Med.	17	4.470	4.640	1.280	0.701	+
	Ped. Perin.	3	5.000	4.660	-	0.577	-
	Endo.	12	4.000	-	1.470	-	-
Opn 3	Urology	7	3.428	3.571	0.534	1.511	+
	Int. Med.	8	4.375	4.000	0.916	1.309	-
	Ped. Immun.	5	3.400	3.400	0.540	0.894	+
	Fam. Med.	17	3.125	3.117	1.627	1.110	-
	Ped. Perin.	3	3.660	3.660	1.154	1.527	+
	Endo.	10	3.200	-	1.030	-	-
Opn 4	Urology	7	3.428	4.428	1.133	0.786	+
	Int. Med.	8	4.750	4.625	0.707	0.744	-
	Ped. Immun	5	4.200	4.600	0.836	0.547	+
	Fam. Med.	17	3.760	4.000	1.347	1.000	+
	Ped. Perin.	3	5.000	4.660	0.000	0.577	-
	End.	11	3.500	-	1.50	-	-

TABLE 9. (Continued)

OPINION ITEM	HEALTH CARE TEAM	N	MEAN AND STANDARD DEVIATION				CHANGE
			Pre	Post	Pre	Post	
Opn 5	Urology	7	4.714	5.000	0.487	0.000	+
	Int. Med.	8	5.000	4.875	0.000	0.353	-
	Ped. Immun	5	4.200	4.800	1.095	0.447	+
	Fam. Med.	17	4.529	4.235	1.280	0.752	-
	Ped. Perin.	3	3.000	5.000	-	-	+
	End.	11	3.900	0	1.380	-	-
Opn 6	Urology	7	3.857	4.428	1.214	0.786	+
	Int. Med.	8	5.000	4.875	-	0.353	-
	Ped. Immun	5	4.200	5.000	1.095	-	+
	Fam. Med.	17	4.812	4.529	0.543	0.1624	-
	Ped. Perin.	3	5.000	5.000	-	-	+
	End.	12	3.900	-	1.510	-	-

library also were more positive in the post test. This finding suggests that the librarian's traditional role became more visible after exposure to the CL and represents an important and beneficial goal for an outreach library program, such as the CL program, to achieve.

Of all the opinions, number 3 (attending daily staff meetings) showed the least change with the exception of Internal Medicine, where opinion 2 (attending departmental seminars) changed even less.

QUESTION 6: Information Sources - General

This question attempted to elicit information regarding the sources health care team members used for general information purposes. The rank order of these data are given in Table 10 (pre) and Table 11 (post). The top seven information resources were: papers in professional journals--item 6; books--item 8; Informal discussions and contacts with other professionals --item 19; private information files (personal libraries)--item 13; formal consultations with other professionals--item 20; Seminars, workshops, and conferences--item 1; and Contact with other health professionals (meetings and conferences, etc.)--item 22.

Items 6 and 8 (papers in journals and books) were among the top four choices for all departments. Items 11, 19, and 13 were chosen as one of the top four choices by several departments. Family Medicine and Pediatric Nephrology listed item 19 (informal discussions) as their top choice and item 6 (papers in professional journals) second, indicating a preference for discussions and professional contacts.

TABLE 10. QUESTION 6.
GENERAL INFORMATION SOURCES
FROM PRE DATA QUESTIONNAIRE*

Rank Order	Item No.	Item
1	6	Papers in professional journals
2	8	Books
3	19	Informal discussions and contacts with other professionals
4	13	Private information files (personal libraries)
5	20	Giving or obtaining formal consultations
6	1	Seminars, workshops, and conferences
7	22	Contact with other health professionals (meetings and conferences, etc.)
8	16	Regular hospital rounds
9	18	Group discussions (study groups, journal clubs)
10	4	Abstracts of papers
11	23	Library reference services
12	15	Indexing services (e.g., Index Medicus)
13	11	Bibliographies (lists of books and journal articles)
14	24	MEDLINE or other computerized information services
15	17	Regular hospital meetings
16	7	Articles in newspapers and magazines
17	10	Catalogs (books, equipment, material, etc.)
18	12	Video, slide and tape programs
19	21	Contact with detail men (sales representatives)
20	2	Exhibitions (e.g., at medical or other meetings)
21	5	Directories and/or registries
22	9	Radio and TV Programs
23	3	Correspondence or postgraduate courses
24	14	Current awareness or selective dissemination of information services

*Summary data from all departments, N=40, Pre Data, Rank Order from most used to least used

TABLE 11. QUESTION 6.
GENERAL INFORMATION SOURCES
FROM POST DATA COLLECTION*

Rank Order	Item No.	Item
1	19	Informal discussions and contacts with other professionals
2	6	Papers in professional journals
3	13	Private information files (personal libraries)
4	8	Books
5	20	Giving or obtaining formal consultations
6	16	Regular hospital rounds
7	1	Seminars, workshops, and conferences
8	22	Contact with other health professionals (meetings and conferences, etc.)
9	24	MEDLINE or other computerized information services
10	18	Group discussions (study groups, journal clubs)
11	15	17 Regular hospital meetings
12	23	Library reference services
13	15	Indexing services (e.g., Index Medicus)
14	4	Abstracts of papers
15	11	Bibliographies (lists of books and journal articles)
16	7	Articles in newspapers and magazines
17	10	Catalogs (books, equipment, material, etc.)
18	2	Exhibitions (e.g., at medical or other meetings)
19	14	Current awareness or selective dissemination of information services
20	12	Video, slide and tape programs
21	21	Contact with detail men (sales representatives)
22	5	Directories and/or registries
23	9	Radio and TV Programs
24	3	Correspondence or postgraduate courses

*Summary data from all departments, N=40, Post Data, Rank Order from most to least used.

In the post data questionnaire (Table 11), Urology gave the same three top choices as in the pre data questionnaire and in the exact same order (item 6, 11, and 8). Pediatric Nephrology made the same changes as Urology, indicating a move away from informal discussions and toward resources that would have been provided by the CL. Family Medicine, in particular, remained firmly committed to personal and informal professional interactions as a resource for general information. These choices may reflect the type of service delivered and the free and constant communication required in family practice, rather than any failure of the CL Program.

Generally speaking, the data varied across all departments. No one item stood out as most popular. Information resources selected infrequently after exposure to the CL were: correspondence or post graduate courses, regular hospital meetings, current awareness service, and private information files.

QUESTION 7: Information Sources Utilized for Patient-Care Issues

The clinical care team members were asked to indicate sources they used to resolve patient-care problems. Comparison between pre and post data showed significant changes occurring after the introduction of the CL. The information sources checked were assigned a value of one (1); those not checked received a value of zero (0).

The 24 information sources most and least used for resolving patient care problems are listed in Table 12a and b, in rank order before and after exposure to the CL. McNemar's test for significance was applied to each of the 24 items (Table 13). McNemar's test for significance of change is applied when sample sizes are small and

TABLE 12a QUESTION 7.

MOST USED PATIENT CARE INFORMATION SOURCES BEFORE AND AFTER CL
EXPOSURE*

Rank	Pre	Post
1	6. Papers in prof. journals	13. Private information files
2	19. Information discussion	19. Information discussion
3	8. Video, slide, tape	20. Giving/obtaining consults
4	13. Private information files	8. Video, slide, tape
5	20. Giving/obtaining consults	24. MEDLINE, etc.
6	16. Regular hospital rounds	16. Regular hospital rounds
7	1. Seminars, workshops	6. Papers, prof. journals
8	4. Abstracts, papers	22. Contact, other professionals
9	24. MEDLINE, etc.	18. Group discussions
10	18. Group discussions	1. Seminars, workshops
11	15. Indexing services	17. Regular hospital meetings
12	17. Regular hospital meetings	4. Abstracts, papers

* Cumulated data in rank order by question number.

TABLE 12b. QUESTION 7.
LEAST USED PATIENT-CARE INFORMATION SOURCES
BEFORE AND AFTER EXPOSURE TO CL

Rank	Question Pre	Question Post
1	5. Directories & registries	5. Directories & registries
2	2. Exhibitions	9. Radio & TV programs
3	9. Radio & TV programs	21. Contact with other health care professionals
4	14. Current awareness services	10. Catalogues
5	21. Contact with detail men	3. Correspondence, postgrad. courses
6	10. Catalogs	2. Exhibitions
7	12. Video, slides, & tapes	12. Video, slides, and tapes
8	3. Correspondence, postgraduate courses	14. Current awareness service
9	7. Newspapers & magazines	7. Newspapers & magazines
10	23. Library reference services	11. Bibliographies
11	11. Bibliographies	4. Abstracts, papers
12	22. Contact with other health care professionals	15. Indexing

Cumulated data in rank order by question number.

TABLE 13. QUESTION 7.
 INFORMATION SOURCE UTILIZATION FOR PATIENT-CARE ISSUES
 RESULTS OF McNEMAR'S TEST FOR SIGNIFICANCE

Question		McNemar's Test	Direction
20	Formal consultation	6.4	(+) post
22	Contact with other health professionals	5.6	(+) post
13	Private information files	4.0	(+) post
17	Regular hospital meetings	3.6	(+) post
14	Current awareness	3.6	(+) post
24	MEDLINE and others	3.0	(+) post
7	Newspapers	2.2	(-) post
9	Radio and TV	2.0	(-) post
21	Contact with detail men	1.8	(+) post
3	Correspondence, postgraduate courses	1.8	(-) post
23	Library reference sources	1.7	(+) post

individuals are tested twice in a randomized block design. Eleven items showed significant changes between pre and post data collection. Individual departmental data, however, showed no consistency in either choice of information source or direction of change. For the pre data, the top four information sources utilized to solve patient-care problems were (in rank order): item 6, papers in professional journals; item 19, informal discussions and contacts with other professionals; item 8, books; and item 13, private information files (personal libraries). These are all traditionally accepted information sources. The four top choices for the post data were (in rank order): item 11, private information files; item 19, informal discussion; item 20, giving/obtaining professional consults; and item 2, video, slides, and tape presentations. Of these, item 13 and item 19 showed a significant, positive change when the McNemar's test was applied.

QUESTION 8: Urgency of need for information for patient-care issues.

This question attempted to determine the perceived urgency of the participants' patient-care information needs. This information was important for the library administration, and was initiated in the formative evaluation (pilot study). The objective was to establish a 24-hour or less turnaround time, measured from the time the information need was expressed (to the CL) to the delivery of the appropriate article or other instrument of information.

During the pilot study with the Urology Division, the members indicated the need for an 8 to 24-hour turnaround on patient-care information requests. As a consequence, adjustments were made in the CL's work schedule to accommodate this need. In the summative study,

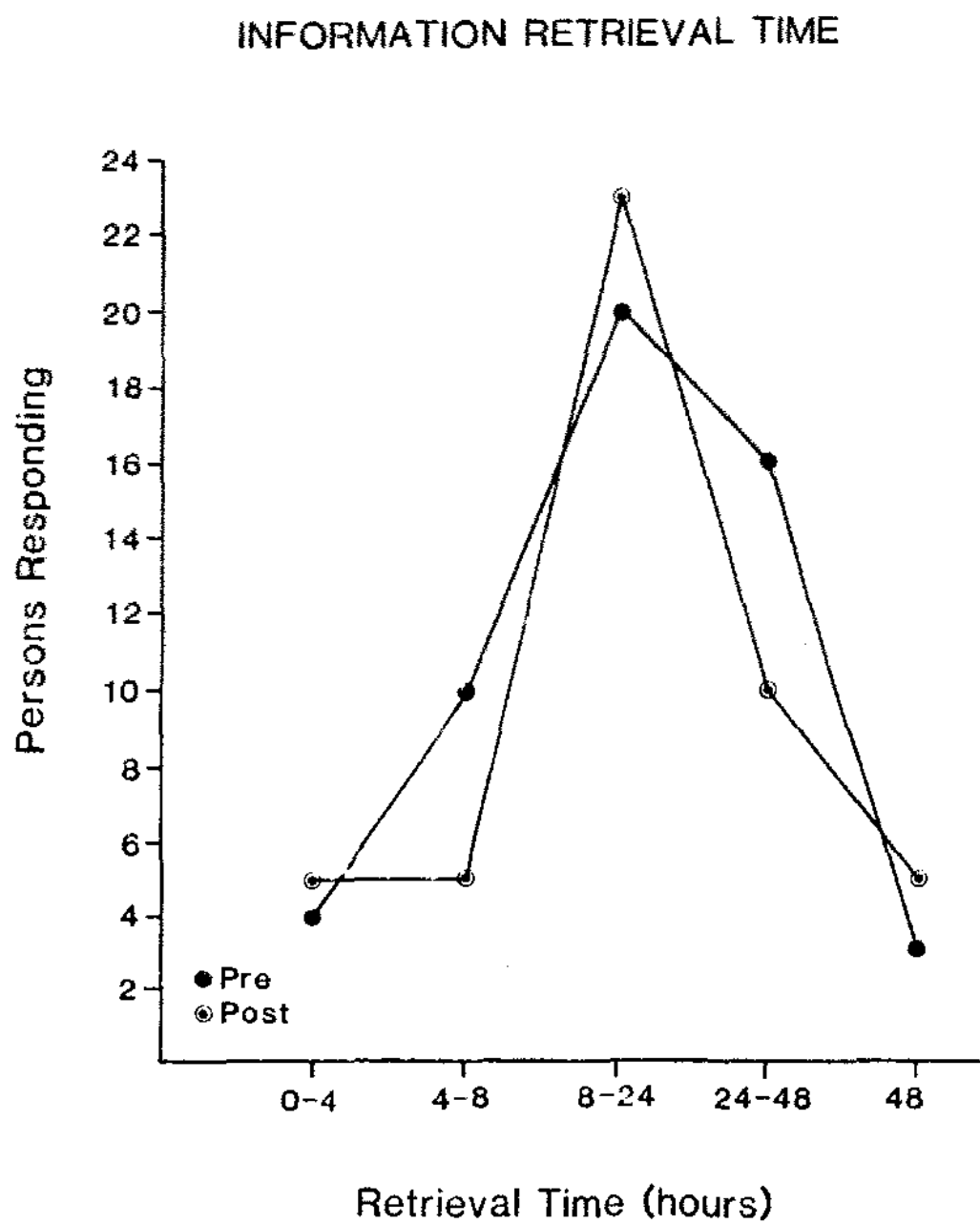
TABLE 14. QUESTION 8--TURNAROUND

URGENCY OF INFORMATION NEEDS

PRE AND POST EXPOSURE TO CL

TURNAROUND		0-4	4-8	8-24	24-48	48+	TOTAL N
Urology	PRE			5	1	1	7
	POST			6	1	0	7
Pediatric Immunology/ Allergy	PRE	1			2		3
	POST			2	2		4
Family Medicine	PRE	3	7	10	8	1	29
	POST	4	3	11	2	4	25
Perinatology	PRE		1	1	1	0	3
	POST		1	1	1	0	3
Pediatric Nephrology	PRE	1	2	4	4	1	11
	POST	1	1	3	4	1	10
PRE/POST		4/5	10/5	20/23	16/10	3/5	53/48
Totals		9	15	43	26	8	101

Figure 1.



other departments also preferred the 8-24 hour turnaround; however, divisional variation was observed. Particularly in the pediatric specialties, a 0-4 hour and 4-8 hour turnaround was requested in times of acute or emergent cases.

Departmental responses to question 8 are given in Table 14. Overall, the 8-24 hour turnaround time was preferred. The summary data are depicted graphically in Figure 1.

QUESTION 9: Convenience of obtaining library information.

The convenience (inconvenience) of obtaining library materials was measured pre and post exposure to the CL, using a 5-point Likert-type scale response. The response categories were assigned a value of 1 to 5, "very easy" to "very difficult." The responses in each category were reported individually and summed (see Tables 15 and 16).

The results show a positive shift in the perceived convenience of obtaining library materials. In the pre study data, 12% of 33 respondents stated they found it "very easy" to obtain library materials, whereas 31% of 29 respondents stated found "very easy" to obtain library materials post exposure to the CL. Forty-five percent in the pre study, compared with 55 percent in the post study found it "easy or very easy" to obtain library materials, and 72% pre study versus 92% post study found it "neutral, easy, or very easy" to secure library materials. Individual departments showed a similar trend to the cumulative data.

QUESTION 10: Library usage

This question asked participants to indicate how frequently they used the library to fulfill their information needs. The pre and post

TABLE 15. QUESTION 9.
CONVENIENCE OF OBTAINING LIBRARY MATERIAL
Summary Data

Likert Scale	Very Easy	1	2	3	4	5	Very Difficult	Total
N/(%)								
PRE		4(12%)	11(33%)	9(27%)	7(21%)	1(3%)		32(100%)
POST		9(31%)	7(24%)	12(41%)	1(3%)	0(0%)		29(100%)
Totals		13(21%)	18(29%)	21(34%)	8(12%)	1(1%)		61(100%)

TABLE 16. QUESTION 9.
CONVENIENCE OF OBTAINING LIBRARY MATERIAL
Departmental Data

Likert Scale	Very Easy	1	2	3	4	5	Very Difficult	Total
(N)								
Urology	Pre		4	2	1			7
	Post	2		2				4
Ped. Immunol.	Pre	2	1	3				6
	Post	2	1	1				4
Fam. Med.	Pre	2	3	5	6	1		16
	Post	4	3	9	1			17
Ped. Immunol.	Pre		3					3
	Post	1	2					3

TABLE 17. QUESTION 10.
FREQUENCY OF LIBRARY USE
PRE AND POST EXPOSURE TO CL (BY DEPARTMENT)

Department		Once/week	4+/week	Infrequently	Never	Other
Pediatric nephrology	Pre	6	1	1		
	Post	6	1	1		
Pediatric immunology	Pre	4		0		
	Post	4				
Family Medicine	Pre	3	13	1		
	Post	6	9	2		
Pediatric Perinatology	Pre	1	2			
	Post	2	1			
Urology	Pre	5	2	0		
	Post	4	0	1	1	

study results were strikingly similar (Table 17). Forty-seven percent of the pre study population and 56% of the post study population indicated that they used the library once a week. After exposure to the CL this shifted slightly in a positive direction. At the same time, however, those who had used the library 4+ times per week prior to exposure to the CL, now tended to use it less often (slight negative shift).

QUESTIONS 11, 12, and 13: MEDLINE Usage

To determine the level of MEDLINE usage, direct questions were asked of each of the clinical care team members. Pre and post study data were compared. In the departments surveyed, the pre study data for Question 11 (Have you had a MEDLINE search done in the past year?) showed that most respondents had requested at least one MEDLINE search in the past year. The Urology Division responded 100% affirmatively (7 out of 7). Pediatrics responded 5 of 7 affirmatively, and Family Medicine responded 15 of 17 affirmatively. Perinatology Division responded 2 of 3 affirmatively.

Results varied in the pre study data for question 12 (If you have requested a MEDLINE, was the information received "more than adequate," "adequate," or "less than adequate"?). Responses among the three choices were evenly distributed for the Urology Division. For Family Medicine, 6 indicated the service was more than adequate, 6 found it adequate, and 2 found it less than adequate. For Perinatology, 2 said it was more than adequate.

The post study data showed a similar trend for MEDLINE searches. Departmental opinion of the information received shifted positively

with the exception of Family Medicine, where 5 stated the information was more than adequate, but 12 post compared with 6 pre study respondents indicated that the information received was only adequate. No one indicated that the information was less than adequate.

Question 13 (How was this information requested, personally or through an assistant?) showed that prior to the study, most physicians requested their information personally. After the study, on the other hand, Urology and Family Medicine used the CL either exclusively or approximately 50% of the time. Perinatology and Pediatric Nephrology made searches personally and through the CL as well, but did not give specific details on usage.

B. Library Data

Hypothesis No. 3 concerned the question: Does CL presence affect the information available and obtainable by the clinical team? Information concerning this hypothesis was important because it pertained to one of the basic objectives of the UTMB CL Program, i.e., to support information requirements arising from patient care, research, publishing, and teaching responsibilities. Both the library statistics and the information elicited in the oral interview were useful in evaluating this hypothesis. Library data collected included the monthly CL departmental statistics. These regular reports gave the number of articles selected by the CL, the number of photocopies made, and the number of database searches performed as the CL satisfied information needs of their clinical care team members.

CL data are reported in Table 18. Two statistical records were kept, one for the numbers of MEDLINE searches performed, and the other

TABLE 18. LIBRARY DATA 1978-1982
YEARLY DATA SHOWING CL ACTIVITY

CL Activity	1978-79	1979-80	1980-81	1981-82
<hr/>				
No. MEDLINE database				
searches performed	262	804	1,407	2,271
Other Databases	32	82	151	125
Photocopy				
No. page copies	13,450	31,500	37,382	42,474
No. of CLs	1	2	3	3
<hr/>				

TABLE 19. CL DIRECT COSTS

1980-1981

Item	Unit Costs	Total Costs
Salary for 2 CLs	\$18,000 40 h/week	\$36,000
1 Clerical Assistant	\$10,000 40 h/week	10,000
Photocopies-pages	\$37,382 0.10/pg	3,738
CL Book material	500	500
Database Searches	3,000	3,000
Database search costs		
MEDLINE	\$1,117	
Backfiles	380	
Other NLM	157	
Other	<u>5</u>	
Total	\$1,659 (x 2.50) = \$4,147.50/year	<u>4,147.50</u>
TOTAL YEARLY COSTS		\$57,385.70

for non-MEDLINE commercial database searches. Table 18 gives an accounting of the library statistical data reflective of CL activity. Direct CL costs, tabulated for the year 1980/81, are given in Table 19.

C. Oral Questionnaire

The oral interview consisted of 2 parts. In part I, the interviewer asked questions similar to those on the written questionnaire (see Appendix). Part II consisted of a series of open-ended questions designed to elicit the participants' opinion regarding to the quality of the CL service. The oral questionnaire was administered to two divisions, Pediatric Nephrology and Urology. The results of Part II of these interviews are reported below.

QUESTION 10: "Since the CL has been involved with your department, how well have your information needs been met?"

Choice	Ped. Nephrology (N=8)	Urology (N=8)
Not so well	-	-
Well	3	1
Very well	5	7

Comments: (mainly from the Urology Division)

"Sometimes I ask for topic not quite on target."
 "References sometimes lead to more specific articles."
 "Far exceeded my grandest expectations."
 "Immediate access to all library services--no delays."
 "Very well, CL on ball, expedient."
 "Excellent, very well."
 "Excellent, time sequence is good."

QUESTION 11: "To what extent has the CL aided you in identifying your information needs?"

Choices	Pediatric Nephrology (8)	Urology (8) (1 no response)
Not so well	1	1
Well	4	4
Very well	3	2
"I ask the questions"		1

Comments:

"CL finds what he's looking for." (Urology)

"CL plays a role by questioning whether we have a need for special topics, thereby crystallizing our needs--he asks questions--serves as a catalyst."

"Not told what to do--you ask questions."

"CL given a specific topic and which journals--given a broad topic--CL selects and xeroxes articles."

"Thorough job--brings more to my attention."

QUESTION 12: "What criteria did you use to determine the above answers?"

Choices	Pediatric Nephrology (8)	Urology (8)
CL knows research needs	1	1
CL sought more than I would have	4	1
CL expediated information retrieved	2	3
CL helped me know what new information was available	1	-
CL selects articles	-	1

Comments:

"CL helps me fill out own research."

"CL keeps me informed about book reviews, bibliography and notes--
she tells me what's new."

"I tell CL information needs, she does search."

QUESTION 13: "In what ways has the presence of the CL changed the time
you spend seeking/utilizing information needs? Please
elaborate.

Choices	Pediatric Nephrology (8)	Urology (8)
Freed up time--more time for reading, research	7	4
Additional information is supplied	1	1
Sought more than I would have	-	2
Increased my productivity	-	1

Comments:

"Increased information received in the same amount of time."

"Freed up time, I don't go over to Library as much."

"CL freed up time, I spend more time analyzing the information
provided."

"Freed up more time to work with patients."

"Allow us to take time normally used in finding items to digest."

"CL removes roadblocks, does 'dirty work'."

"Expedited retrieval of information not available on Division."

"Cadillac transportation."

"Helps in my productivity - 1979, 6 papers published."

"Helps with ward information and with patient care, then I can go over
bibliographies."

"Enormously, CL does leg work."

"Yes, use author line and other NLM data bases."

QUESTION 15: "Has the CL program increased your use of on-line data
bases such as MEDLINE, Cancerline, etc. Please explain."

Choices	Pediatric Nephrology (8)	Urology (8)
Yes	6	4
No	2	1

Comments:

"I use MEDLINE three times as much."

"I request more."

"Yes, am able to utilize the CL--wouldn't have done search otherwise."

"Yes, to both, more detailed through CL."

"Yes, CL does it, before I didn't, too lazy."

"Yes, not used before because of time."

QUESTION 16: "Do you request a search or does the CL?"

Choices	Pediatric Nephrology	Urology
CL	6	5
Self	3	2
Both	1 (both checked)	-

Comments:

"Forms for requests are given to all members."

"You ask Dave."

"Tell CL what interested in, leave up to CL - I provide headings when I can."

"In past I have called, now wait til CL comes if no rush or I call CL."

"I request CL to find information--he uses the tools."

QUESTION 17: "Is this different from the time prior to the CL?"

Responses	Pediatric Nephrology	Urology
Yes	7	7
No	-	-

If yes, what are the main differences?

Responses	Pediatric Nephrology	Urology
Don't go to the library as frequently	2	3
Did own searches before, now more convenient	2	2
Use more search tools now	3	1
Didn't go to library (or use library) before	1	-

Comments:

"My use of information sources has grown."
 "The interface with the Library is good."
 "Personally, don't run searches, but about the same library use."
 "Spend as much time in the library, get more information, am in the Library on different items."
 "More aware now, decrease my trips to the Library."
 "I ask the CL to perform MEDLINE."

QUESTION 18: How frequently do you use the CL as a substitute for your library visits?

Responses	Pediatric Nephrology	Urology
Once a week	3	3
Four times or more/year	1	1
Infrequently	1	1
Whenever something comes up	2	1
All the time	1	1
For the large searches and photocopies	-	1

Comments:

"Use the library 20-30% less, I visit the library to read, use of library for research and private reading, no change."
 "Almost always use CL for search."
 "Frequently."
 "Begin projects with CL's help."
 "Changed with CL, 50-75% time now 100% of time."
 "For four or five projects in past year, still go to library for preparation for journal club."

QUESTION 19: Do you consider this (#18) an important function for the CL? Explain the reasons for your answers to the above question.

Answers	Pediatric Nephrology	Urology
Yes	8	6
Partially	-	1
Searching-only CL function	-	1

Comments:

"Does well, time saver."
 "Assists staff, convenient."
 "Yes for me."
 "Increased information gathering and presumed effective."
 "Provides current awareness."
 "Gives more time to clinicians."

"It helps to research projects--time is important."
 "Primarily a CL function--to save time and find information."
 "Attendance at conferences and seminars." (CL function)
 "Handy, cream on the cake!"
 "Good for my needs."
 "I spend time where I enjoy, and get more percentage of key articles."
 "Saves time in getting baseline information."
 "More thorough, more energetic."

QUESTION 20: Do you look at information brought to the Unit by the CL? Which ones?

Answers	Pediatric Nephrology	Urology
Yes	8	7
No	-	1
Items: (Several persons mentioned more than one)		
Clinical topics in file	2	4
References in file, retrospective	1	4
Any which I need or are applicable	4	-
Bibliographies	1	1
Others, those needing MEDLINE	-	2

QUESTION 21: How frequently do you use these services (#20)?

Responses	Pediatric Nephrology	Urology
Once a week or more	3	3
Four times a year	1	4
When need arises	2	1

Comments:

"I glance at list, if books are needed, I get them."
 "I look at bibliographies, references, and book list as they circulate."
 "I use these sources again and again."
 "I look at journal articles mostly."

QUESTION 22: What changes in the CL activity for your unit would you like to see? (Several individuals checked more than one response)

Responses	Pediatric	
	Nephrology	Urology

None	8	3
Teaching	1	-
Clinic/Round Attendance	-	1
Refine or redefine information	1	1
More depth	1	-
To continue	-	2

Comments:

"Attendance at X-ray, journal club, teaching rounds are less important."
 "Need to expose residents and students to facilities of the library and show how to use." (Urology)
 "Satisfied."
 "Cover other areas."
 "CL used to come to all conferences but now she is more selective."
 "Beeper is good."
 "CL should tell us how she got there--how to use library tools."
 (Pediatrics)
 "CL needs to be very informed on specific items of interest."
 "Eliminate the book chapters."

QUESTION 23: What would you say are the strong points of the CL Program? (Several suggested more than one point)

Responses	Pediatric	
	Nephrology	Urology
CL eagerness	4	-
Time saved	1	3
Ready access to recent literature	2	2
Get information I am seeking	4	1
Very good bibliography	1	3
Information more quickly	-	2

Comments:

"Someone who knows library and our subject can select useful articles."
 "Accessibility, getting the information quickly."
 "Teaching us more about the library."
 "CL specifically, she does an excellent job, she's willing to learn basic medicine, she's prompt, helpful, interested."
 "People are more prone to ask for information and items."
 "Allows us to do more away from the mechanics."
 "CL runs a better search than I could."
 "She's available and I can talk to her, she's quick and listens well." (Pediatrics)
 "Creative searches. She looks for things I wouldn't, example, rich review articles."
 "Satisfied."
 "Ready access to recent literature available."
 "Bring library to me, save time, bring expertise, getting right kinds of references, saves time."
 "CL can take a broad topic and find specifics, can discriminate."
 "Likely to search if easy to obtain."
 "More reading from journal articles than without CL."
 "Provides expedient and efficient service."
 "Provides time for other activities."
 "Information quickly, lots more digging."

"Overall--helps get a very good bibliography we can go thru in detail."
 "Quick and ready access to library material, xerox privilege."
 "Time savings system, can gather information quickly."
 "Thoroughness of search."

QUESTION 24: What would you say are the weak points of the CL program.

Responses	Pediatric Nephrology	Urology
None	5	2
Information needs defining	1	4
Residents and students need library education	1	1
Need to guard against <u>not</u> knowing how to use library	1	1
Hard to find CL	-	1
Easier if CL in only one place	-	1

Comments:

"CL needs to be very specific."

"The Division is scattered, offices are far apart, difficult for CL."

"Not learning about the resources of the library."

"Information sometimes needs refining."

"Difficult to consult with CL because of irregular schedule."

"Xerox bill--want it free!"

"Great program, hard to find weak point."

"Discourages self help."

"Guard against now knowing how to use library."

"Residents may not be familiar with library--how to use--take things
for granted."

"Sometimes we know what we want, can't communicate exactly."

"Lack proper communication, certain phase of study, but I do ask."

Part III. Evaluation of the Endocrinology Division, Department of
Internal Medicine

In the original study design, three major departments-- Surgery, Pediatrics, and Internal Medicine--were included in the Clinical Librarian Service Evaluation Study. In accordance with the study design, the CL for the Endocrinology Division (Internal Medicine Department) was hired in year three (1980). The Pediatric PRE study questionnaire data were to serve as the comparison for Internal Medicine PRE study data, and the Internal Medicine Pre test data, in turn, were to serve as the comparison for Family Medicine. However, the CL serving the Endocrinology Division left his position less than 4 months after he began (March 1981) and his position was not filled until six months later. Due to this interruption, the POST study measurements, which were supposed to follow a year after the PRE study test, could not be obtained. This section reports the results of the Endocrinology Division PRE study test, administered as an interview in October of 1980.

A second problem arose with the Endocrinology group in that the division was divided into two distinct groups--clinical and research--and each had extremely divergent needs. The needs of both groups were not being adequately met and, consequently, when the replacement CL was introduced, procedural revisions were made in order to ensure that clinical information for patient-care needs would take priority. Research needs were referred to the Library Reference Department.

Endocrinology team members interviewed for the pre-study test included: three medical students, two fellows, and one Ph.D. candidate, plus five faculty members (three Associate Professors, one Assistant Professor, one Research Associate), and four others including a staff nurse, the nutritionist, a Diabetes Nurse Educator, and the Administrative Assistant.

QUESTION 1: Prior exposure to CL

One member of the faculty, an Associate Professor, had prior exposure to a CL when he was a student in 1974 at Buffalo, New York and again, later, at Duke University.

QUESTION 2: Membership in Professional Organizations

Most members belonged to 2 to 5 professional organizations and subscribed to journals on that basis.

QUESTION 3: To how many professional journals do you subscribe?

The most frequently cited journal was The New England Journal of Medicine (NEJM). In the summary pre tests the results are similar. Field specialty journals were the second most frequently cited. Annals of Internal Medicine and Urology were listed by both the Endocrinology Division and other departments and divisions.

QUESTION 4: The results are similar to the previous cumulated results reported from other CL services. The three most frequently approved CL functions, as indicated by the Endocrinology division members, are identical to those in the cumulated summary results, namely, opinions 2,5, and 6.

TABLE 20. QUESTION 4, Opinion Question
 ATTITUDE TOWARD SPECIFIC CL TASKS
 Pre Data Endocrinology Division

Rank	CL Task	Opinion		
		Number	N	Mean
1	CL attending department seminars	OPN 2	12	4.0
2	Generating bibliographies	OPN 5	11	3.9
3	Selecting appropriate titles	OPN 6	12	3.9
4	As a member of health care team	OPN 4	11	3.5
5	Attending department seminars	OPN 2	10	3.2
6	Accompanying members on rounds	OPN 1	9	3.1

Rank order and means before (PRE) data regarding opinion of CL tasks,
 Mean 5 most favorable, mean 1 least favorable.

TABLE 21. QUESTION 4
 ATTITUDE TOWARD SPECIFIC CL TASKS
 Pre Endocrinology versus Pre Summary Data

ENDOCRINOLOGY DATA				SUMMARY ALL OTHER DATA			
RANK ORDER PRE				RANK ORDER PRE			
Rank	OPN	Mean	N	Rank	OPN	Mean	N
	CL Task				CL Task		
1	2	4.0	12	1	5	4.65	40
2	5	3.9	11	2	6	4.61	40
3	6	3.9	12	3	2	4.45	40
4	4	3.5	11	4	4	4.05	40
5	3	3.2	10	5	3	3.51	39
6	1	3.1	9	6	1	3.17	40

Endocrinology data compared with cumulative data pre exposure to CL.

Mean 5 most favorable, mean 1 least favorable.

TABLE 22. QUESTION 6
GENERAL INFORMATION SOURCES
Pre Endocrinology Results
Sources in Rank Order from most to least used

Rank	Item No.	Source
1	6	Papers in professional journals
2	8	Books
3	19	Information discussions and consultants to other professionals
4	15	Indexing services (e.g., Index Medicus)
5	13	Private information files (personal library)
6	20	Giving or obtaining formal consultants to other professional
7	24	MEDLINE or other computerized information services
8	4	Abstracts of papers
9	1	Seminars, workshops, and conferences
10	22	Contact with other health professionals (meetings and conferences, etc.)
11	23	Library reference services
12	11	Bibliographies (lists of books and journal articles)
13	16	Regular hospital rounds
14	18	Group discussions (study groups, journal clubs)
15	17	Regular hospital meetings
16	2	Exhibitions (e.g., at medical or other meetings)
17	10	Catalogs (books, equipment, material, etc.)
18	12	Video, slide, and tape programs
19	7	Articles in newspapers and magazines
20	2	Exhibitions (e.g., at medical or other meetings)
21	14	Current awareness or selective dissemination of information services: individualized information packages from library or commercial services
22	3	Correspondence or postgraduate courses
23	9	Radio and TV programs
24	21	Contact with detail men (sales representatives)
25	5	Directories and/or registries.

The least favorite ranked task for the CL (Opinion 1) was also ranked least favorable in the cumulated PRE study data of the other participating departments. Mean scores were somewhat lower.

QUESTION 5: Not used in data analysis.

QUESTION 6: Information Sources--General

Four of the six top information sources cited by the Endocrinology Division were identical to the summary departmental data.

QUESTION 7: Patient-care Information Sources

Comparison between the Endocrinology Division and other departments show close similarity in information sources utilized to resolve patient care problems.

QUESTION 8: Urgency of Need for Information

Two persons checked both four hours and 8-24 hours, indicating the need for acute care and less acute care information. Ten of twelve individuals needed information between four and 24 hours. This is similar to the overall data for other participating departments.

QUESTION 9: Convenience of Obtaining Library Information

On a scale of responses ranging from "very easy" to "very difficult," the results indicate that 11 out of 12 members of the Endocrinology Division found it "very easy" or "easy" to use the library.

QUESTION 10: Frequency of Library Usage

Eight responded that they used the library once a week, four said they used it four or more times per year.

TABLE 23. QUESTION 6
 GENERAL INFORMATION SOURCES
 PRE ENDOCRINOLOGY DATA VERSUS PRE SUMMARY DATA

Rank	Item	Endocrinology PRE	Item	Summary Data PRE
<hr/>				
1	19	Informal discussions and con- tacts with other professionals	6	Papers in professional journals
2	6	Papers	19	Informal discussions
3	13	Private information files	8	Books
4	17	Regular hospital meetings	13	Private information files
5	1	Seminars, workshops, conf.	20	Formal consultations
6	8	Books	1	Seminars, workshops
7	16	Regular hospital meetings	22	Contact with other health professionals
8	22	Contact with other health professionals		
9	15	Indexing service	18	Group discussions
10	11	Bibliographies	4	Abstracts of papers
11	4	Abstracts of papers	23	Library reference serv
12	20	Formal consultations	15	Indexing service
13	18	Group discussions	24	MEDLINE or other compu- terized information serv
14	24	MEDLINE or other computerized information service	17	Regular hospital meetings
15	2	Exhibitions	11	Bibliographies
16	23	Library reference service	2	Exhibitions

TABLE 24.

QUESTION 7. PATIENT CARE INFORMATION SERVICES

PRE Endocrinology vs PRE Summary Data

Rank	Item	Endocrinology - PRE	Item	Summary Data - PRE
1	6	Papers in prof. journals	6	Papers in prof. journals
2	8	Books	19	Informal discussions and consultation
3	9	Information discussions and consultations	8	Books
4	15	Indexing services	13	Private information files
5	13	Private information files	20	Formal consultations
6	20	Formal consultations	16	Regular hospital rounds
7	24	MEDLINE or other computerized information serv.	1	Seminars, workshops, conf.
8	4	Abstracts of papers	4	Abstracts of papers
9	1	Seminars, workshops conf.	24	MEDLINE or other computerized information serv.
10	22	Contact with other health professionals	18	Group discussions
11	23	Library reference services		

TABLE 25. QUESTION 8

URGENCY OF NEED FOR INFORMATION

Pre Endocrinology Responses in hourly range

HOURS	RESPONSES
4 Hours	4
4-8 Hours	3
8-24 Hours	5
24-48 Hours	0
48+ Hours	2

TABLE 26. QUESTION 9

CONVENIENCE OF OBTAINING LIBRARY INFORMATION

CONVENIENCE	NO. Responses
Very Easy	10
Easy	1
Neutral	1

QUESTION 11: Have you used MEDLINE in the last year?

Eight out of 12 said yes and four said no. Of the eight, all indicated that the information received was adequate. Six of the eight respondents requested MEDLINE searches on their own, independent of the CL.

U.S. copyright law (title 17 of U.S. code) governs the reproduction and redistribution of copyrighted material.

CHAPTER 5. SUMMARY AND DISCUSSION

I. Introduction

The results of this program evaluation point to a positive influence of the CL on the information-gathering habits of the health care team. The questionnaire developed for this study has proved to be an easy, effective tool for measuring attitudes, assessing library use, and collecting information regarding the information resources most used by the clinical care team members. However, the effect of unknown variables makes several different interpretations of these data possible. The supporting data from the library monthly statistical reports offers a practical means of validating some of the responses obtained from the questionnaires and provides an opportunity to clarify some of the trends observed in this study.

Several other questions arose in the course of this Program Evaluation. What is the impact of the CL program on the sponsoring institution? What is the cost? What are the future implications and outcomes? What could one do differently in future programs? What have we learned about the information gathering habits of health care professionals? Have we come closer to understanding how to better use information in the patient-care setting? Finally, what can be said about the impact of the CL on patient care itself? This chapter focuses on these issues and evaluates the advantages and disadvantages of the model and study design.

II. Evaluation Model

The model presented in this thesis (Appendix II) was developed specifically for CL program evaluation. One advantage in using an evaluation model was the ease it lent to program planning. The model encouraged clear initial statements of goals and objectives, activities planned, and instruments designed to measure the stated goals. Thus, the first step of this model consisted of formulating a formal statement of goals, objectives, and tasks. Although general in nature and subject to change, the goals statement gave focus to the program planning phase and aided in developing the objectives and tasks statement, which detailed the activities designed to reach the stated goals. Another advantage in using an evaluation model was the ability to make meaningful, cross-group comparisons between the participating health care teams at UTMB, or between CL programs at other institutions, should others adopt the same model.

Because this model was designed to serve as a working model for assessment of, and cross-comparison with, other CL programs, it provides information useful to administrators, librarians, and evaluators, alike. Several problems may arise, however, if this model is incompletely applied to other CL Programs. Although the first, or formative, stage is vital to proper program evaluation, program developers may be tempted to skip it, seeking to measure only outcome data for the summative stage. The Evaluation Study conducted at Yale is an example of such omission. Experimental bias will occur without clear advance planning. In the evaluation conducted at Yale, the CLs, desiring certain favorable results, selected their subjects

accordingly. The formative stage identifies the antecedents and the outcomes. It is at this formative stage that program planning changes should occur.

A second, more elusive problem with the model is that the institution at which the study is conducted may be undergoing change. Life in a large medical center or small hospital is not static. During the course of the evaluation, unpredictable events may occur. If events, such as changes in administration or budgetary matters, do happen, the evaluators, administrators, and CLs must make the best decisions appropriate. Data collection may thus be affected. In such cases, it may be necessary to change the program plan during the summative evaluation. For example, departmental and library budgets play a substantial role in supporting the CL Program. In Texas, state legislators appropriate the University's budget biannually. An unexpected surplus or deficit may change the course of budget allocations. Thus, although it may appear to compromise the result of the summative evaluation, changes must be honestly reported and statistics and reports accurately modified to reflect such changes. Maintaining the integrity and credibility of the summative evaluation is, in the long run, far more important.

III. Methodology

The study consisted of a pre/post group comparison conducted within a time series design. The results of the oral and written questions, as well as the similarities and differences of the groups, are reported in Chapter 4. The appropriateness of the study design is reflected in the responses to the pre and post study questionnaires.

For example, in opinion question 4, which assessed attitudes towards particular CL tasks, the overall cumulated departmental responses were similar. To review, the change between pre and post data was greatest for opinion 1 (attitude toward CL attending rounds) and least for opinion 3 (attending staff meetings) for all departments and divisions participating in the study. Moreover, the trend in the opinion responses reflected an increasing acceptance of the CL Program over time. The first division to enroll in the program, Urology, had the lowest overall opinion scores. As mentioned above, the Endocrinology Division was excluded from the time series design because of the lack of post study data for comparison. The low overall opinion scores of the Urology Division, may actually be a sign of program improvement, because, as the program matured, the divisional scores became increasingly more positive.

Family Medicine (Division of Endocrinology) had the second lowest scores in the opinion items, and this may have been attributable to differences in divisional configuration. Family Medicine, considered separately and collectively, operated quite differently from the Urology Division. First, Family Medicine was housed in a single building with the out-patient clinics, offices, and conference room located in close proximity. The residents and faculty often gathered together in the large conference room during and after patient rounds. Frequently, if a patient required a consult, the attending physician would casually enter the conference room and request the needed assistance. Thus, no formal, scheduled gathering, to which the CL would have been invited, took place. The CL was, therefore, more of an

outsider with this group, and did not actually attend rounds. This could account for the lower rankings on some of the opinion questions and would represent a confounding variable.

Secondly, the test period for Family Medicine was only 6 months, as opposed to a full year for the other divisions and departments. Thus, inadequate exposure to the CL could also be responsible for the lower scores on several opinion items.

In summary, using a time series study design with pre and post comparison permits group comparisons to be made within certain constraints. Users may find test results from later groups in the time series to be higher, reflecting the influence of earlier groups, or the increasing experience of the program supervisors. Other items to be considered in the study analysis include differences in divisional configurations and interests, i.e., research versus clinical. The time series design charts the impact of time on the outcome. In this study, time did appear to influence the outcome, and the pre/post group comparison permitted measurement at discrete points in time.

IV. Hypotheses

HYPOTHESIS 1:

Question 4 of the opinion section was used to test the null hypothesis, namely, that attitude toward the CL would not change as a result of exposure to the CL. As Lamb has stated (1975), the acceptance of the CL is crucial. The CL functions in a very nontraditional manner upon leaving the library. Donning a white coat, the CL takes on the look of a clinical care member. Clearly, if the CL

is not accepted in this role, he or she may not be able to fulfill their function.

After the CL service was implemented, we observed an increasing acceptance of the CL. Of note, the change was greater for nontraditional CL functions (e.g., the librarian in the hospital) than for traditional functions (librarians in the library). At first, the clinical care team members rated the nontraditional functions (opinion 1), the CL accompanying me on rounds, and opinion 4, the CL as a member of the clinical care team, neutrally or low on the scale of acceptance. The traditional functions scored far higher; however, the nontraditional roles shifted toward the positive for the post study data. All departments showed this consistent shift toward the positive. Opinion 3, attending staff meetings, showed a slightly negative shift. The pre or before overall mean was 3.51, post 3.45. However, nonacceptance in this task (attending staff meetings) is not as important functionally to a CL as both acceptance at rounds and acceptance as a member of the clinical care team (opinion 1 and 4, respectively).

Two factors may have influenced the neutral scores for opinion 3. First, each participating division had different configurations and schedules. Several respondents wrote remarks on the questionnaire indicating that they, themselves, did not attend staff meetings. Second, the Pediatric Division did not have identifiable weekly staff meetings, thus precluding an appropriate response.

The two most important changes, from an administrative point of view, were the positive shift for opinion 1 and opinion 4.

Functionally, the clinical librarian must attend rounds. Consequently, he or she becomes a member of the health care team. The fact that these two opinions showed a significant positive change in our program is indicative of CL acceptance. This acceptance can be used to justify placing other CLs on clinical divisions.

Perhaps these results stem from the support given by at least two people: the Dean of Medicine, who supported the library's efforts in the CL Program, and the Chief of the Urology Division, who is an active library user and enthusiastically introduced the program into his own department. These results suggest the rejection of the null hypothesis...that there is no attitude difference between health care members exposed to the CL and those not exposed.

HYPOTHESIS 2:

Questions 3, 7, 10, 11, 12, and 13 measured the validity of null hypothesis 2: The CL had no measurable influence on the information gathering habits of the clinical care team.

Question 3 elicited information regarding the individual journal subscriptions of the clinical care team members. A core list resulting from the responses to the questionnaires showed no appreciable change in this category pre and post exposure to the CL. The importance of identifying the subscription habits of the participants is threefold. The use of primary literature, i.e., the medical journal, is a means to keep current with the medical and scientific literature. The UTMS library subscribes to approximately 3,900 journals in the clinical medical subject area. Many clinicians and staff individually subscribe to a number of journals. The clinical librarian could thus bring

citations and references from journals, not necessarily the article itself, to those physicians who hold subscriptions. Also, a core list of preferred journals can be cumulated for each service, depending upon the perceived needs of the health care team members. For some libraries, especially those with very limited budgets and consequently limited journal selections, a core list would serve as a guide for selection and purchase of journals. Finally, pre and post changes can be observed by examining the list of preferred journals. Does the core journal list increase, decrease, or remain the same after exposure to the clinical librarian?

As described in Chapter 4 (Results), no appreciable changes were noted in the core list of individual journal subscriptions post exposure to the CL program. This does not necessarily indicate absence of change in reading habits; however, it does provide a self-selected journal list, which is specific to the needs of the clinical care team members.

Question #7 elicited information concerning the information sources team members used to resolve patient-care problems. The pre data responses resulted in a list of the more traditional and less individualized sources (papers in professional journals, item 6; books, item 8; private information files, item 13; and discussions with other health professionals, item 19). After the CL service began, the clinical care team members used the individualized sources more, relying heavily on private information files and personal libraries (item 13), information derived from discussions with other professionals (item 19), and formal consultations with other

professionals (item 20). This finding shows that a more individualized means of gathering information was achieved.

The CL encourages the use of these more individualized methods of gathering information; the physician is aided and encouraged to build personal files for frequently requested patient-care problems, and the CL's presence on rounds prompts informal discussion in hallways and at the bed side. The responses and changes in function pre and post exposure to the CL, observed in this study, lend support to the alternate hypothesis—that the CL has a positive influence on the information-gathering habits of the clinical team.

A possible disadvantage to the CL program is that the team members may come to rely too much on the CL for information. Therefore, the finding that even with the CL service a clinical care team member goes to the library as frequently or more frequently than before is a positive, not a negative, consequence. Alternatively, the team members could decide that the CL was so efficient, there was no need to keep up with their journal reading or to maintain good library skills. Therefore, care must be taken by the CL to encourage the clinical care team to use the library independently.

Question 10 deals with the frequency of library use. After exposure to the CL a slightly positive shift toward more frequent library use occurred; however, for those that were more frequent users, initially, a slight decrease occurred. This may indicate that some health care team members were inspired to utilize the library more frequently, whereas others learned to utilize the clinical librarian

for their library information needs and consequently reduced their library visits.

Question 11, 12, and 13 dealt with MEDLINE, the backbone of all medical literature searches. The questions were:

Question 11. Have you had a MEDLINE search done in the past year?

Question 12. Was it adequate?

Question 13. How did you request it?

MEDLINE is a service most respondents had used before the CL service began and one they continued to use after it began. The opinions of the clinical care team about the information they received shifted in a positive direction for all departments, with the exception of Family Medicine. In Family Medicine, 5 respondents answered that the information they received was more than adequate, but after the CL service began there was a twofold reduction in satisfaction with MEDLINE information. No one indicated that the information was less than adequate. Most of the respondents requested searches themselves before and after the CL service began. The reason for the shift in the Family Medicine Department respondents is not clear. Perhaps the group became more aware of the quality of searches during the CL service and thus were more critical afterwards. Also, the CL may have been seeking information which was not thoroughly or clearly elucidated in the literature.

In summary, this study demonstrated that the CL had a positive effect on the information-gathering habits of the clinical team members. Resource utilization, journal reading, library usage, and

MEDLINE requests all increased after exposure to the CL. Thus, the evidence supports acceptance of the alternate hypothesis.

HYPOTHESIS 3:

Responses to the open-ended question in Part II, Questions 7 and 9 and the monthly statistic reports were used to test null hypothesis 3, which held that the CL would have no effect on the amount or convenience of obtaining information for patient-care needs.

The clinical care team members responded positively and enthusiastically to the open-ended questions regarding the currency and availability of information provided by the CL. They reported good utilization of the special files and bibliographies provided by the CL.

Responses to Questionnaire No. 7 showed a greater use of private information files and more use of informal means of gathering information (e.g., discussion with colleagues, formal consultations).

These are important responses because one of the major objectives of the UTMB CL Program was to support the information requirements arising from the responsibilities of patient care, research, publication, and teaching activities. If the CL is successful in effecting the currency and availability of information, confidence will rise, more services will be requested, and, as a consequence, there will be an increase in the information sources used.

Question 9. "How convenient is it for you to obtain the library material you need? Responses to this question showed a positive shift in all divisions after the CL services began. All departments responded positively. This response indicated that the CL was responding within a perceived, adequate time frame to clinical care

questions, an important component of the CL's job description. One CL job objective was to establish a 24-hour or less turnaround time, measured from the time the information need was expressed until the information was delivered.

Question 8 dealt with this question. The 8-24 hour turnaround time represented a desired information delivery turnaround time for the clinical care team members; however, the CL had to be alert to the departmental members' special needs. The timing depended on the urgency of care being delivered. In the Pediatric Department, more acute-care patients were seen. Thus, a shorter information delivery time frame was often required. The Urology Division, on the other hand, dealt with chronic cases and elective surgery. An 8-24 hour delivery time was therefore quite satisfactory. The Family Medicine Department was presented with both chronic and acute cases that required two delivery times: 0-4 hours and 8-24 hours.

The positive responses to question 9 and the appropriateness of the perceived turnaround time for information delivery indicated in the responses to question 8 show that the clinical care team members found it more convenient to obtain library materials after CL exposure than before. These results support the alternate hypothesis No. 3.

HYPOTHESIS 4:

Results from the document evaluations, the monthly statistic reports, and Part II of the Interview all contributed data supporting rejection of null hypothesis 4, which stated that the CL would have no effect on the retrievability of patient-care oriented documents.

During the first 6 months of the CL program an evaluation form was attached to all documents retrieved in response to the clinical care team member's information requests related to patient-care questions. Information retrieved was rated as excellent, good, fair, and poor. The clinical care team members rated the documents (primarily journal articles) excellent to good twice as frequently as fair to poor. Written comments suggested that respondents were evaluating the degree to which the information added to their personal knowledge rather than the appropriateness of the information. For example, a medical student probably would find a general review article on cystitis excellent and more meaningful than the Chief Resident, who was already knowledgeable in that area.

Additionally, the periodical literature may not address some questions very well. On occasion, a "fair" discussion of a particular topic may be all that exists in the literature. The CL subsequently might expand the search to books, which often have a state-of-the-art summary. This evaluation form provided good initial feedback about the usefulness of the patient-care documents delivered by the CL. However, because the response rates were low (only 40%) and the respondents added numerous comments in the margins, making interpretation difficult, these checksheets were used only when the program was first started to assure that the CL was performing adequately.

The monthly statistics show an increase in clinical care requests and subsequent search requests. Responses to Questions 11, 12, and 13, of the Interview, Part II, support acceptance of the alternate hypothesis 4, that the CL positively affected information retrieval of

patient-care related documents. The clinical care team members stated that the CL aided them in identifying information needs, which provided them more time for reading and research and increased their utilization of MEDLINE services.

Interview Question 20. "Do you look at information brought to the unit by the CL? Only one person out of 16 queried said "no." Most used book lists, references in files, clinical topics in files, and other bibliographies. The frequency of use ranged from once a week to "whenever the need arises."

All persons interviewed answered the questions dealing with the strengths of the program and the perceived weaknesses or need for changes. Eleven of 16 respondents said there were no program changes they would like to see. One person each in two departments, Nephrology and Urology, said he wanted the information redefined or in more depth, meaning that the information could have been more useful. Comments on the strengths of the program focused on the ready access to the literature, the finding of the information needed, the provision of adequate bibliographies, and the quick retrieval of information.

HYPOTHESIS 5:

Question 8, "How often do you use the library?" and Questions 11, 12, and 13 (concerning the MEDLINE services) as well as questions from the Interview provided the test of null hypothesis 5, which stated that the presence of the CL would have no effect on personal library use.

Conventional wisdom suggests the possibility that the clinical care team member might depend on the CL for all his or her library

needs, and not visit the library or use its resources in person as frequently as before the program.

The results in Question 8 dispel this concern and show a shift toward more frequent usage of the library after CL services began. Most respondents used the library once a week. The faculty in the department of Family Medicine showed equivalent response patterns. Some used the library more, some less, but overall there was a shift toward increased usage.

As indicated in Question 11, 12, and 13, all respondents used the MEDLINE search services in the past year both before and after the CL program. The clinical care team member used the CL for some of these searches. They responded that they also requested MEDLINE searches independently of the CL. Perhaps this shows that the clinical care team members were interested in up-to-date information and the state-of-the-art in their field, which MEDLINE readily offers. Currently, the only way to utilize MEDLINE services is to request the service directly from a clinical or reference librarian. Thus, the respondents used library services either by going to or calling the librarian.

In the Interview, some questions dealt directly with library use. For example, Question 13 asked "In what way has the presence of the CL changed the amount of time you spend seeking/utilizing information?" The respondents indicated that the CL saved them a great deal of time. With their spare time they could pursue other areas of immediate interest, oriented more toward patient care and journal club interests.

HYPOTHESIS 6:

In the Interview, Questions 10, 11, 12, 13, 17, 23, and 24 were used to determine the clinical care team member's knowledge about the library. All persons answered the questions and many of the comments were judged germane (Chapter 4).

Responses to Question 11, "To what extent has the CL aided you in identifying your information needs" and Question 12, an open-ended question that requested clarification of Question 11, suggested that the clinical care team members had a working knowledge of specific information needs. Responses such as "CL knows research needs," "CL sought more than I would," "CL is expedient in information retrieval," "CL helped me with new information," and "CL selects articles," all indicate a sophisticated knowledge level regarding current literature and resources. The responses suggest an ability to distinguish among several levels of useful and important specific information sources.

Question 13, "In what way has the CL changed the time you spend seeking information?" received such responses as "CL removed road-blocks" (see Results, Chapter 4). Most respondents stated that the CL freed up their time for patient care and reading. However, this may mean that although the clinical care team members felt the need for information, if given a choice they would select activities such as reading, patient care, and research rather than doing their own library research.

Responses to Question 17, which asked who made the information request, the users or the CL, indicated that half actually used the search tools themselves. Other open-ended comments suggested that with

the CL service, both the information sources used and the awareness of these sources increased.

Question 23, regarding the program's strong points, received mainly positive responses. For example, one person stated "the CL teaches us more about the library." Eight of 13 commented that the CL gave ready access to recent literature, that they received the information they sought, and that the bibliographies retrieved by the CL adequately met their information needs. All these respondents showed a sensitivity toward information retrieval that generally is shown only by persons knowledgeable about library resources and information. The apparent conclusion is that these clinical care team members added to their personal information banks, knowledge about how libraries work and what information they can provide. The clinical care team members were, therefore, more critical in the evaluation of the breadth, quality, and appropriateness of the retrieved information.

Question 24, "What are the weak points of the program," was answered with such statements as, "not learning about library resources." Although this statement seems somewhat contradictory in juxtaposition with Question 23, it reflects an awareness that each person must experience the library resources firsthand in order to be familiar with and know how to use them. The faculty reported that some of the residents needed assistance in learning how to utilize the library resource and suggested that the CLs might teach them. Again, the results of this study indicate a fairly sophisticated knowledge of library resources. To request aid in learning more about library

resources, first, one has to be aware of the potential tools and services.

Starting in June 1982, the UTMB Reference Librarians began teaching a monthly course called "Library Orientation for Students" (LOST). The Chief of the Urology Division requested this presentation for third-year medical students during their Urology rotation. The reference librarians structured the course to reflect the Urology students' subject interests, using relevant resources and carefully selected samples. There was a positive increase in test scores post exposure to the CL service, reflecting an increase in the retention of specific knowledge of library resources. Other tests or follow-ups, as the students approach residency, should reflect further knowledge and learning retention. However, the stimulus of the class, the enthusiasm of the Urology Division Chief, and the continuity of monthly instruction were a good beginning to the establishment of life-long learning habits, which included knowledge and utilization of library resources.

Through personal testimony, positive test scores, and summative results, the alternate hypothesis 6 is supported over the null hypothesis. Other library statistics, such as increases in MEDLINE services, both from the CL activities and the reference department's statistics, as well as increases in the general library reference statistics and the feedback from the library instruction course test results, provide additional support to alternate hypothesis 6. These statistics indicate a knowledgeable level of library resources and literature.

HYPOTHESIS 7:

Null hypothesis 7 held that the C1 program would have no effect on cost. Cost Benefit Analysis (CBA) and Cost Effectiveness Analysis (CEA) are tools one uses for measuring cost. Both require that the significant costs and desired results be addressed, identified, measured, and compared. However, these tools of measurement differ in one respect. CBA measures both cost and success in monetary terms, whereas the CEA can measure success independent of monetary value. Thus, the CEA permits a more flexible research design without elimination of the cost benefit assessment. It also more easily permits comparison of programs with similar objectives and measurement criteria.

The "cost effectiveness ratio" (cost per amount of change) indicates the level of cost effectiveness a program has achieved. When the cost effectiveness ratio is low, it indicates a low unit of cost per unit of outcome (i.e., a high cost effectiveness). Conversely, when the ratio of cost to effect is high, it indicates a high cost per unit of outcome (i.e., a lower cost effectiveness). CEA-compared programs must use the same criteria (not necessarily money) to determine the relative value of a unit of outcome, i.e., the effectiveness or success criteria. Because of its greater flexibility, the UTMB CL program evaluation used the CEA to assess cost effectiveness.

V. Was the UTMB Program Cost Effective?

To determine the cost effectiveness ratio, the cost of the program was measured in terms of staff time, salaries, online data base

searching costs (based on an hourly rate), photocopy expenses, and other material costs (Chapter 4, Tables 18 and 19). Yearly costs for all CL services totaled \$57,385.

The CL services data showed increases in numbers of database searches, and in the numbers of clinical researchers, staff, and students receiving CL services. Increases were also observed in the numbers of contacts made and the places they were made, such as rounds, informal conferences, and the Intensive Care Units (ICU's) (see Chapter 4, Results). The change in costs from beginning to end of this program is reflected in the testing of hypotheses 1 through 6 and by direct measurement of increases in CL services.

1. Positive changes in the acceptance of the CL's nontraditional roles were noted after CL services were introduced (Hypothesis 1).

2. Measurable CL influences on the clinical care team's information gathering habits (Hypothesis 2).

3. The CL positively affected the amount and convenience of obtaining information for the clinical care team member's patient-care information needs (Hypothesis 3).

4. The CL positively affected retrievability and usefulness of CL delivered problem-oriented, patient-care documents (Hypothesis 4).

5. The CL positively affected personal use of the library by clinical care team members (Hypothesis 5).

6. The aid and assistance of the CL positively affected the team member's knowledge of library resources (Hypothesis 6).

Other changes, in addition to these six hypotheses, were increased database searching (over 1,500 more per year) and increased contacts

with clinical care team members. One CL, covering two or three clinical services, can serve between 40-60 persons. This includes the clinical care team (as defined in Chapter 3), of approximately 15 persons per service, and the students rotating through the services, equalling 10-15 per year.

A cost figure per search question can be determined using the data from Chapter 4 (Table 19). In 1980/81, the yearly cost of CL services, including salaries, materials, photocopy costs, and database searching costs was \$57,385.70. CL database search costs were based on total annual numbers of database searches, which equalled 1,659. Each search averaged five minutes, and the hourly fee was \$15.00. Thus, a five-minute search cost \$2.50, resulting in a total annual database search cost of \$4,147.50. Based on the 1980/1981 salary figures and material costs, each discrete question presented to the CL cost the institution \$59.00.

Compared with current open-market information costs, this is an average information service cost. It appears to be both reasonable and cost effective, when considered in light of the results from a similar study conducted at the University of Cincinnati Medical Center Libraries (UCMC). Their results showed that each information search packet cost approximately \$50.00 to assemble. It is not clear from the UCMC data, whether equipment costs were included in their reported material costs. Additionally, they did not document change, since pre and post studies were not performed. However, the UCMC report does conclude that the changes resulting from their program were positive and cost effective.

An insufficient number of cost effectiveness studies have been performed to permit meaningful, valid group comparisons. Therefore, it is not clear whether the UTMB or UCMC cost effectiveness ratio (cost/amount of change) is high or low. The resulting changes in the UTMB program were positive, however, and the costs moderate. Thus, these data support the alternate hypothesis 7.

HYPOTHESIS 8:

Null hypothesis 8 states that the CL program will have no impact on patient care delivery. H1 states that it will influence patient care, and alternate hypothesis H2 states that the outcome measurement will be inferential at best.

In this and other CL programs, the underlying assumption is that a better informed physician will make a better informed patient-care decision. The literature concerning the effects of Continuing Medical Education (CME) is extensive (Chapter 1). The CME literature focuses on improving the physician's motivation to keep abreast in his/her field. When asked which method was preferred, physicians ranked "reading medical books, journals, and other relevant literature" as number one. In the 1950's and 1960's, CME program developers began to view the perceived need for medical information as a self-motivating factor. The medical library, a rich literary resource, and the Clinical Librarian increase the perceived information need and make the literature more accessible to the health care team.

Hypothesis 8 requires a measurable outcome criterion. Improvement in patient care is difficult to measure because of the many variables, which cannot be controlled. Thus, the outcome criterion "to create a

better informed physician" and measurement of this criterion, by showing increased exposure to the medical literature, is viable. This criterion was used for the UTMB CL program. The program goal, to create a better informed physician, was achieved by virtue of the following findings. First, the opinion questions showed that the clinical care team accepted the nontraditional CL roles. Concerning their reading habits, the clinical care team members already subscribed to subject specific journals. However, the information sources most important for solving patient-care problems were papers in professional journals and private information files. An important component of the CL's function was to encourage the building of private information files. Post exposure to the CL, the use of private information files increased. Other questions dealing with library use and information needs indicated similar increases in knowledge and utilization of library services, which were confirmed by the responses to the open-ended questions and the library monthly statistical reports. Finally, the clinical care team members indicated that the information they received was current and appropriately chosen. Therefore, we can infer that these physicians made well- and even better-informed decisions because of their participation in the program.

VI. CL Program Impact at UTMB

The Clinical Medical Librarian Program is entering its second decade with a clear lack of hard evaluative data. The extensive proliferation of these outreach services and the numerous novel approaches to their delivery suggest the need for evaluation. To adapt to the rapid changes in the delivery of medical care, clinical care

team members are engaging in Continuing Medical Education programs and utilizing library services more than ever before. This study shows that the CL Program fills the current gap between vital library resources and clinical/research users. Hard evaluative data from other CL programs may help to insure the survival of these services and would, at the very least, provide useful comparative data for other existing CL programs.

Library use by CLs and clinical care team members has increased in all areas. Librarians, who are trained as resource persons, are assuming new roles and a changed image. Library users commonly view the librarian in a very traditional manner, as a "woman" wearing a bun, squeaky shoes, and hovering close to her neatly arranged books. One assumption of this study is that attitudes toward the CL, a very non-traditional librarian, will change as the CL becomes more visible. The attitude toward the CL did, in fact, change in the UTMB CL Program, and thus brought acceptance of this new "outreach" role.

Another change occurring since the implementation of the CL program at UTMB is a subtle dependency shift. The clinical care team members now depend more on the library resources than on the CL to fulfill their information needs. Rather than expecting the CL to provide all of their library services, a danger inherent in a program of this nature, the clinical care team members personally utilize the library for journal club reading materials, article reviews, and journal perusal. They also use the library for indepth literature reviews and research projects. The clinical care team members do

request CL assistance for MEDLINE searches (which have increased at UTMB), but this is an area where the CL's are expert. Team members request that CL to assist them with bibliographies and supply them with book reviews. The dependency on the CL for MEDLINE service is a positive factor in promoting more CL programs. When the clinical care team members leave the department, they may expect, and ask for, similar CL services at other institutions. Additionally, there is a good chance that these individuals will encourage their students and colleagues to adopt a CL service.

The CLs had a substantial impact on the user's library knowledge and utilization at UTMB. This study demonstrated increased library visits, increased library resource usage, and positive attitude changes as a consequence of the CL Program. Other library statistics, such as increases in MEDLINE services and general library inquiries, also supported this finding and suggested that a higher knowledge level had been achieved.

Upon request, the CLs implemented a resident and student library instruction course. The courses began in 1980 and 1982, respectively. Both the CLs and the reference librarians taught the course to graduate nursing students, pediatric fellows, occupational therapy students, and pharmacology residents. In the second year, the librarians designed a Urology resource course specifically for the third-year medical students, complete with a pre/post test designed to test knowledge retention. The encouraging results showed good knowledge retention after the course work. A future project might be to review knowledge retention over a longer period. Byrd assessed people's perception of

the CL program after leaving the program conducted at the University of Missouri-Kansas City (UMKC; Byrd 1979). Sixty-six graduates had positive impressions of the UMKC CL program after leaving the program. The graduates credited the CL with helping them learn how to use library resources effectively. Similar studies would be appropriate in the field. An attitude and perception review after persons exposed to the CL Program leave UTMB might reflect similar results.

We are witnessing, perhaps, an intermediary stage between the traditional, non-automated library and the future electronic library. Access to the massive patient-care related medical literature is critical. The CL aids in this accessibility. Perhaps, one day the CL will be replaced by a computer terminal and headphones, but until then, the CL bridges the gap between the clinical care team and the complex task of identifying and retrieving appropriate information.

TABLE 27. CL EFFECTIVENESS AT UTMB
RESULTS BASED ON HYPOTHESIS TESTING

Statement of Hypothesis and Effect of CL

Hypothesis		Question Results (Effect of CL)
H1	Attitude of health care team toward CL	Positive, acceptance of nontraditional CL roles
H2	Information-gathering habits	Positive, increased utilization
H3	Patient-care documents retrievability	Positive, increased literature access
H4	Patient-care documents usefulness	Positive, increased literature access
H5	Library use	Positive, increased usage
H6	Knowledge of library resources	Positive, sophisticated knowledge level
H7	Cost effectiveness	Positive, moderate costs
H8	Impact on patient care	Better informed clinical care team

VII. Limitations of this Study

This study utilized both mixed questions (fixed alternative type, open-ended type, and scaled items) and two different types of questionnaires (interview and written). Although the questions were worded carefully and the interview conducted according to a script, limitations, due to the inhomogeneity of the measurement instruments used, did exist. In general, the data were self-reported. Consequently, the questions, oral or written, may have been interpreted differently by each individual. Some of the respondents may have objected to writing down their answers, checking boxes, or spending time reading the instructions. Others may have been concerned about anonymity, even though strict confidentiality was guaranteed. Finally, each of the three kinds of questions used had unique advantages and disadvantages.

The fixed alternative items in the questionnaire (i.e., #8, #10, #11) force the respondent to select from a limited number of alternatives. There are several disadvantages to this type of question. First, the questions are necessarily superficial, and if one could probe the respondent, their answer might be quite different. Second, the respondent is sometimes forced to choose an answer that only approximates his/her real response, or, because none of the items really fit, the respondent may leave the question blank. Interviews and careful wording of the questions were methods used in this research to overcome the limitations of fixed alternative questions.

The open-ended questions establish a frame of reference, yet place minimum restraint on the respondent's answer. Interviews can establish

rapport, encourage cooperation, or detect ambiguity. However, the volume of data an interview elicits can be unwieldy and difficult to analyze. On the other hand, an interview may uncover unexpected answers, or demonstrate unanticipated relationships. For these reasons, although the open-ended questions (#2 and #3) and the final questions of the interview yielded good information, the responses were difficult to report succinctly and subject to wide interpretation possibilities.

The scaled items with fixed alternatives, such as question #4 with a Likert Scale, permit a greater variation of response. The disadvantages to scaled item questions, however, lie in the fact that individuals tend to use certain types of responses, resulting in a response reflecting a personality trait. In a rank-order scale, the defect is a lack of independence of items. For example, all items in question #5 are possible areas of importance to the respondent's information needs; if some are not chosen and the results are pooled, the resulting rank order may be inaccurate.

Throughout the questionnaire and interview development, careful attention was given to construction and wording. Appropriate question types were selected depending on the objective, i.e., attitude measure, opinion, factual information, and so forth. The statistical analysis was performed blindly and data, when reported, were included. Nevertheless, self-report data have limitations, some of which are described above.

VIII. Implications for Future CL Programs

The future of the CL Program is particularly crucial in light of the current information explosion brought about by computerization. The Nina Matheson AAMC Report addresses the issue of information management in academic medicine (Matheson 1982). This report calls for managers to think beyond today to the stages to which technology is taking our culture, to develop a future strategic plan, and to establish a model for desired strategic outcomes. The AAMC report addresses the new information technology available and the patterns, stages, and rates of technological adaptation. The report also addresses the behavior and attitudes of individuals toward information management. The recipients, i.e., librarians, clinicians, and academic faculty must be prepared as well as eager for the technological changes that are fast approaching. The AAMC report views librarians as catalysts and leaders in the changing climate of information management, stating that an essential first step is to transform the library from a repository to an interactive information transfer and management system.

Matheson describes three distinct stages which illustrate the information handling environment evolution. Stage 1 is the modern resource library. In Stage 2, the library is in transition toward an information management center, and in Stage 3, the library is an information management system for computer-stored files. Most libraries today have already entered into Stage 1.

The Clinical Medical Library Program (CML), or the Clinical Library Program (CL) can be viewed as a liaison program which will

help make the first stage a reality and the second and third stage possibilities for the future.

Expanding technology will undoubtedly provide health care team members with an opportunity to access information via computer at home and at work. If future predictions, such as those from Megatrends (Naisbitt, 1982), are true, data terminals are here to stay as we move from an industrial to an informational society. In the past five years, more than 600 library information files have become available online through computer terminals. A commercial vendor, Bibliographic Retrieval Service, Inc., (BRS) offers services called BRS After Dark, and BRS Colleague. These are inexpensive (\$12 a month plus time online) subscription services marked with an "easy to follow" user's manual. An individual subscriber can search science/medicine, business/finance, and reference book databases from his/her home or office personal computer.

The AAMC report emphasizes, however, that furnishing a computer data terminal and making information available do not automatically produce good use of available resources. A link is needed, and that link is the library, an important management integrating center. The AAMC report specifically cites the Clinical Library Program as a program designed to reduce the clinicians' and researchers' time intensiveness and to improve the speed and accuracy of information retrieval.

From the experience at UTMB the CL program does fill these roles. In addition, the program establishes an effective marketing method and

educational base to move the library toward Stage 3, the information management center.

The CL program is an outreach program through which the health care team members are introduced to available resources and made aware of quality information retrieval. The CL is, by training, subject knowledgeable and can select appropriate articles and bibliographic references to meet the health care team's information needs. In this manner, Clinical Librarianship assists the health care team members' information-gathering and life-long learning habits. The results of this study indicate that CLs positively influence the health care team members' attitudes toward information services and also positively affect their information-gathering habits.

Much has been written concerning the volume of medical literature generated each year and the need for such literature, and yet, how little health care workers avail themselves of these resources. When the CL Program was first introduced at UTMB, library services and resource usage were monitored. By the end of the program, there was an encouraging trend toward more and better use of available library resources. This trend can be attributed to the CL Program.

As automation changes our lifestyles and the way we receive and retrieve information, there will be a smoother and more efficient transition if users understand the full implication and relevance of information retrieval. The transition to the new high technological information age will be steady and smooth, if we are adequately prepared. The CL Program can facilitate this transition. This study has shown an already positive influence and future need for good

planning, design, and evaluation of these important and innovative approaches to meeting the information needs of the health care team members.

IX. Implications for Further Research

The library of the future will be a center of information, research, education, brokerage, consultation, and relay. Libraries of the future probably will house only a modest amount of physical information (i.e., books, journals). Rather they will serve as the gateway to other diverse databases. In the academic setting, all campus facilities, including the library, will be linked via communication networks, both within and without the institution. The proliferation and use of personal computers have already established this trend, and give credence to several reports predicting the future role of libraries and librarians (AAMC Report I, II). The synthesis of these reports yields three basic characteristics. First, the library of the future will have a network rather than hierarchical database structure. It will be linked electronically both within and without the institution. Video computer terminals (CRTs, cathode ray tube), such as personal computers, will provide the link between the individual, the library (relay station), and the appropriate database or other information resource. As the technology and software advance, we will move away from independent databases toward a complete electronic environment, where bibliographic, text, and primary information databases are linked together and searchable from any properly accessed CRT. Further research therefore should focus on the "computerization" and "electronic management" of traditional library

resources. The opportunities for fruitful investigation would appear limitless. It is imperative for all librarians, however, to have a firm background in, and understanding of, computers and the principles of electronic information management.

Thus, the CL of the future of necessity will have expertise in all areas of electronic communication, including structuring and indexing databases, retrieving information (e.g., searching databases, managing personal information requests), brokering databases, and managing information transfers. The training of health care professionals will take place in the work place, rather than in the library, by means of self-taught software training programs, which emphasize the principles and practices of database building.

Currently, the CL programs fill the void between the clinical care team and the complex tasks of information identification and retrieval. The tasks and duties performed by the CL, as described in this and other research, may represent a short-term solution, required only during the transition from the traditional non-automated library to the fully electronic library. Thus, future CL's may return to the library to concentrate on information management rather than information retrieval. The CL will focus more on strengthening the health professionals' independent information-seeking skills and encouraging and teaching personal "end user" database searching.

Already in development are several interactive networks for medical information usable in local libraries by physician and hospital personnel. GaIN, Georgia Interactive Network for Medical Education, is one example, which has the goal of transmitting medical information via

computer directly to the individual requesting the information. The project involves networking and participation on three levels: the practice site or physician's office, the hospital library or local information resource, and the site library (in this case, Mercer University School of Medicine, Medical Library). By electronic mail, physicians have access and can send messages to colleagues and they can access other information files, such as the continuing education course list. Moreover, they can "dial through" to Telenet, an external telecommunications network, to research other databases, such as AMA/Net (American Medical Association Network) and MEDLINE (the NLM database).

The National Library of Medicine (NLM), a front runner in indexing and computerizing medical literature, is currently funding a project called IAIMS, Integrated Academic Information Management Systems, Planning and Development Programs. An objective of IAIMS is to build on institutional strengths by expanding database management systems to incorporate and facilitate the flow of new information through the system and to advance the application of information technology to the biomedical sciences.

The CML program was conceived out of necessity. Many librarians instituted CL programs independently, often without institutional wide commitment (or policy) or a planned evaluation. Consequently, in ten years only a handful of evaluation data exist, making program justification difficult. The stakes are higher now. New programs involving electronically retrievable information and databases are costly and require broad institutional support, both substantive and

philosophical. Thus, future research efforts will be needed to document and evaluate these new programs, such as GaIN and IAIMS. Research begun early in the "network development" stage may answer questions that arise later regarding information needs, information retrieval, and learning methods. Research of this nature will also assist the librarians and physicians to work together as a team toward understanding and applying the principles of information management. Finally, as the professional role of the librarian changes, such controlled, evaluation studies will help to identify deficiencies and new areas to be explored in postgraduate library science education.

REFERENCES

1. Algermissen, V. Biomedical librarians in a patient care setting at the University of Missouri-Kansas City School of Medicine. Bull. Med. Libr. Assoc. 1974;62(4):354-358.
2. American Medical Association, Continuing Medical Education Fact Sheet. Chicago: American Medical Association, July 1, 1981.
3. American Men and Women of Science.
4. Association of American Medical Colleges and Institute for the Future, The Management of Information in Academic Medicine. Washington, D.C.: AAMC, C 1982, 2 Volumes.
5. Berg, A.O., Does continuing medical education improve the quality of medical care? A look at the evidence. J. Fam. Prac. 1979; 8(6):1171-1174.
6. Boissoneau, R., Continuing Education in the Health Professions. Rockville, Maryland, Systems Corps, 1980.
7. Brodman, E., Medical periodicals. Library Trends. 1961-1962; 10:381-389.
8. Brown, C.R., Jr., Uhl, H.S., Mandatory continuing education: Sense or nonsense? JAMA 1970, September 213(10):1660-1668.
9. Clevesy, S.R., A modified clinical medical librarian program. Bull. Med. Libr. Assoc. 1980; 68(1): 70-71.
10. Cochran, W.G., Snedecor, G.W., Statistical Methods, 7th ed., Ames, Iowa, Iowa State University Press, 1980, p. xxx.

11. Coggeshall, L.T., Planning for Medical Program through Education. Report submitted to Executive Council of Association of American Medical Colleges. Chicago, AAMA, 1965.
12. Colaianni, L.A., Clinical medical librarians in a private teaching-hospital setting. Bull. Med. Lib. Assoc. 1975; 63(4): 410-411.
13. Dyer, B.V., Lifetime learning for physicians, principles, practices, proposals: A report from the joint study committee in continuing medical education. J. Med. Educ. Suppl. 1962 June; 37(6): 1-134.
14. Ebert, M., The rise and development of the American medical periodical 1779-1850. Bull. Med. Lib. Assoc. 1952; 40:243-276.
15. Farmer J., Experimental Provision and Evaluation of a Clinical Librarianship Service, a Grant Proposal. 1977.
16. Garfield, E., Essays of an Information Scientist. Philadelphia, ISI Press, 1980.
17. Greenberg, B., Battison S., Kilisch, M., Lerdu, M., Evaluation of a clinical medical librarian program at the Yale Medical Library. Bull. Med. Lib. Assoc. 1978; 66(3): 319-326.
18. Gunning, J.E., Fierberg, J., Goodchild, E., Marshall, J.R., Use of an information retrieval service in an obstetrics/gynecology residency program. J. Med. Educ. 1980 February; 55(2): 120-123.
19. Kerlinger, Fred N., Foundations of Behavioral Research, 2nd ed. New York: Hold, Rinehart and Winston, C 1973.
20. Lamb, G., Jefferson, A., White, C., And now clinical librarians on rounds. Hartford Hospital Bulletin 1975; 30(2): 77-87.

21. Lloyd, J.S., Abrahamson, S., Effectiveness of continuing medical education: A review of the evidence. Evaluation and the Health Profession 1979 September 2(3): 251-280.
22. Marshall, J.G., Clinical librarians join health care teams to provide information directly. Canadian Library J. 1979 Feb/April 36:23-28.
23. Matheson, N.W., Academic information in the academic sciences center: Roles for the library in information management. Journal of Medical Education 57(10):Part 2, 1982.
24. McDonald, C.J., Wilson, G.A., McCabe, G.P. Jr., Physician response to computer reminders. JAMA 1980, Oct 244(14): 1579-1581.
25. Meadows, A.J., ed., The Scientific Journal. London: ASLIB, 1979.
26. Millis, J.A., A Rational Public Policy for Medical Education and its Financing. A Report to the Board of Directors, The National Fund for Medical Education. New York, New York, 1971.
27. Morris, L.L., Fitzgibbon, C.T., Evaluators Handbook. Beverly Hills, Sage Publications, Inc., 1978.
28. Naisbitt, J., Megatrends: Ten New Directions Transforming our Lives. New York: Warner Books, 1982.
29. Price, D. de S., Little Science, Big Science. New York, Columbia Press, 1973.
30. Richards, R.K., Cohen, R.M., Why physicians attend traditional CME programs. J. Med. Educ. 1980; 55:479-485.
31. Roach, A.A., Addington, W.W., The effects of an information specialist on patient care and medical education. J. Med. Educ. 1975; 50(2): 176-180.

32. Schnall, J.G., Wilson, J.W., Evaluation of a clinical medical librarianship program at a university health sciences library. Bull. Med. Libr. Assoc. 1976; 64(3): 278-283.
33. Schulberg, H.C., Baker, F. "Program Evaluation Models and the Implementation of Research Findings" in Readings in Evaluation Research, pp 54-63, ed. Francis G. Caro, NY, Russel Sage Foundation, 1977.
34. Scriven, M., Evaluating education programs, The Urban Review 1969, Feb 3(4):20-22.
35. Stein, L.S., The effectiveness of continuing medical education: Eight research reports. J. Med. Educ. 1981; 56(2):103-110.
36. Stross, J.K., Harlin, W.R., The impact of mandatory continuing education. JAMA 1978; 239(25): 2663-2666.
37. Suchman, E.A., "Evaluating educational programs", in Readings in Evaluation Research, pp 48-53, ed., Francis G. Caro, NY: Russel Sage Foundation, 1977.
38. Thornton, J.L., Medical Books, Libraries and Collectors; A study of bibliography and the book trade in relation to the medical sciences. 2nd ed. London, Andre Deutsch Ltd., 1966.
39. Uhl, H.S.M., Continuing medical education. N Engl J Med 1971;284:50-51.
40. Vollan, D.D., Preview of principal findings of American Medical Association survey of postgraduate medical education. JAMA 1954; 155(4):389-392.

41. Watkins, B.T., Move to require continuing education for professionals appears to be stalling. The Chronicle of Higher Education 1980 Nov.; 21(13): 1.
42. White III, A.A., Savit, K., Madeleine, E., McBride, M.E., Clinical information coordinator: A new information specialist. Bull. Med. Libr. Assoc. 1980; 68(4):367-369.
43. World Medical Periodicals, 3rd edition, 1961.

U.S. copyright law (title 17 of U.S. code) governs the reproduction and redistribution of copyrighted material.

APPENDICES

APPENDIX I

TABLE 1
CLINICAL LIBRARY SERVICE - EVALUATION STUDIES

Institution Name	CL Department/ Date Implementation		Formative		Summative		Time
			Input	Process	Output	Outcome	
UMKC Univ. Missouri Kansas City, Missouri	Docent Teams	Sept. 1971 (1st) Aug. 1972 (2nd) 1974 (3rd)	materials time money personnel initial acceptance	# requests # transactions # photocopies staff actively diaries	identify core journals incr. MEDLINE incr. lit. searches acceptance (fr. diaries)	"cannot quantify impact of student learning and patient care" recorded in diaries	1st year 2nd year 3rd year
Cook County Hospital Chicago, Illinois	Pulmonary Medicine	July 1, 1973	materials time acceptance	# articles # transactions long searches short bibliog	incr. MEDLINE incr. lit. searches incr. seminars	subjective testimony from survey	1 year
Univ. Washington Science Library Seattle, Washington	Neonatal Intensive Care NICU Orthopedics	1973 1973	time money personnel # rounds	# requests # MEDLINE # searches (other) # transactions	questionnaire 30/38 NICU 15/26 Orthoped. acceptance incr. awareness incr. lit. searches incr. influence on pt. management saved time	"education awareness of library" "clinical improvement in determining diagnosis" "immense educ. benefit reflected pt. care" "improved pt. care"	N/A
Cedars of Lebanon Hospital L.A., California	Surgery Pediatrics OB/GYN	April 1973 August 1973 February 1974	time personnel	# MEDLINE # manual searches # photocopies	incr. photocopy acceptance (fr. diaries)	"physician indicate immense educational benefit" Physician/library liaison reported	N/A
Washington Univ. School of Medicine St. Louis, Missouri	39 Residents	July 1974	money personnel cost/month	# subj. searches # transactions # manual searches photocopy cost use of service per resident	resident interviews 16/39 acceptance CBA Would user pay? incr. use of library	N/A	Jan-June 1975
Hartford Hospital Hartford, Connecticut	Surgery Pediatrics Medicine	September 1974 July 1974 1975	materials time money personnel initial acceptance	# requests # transactions # articles diaries	acceptance fr. diaries incr. activity incr. influence on pt. management document info seeking method incr. lit. searches incr. MEDLINE	N/A	N/A
Yale Univ. New Haven Hospital New Haven, CT		1975	time money personnel	# requests/mo # MEDLINE # manual searches staff activity	acceptance	N/A	N/A
McMaster	G.I. Unit Rheumatology OB/GYN Neurology Pediatrics	1975 1978 1978 1978 1978	material time money personnel	# trans. # sources # MEDLINE diaries	topics acceptance incr. lit. searches incr. liaison by Public Library pkg. resource in binder	seeking document info habits and skills treatment/controls groups	6 mo. 9 mo.
UCLA	OB/GYN	1976	material time money	# transactions # MEDLINE # lit. searches	incr. consultation incr. library utilization	"effect of program on quality care difficult to assess"	1 yr. later
Texas Tech. Univ. Sch. Med. Health Sci. Lubbock, Texas	Family Prac. St. Mary's Hospital, Lubbock (part-time) Surg-Amarillo Grand Rounds, VA Malong (part-time)	1976	N/A	N/A	N/A	N/A	N/A

FIGURE 1
MODEL FOR CLINICAL LIBRARY PROGRAM EVALUATION

STAGES

1. NEEDS ASSESSMENT

2. PROGRAM PLANNING

3. FORMULATIVE EVALUATION
(Preliminary Study)

INPUT

PROCESS

4. SUMMATIVE EVALUATION
(Final Study)

INPUT

PROCESS

OUTPUT/OUTCOME

ELEMENTS

- opinions of users, administrative librarians,
- assessment survey
- priorities of needs

- Actual behavior to be changed
- Amount & Type of Change
- Length of Time
- Direction of Change

- Decreased cost/benefit or unit of effectiveness
- Implication of behavior change
- Standards to be achieved

- Organizational structure
- Set Policies
- Set Procedures
- CL activities - define
- Financial support - establish
- What data to collect
- What time frame

- Sample size
- Target Group

- Method of measuring behavior to be studied
- Tools
 - questionnaire
 - tests
- Record Baseline Data

- Data to Collect
 - Diaries
 - # Photocopies
 - # Transactions
 - # Data Base Searches
 - # ILL Requests

- Sample group
- Target group

- Method of Measuring behavior to be studied
- Tool
 - test
 - questionnaire
- Record Baseline Data

- Data to collect
 - Diaries
 - # Photocopies
 - # Transactions
 - # Data Base Searches
 - # ILL Requests

- Measure Change
 - Physician's use of library
 - Physician knowledge of library
 - Physician perception of library
 - Physician information seeking behavior
 - Patient care - treatment changes
 - Pharmacological treatment changes

WRITTEN RESULTS, REPORT

CL INFORMATION QUESTIONNAIRE

The Clinical Librarian (CL) is a potential new member of the health care team. The CL provides a new dimension of service to the members of the patient care team by learning their information needs first hand. The CL then acts as an interface between the team and their medical information needs. Similar programs across the U.S. have demonstrated the value of rapid, problem-oriented literature retrieval. The specific aims of this program are:

1. To identify and provide for the patient-related information needs of the health care team.
2. To cumulate information into a collection of documents which answer questions raised by health professionals or groups.
3. To evaluate the Clinical Library Service.
4. Facilitate use of the Medical Library.

In order to accomplish our objectives, we need your assistance. Please answer the following questions as thoroughly as possible. From this point on, until the end of this questionnaire, all responses will be separated from the identifying information listed on Page 2 and coded to insure confidentiality.

CLINICAL LIBRARY SERVICE
INFORMATION QUESTIONNAIRE

CARD 1
COLS

NAME: _____ DATE: _____
1-4

5

PRESENT TITLE:

6-9

STUDENT (Check both TYPE and YEAR)

10

TYPE:

YEAR:

11 _____ Medical _____ 1st year _____ Residency
12 _____ Nursing _____ 2nd year _____ Master's Program
_____ Allied Health _____ 3rd year _____ Other _____
_____ Other _____ 4th year

.....

FACULTY/STAFF (Please fill out completely)

Department _____
13-14

Title/Rank _____
15

Years at UTMB _____
16

CL INFORMATION QUESTIONNAIRE

Please answer the following questions as completely as possible.

17 1. Have you ever had experience with a CL program?

_____ yes _____ no

18 If so, indicate the place and year. _____

19-20 2. To how many professional organizations do you belong? _____

Please identify the organizations below (no more than three):

23-24 a. _____

b. _____

c. _____

3. To how many professional journals do you subscribe? _____

Please identify the journals below (no more than three):

a. _____

b. _____

c. _____

4. Part of the Clinical Librarian's (CL) daily routine will be to accompany the clinical health care team on their rounds, their meetings and attend relevant seminars. Please indicate your opinion concerning each item listed below by placing an "X" in the box which corresponds to your feelings.

Strongly
Approve

Strongly
Disapprove

25 a. The CL accompanying me on rounds

26 b. The CL attending Department Seminars

27 c. The CL attending staff meetings daily

28 d. The CL as a member of the health care team

CL INFORMATION QUESTIONNAIRE continued

		STRONGLY APPROVE		STRONGLY DISAPPROVE
<u>29</u>	e. The bibliographic files which the CL will generate and keep in a departmental file			
<u>30</u>	f. CL selection of articles appropriate to my needs			

5. In answering the following questions, please follow the instructions below:

Please rate the importance of each of the listed subject areas as pertains to your own information needs by circling a number from 1 to 5. 1 is "most needed," and 5 is "not needed at all."

<u>Subject Areas</u>		<u>Personal Needs</u>				
		<u>Most Needed</u>		<u>Not Needed</u>		
<u>31</u>	1. New developments in areas of specialization	1	2	3	4	5
	2. Routine patient care					
<u>32</u>	a. aid in making or confirming diagnosis	1	2	3	4	5
<u>33</u>	b. aid in establishing or confirming treatment decisions	1	2	3	4	5
<u>34</u>	c. complication of disease or injury	1	2	3	4	5
<u>35</u>	3. New medical equipment	1	2	3	4	5
<u>36</u>	4. Government regulations relating to health care	1	2	3	4	5
<u>37</u>	5. Forensic medicine	1	2	3	4	5
<u>38</u>	6. Psychological aspects of disease	1	2	3	4	5
<u>39</u>	7. Drug information	1	2	3	4	5
<u>40</u>	8. Cardiovascular disease	1	2	3	4	5
<u>41</u>	9. Cancer	1	2	3	4	5

CL INFORMATION QUESTIONNAIRE continued

	<u>Subject Areas</u>	<u>Personal Needs</u>				
		<u>Most Needed</u>	<u>Needed</u>	<u>Not Needed</u>	<u>Not Needed</u>	
<u>42</u>	10. Health care agencies	1	2	3	4	5
<u>43</u>	11. Office organization	1	2	3	4	5
<u>44</u>	12. Other (Please specify any areas of interest to you not listed above)					
<u>45</u>	_____	1	2	3	4	5
<u>46</u>	_____	1	2	3	4	5
<u>47</u>	_____	1	2	3	4	5
<u>48</u>	_____	1	2	3	4	5

6. A list of information sources appears below. Please rate the frequency with which you use these sources to meet your information needs, by circling a number from 1 to 5. A rating of 1 is "use very frequently" and rating of 5 is "use never."

INFORMATION SOURCES

		<u>FREQUENCY</u>				
		<u>Very</u>			<u>Never</u>	
		<u>Frequently</u>				
<u>49</u>	1. Seminars, workshops and conferences	1	2	3	4	5
<u>50</u>	2. Exhibitions (e.g., at medical or other meetings)	1	2	3	4	5
<u>51</u>	3. Correspondence or postgraduate courses	1	2	3	4	5
<u>52</u>	4. Abstracts of papers	1	2	3	4	5
<u>53</u>	5. Directories and/or registries	1	2	3	4	5
<u>54</u>	6. Papers in professional journals	1	2	3	4	5
<u>55</u>	7. Articles in newspapers and magazines	1	2	3	4	5
<u>56</u>	8. Books	1	2	3	4	5

CL INFORMATION QUESTIONNAIRE continued

INFORMATION SOURCES		FREQUENCY				
		Very Frequently			Never	
<u>57</u>	9. Radio and TV Programs	1	2	3	4	5
<u>58</u>	10. Catalogs (books, equipment, material, etc.)	1	2	3	4	5
<u>59</u>	11. Bibliographies (lists of books and journal articles)	1	2	3	4	5
<u>60</u>	12. Video, slide and tape programs	1	2	3	4	5
<u>61</u>	13. Private information files (personal library)	1	2	3	4	5
<u>62</u>	14. Current awareness or selective dissemination of information services: individualized information "packages" from library or commercial services.	1	2	3	4	5
<u>63</u>	15. Indexing Services (e.g., Index Medicus)	1	2	3	4	5
<u>64</u>	16. Regular hospital rounds	1	2	3	4	5
<u>65</u>	17. Regular hospital meetings	1	2	3	4	5
<u>66</u>	18. Group discussions (study groups, journal clubs)	1	2	3	4	5
<u>67</u>	19. Informal discussions and contacts with other professionals	1	2	3	4	5
<u>68</u>	20. Giving or obtaining formal consultants to other professionals	1	2	3	4	5
<u>69</u>	21. Contact with detailment (sales representatives)	1	2	3	4	5
<u>70</u>	22. Contact with other health professionals (meetings and conferences, etc.)	1	2	3	4	5
<u>71</u>	23. Library reference services	1	2	3	4	5
<u>72</u>	24. MEDLINE or other computerized information services	1	2	3	4	5

CL INFORMATION QUESTIONNAIRE

7. The same list of information sources as in question #6 is listed. Check only the information sources you normally use in resolving a patient-care problem. Check all that apply.

INFORMATION SOURCES

- | | |
|-----------|---|
| <u>73</u> | <input type="checkbox"/> 1. Seminars, workshops and conferences |
| <u>74</u> | <input type="checkbox"/> 2. Exhibitions (e.g. at medical or other meetings) |
| <u>75</u> | <input type="checkbox"/> 3. Correspondence or postgraduate courses |
| <u>76</u> | <input type="checkbox"/> 4. Abstracts of papers |
| <u>77</u> | <input type="checkbox"/> 5. Directories and/or registries |
| <u>78</u> | <input type="checkbox"/> 6. Papers in professional journals (numbers contracted) |
| <u>79</u> | <input type="checkbox"/> 7. Articles in newspapers and magazines |
| <u>4</u> | <input type="checkbox"/> 8. Books |
| <u>5</u> | <input type="checkbox"/> 9. Radio and TV Programs |
| <u>6</u> | <input type="checkbox"/> 10. Catalogs (books, equipment, material, etc.) |
| <u>7</u> | <input type="checkbox"/> 11. Bibliographies (lists of books and journal articles) |
| <u>8</u> | <input type="checkbox"/> 12. Video, slide and tape programs |
| <u>9</u> | <input type="checkbox"/> 13. Private information files (personal library) |
| <u>10</u> | <input type="checkbox"/> 14. Current awareness or selective dissemination of information services: individualized information "packages" from library or commercial services. |
| <u>11</u> | <input type="checkbox"/> 15. Indexing Services (e.g., Index Medicus) |
| <u>12</u> | <input type="checkbox"/> 16. Regular hospital rounds |
| <u>13</u> | <input type="checkbox"/> 17. Regular hospital meetings |
| <u>14</u> | <input type="checkbox"/> 18. Group discussions (study groups, journal clubs) |
| <u>15</u> | <input type="checkbox"/> 19. Informal discussions and consultants to other professionals |

CL INFORMATION QUESTIONNAIRE

INFORMATION SOURCES

- | | | |
|-------|-------|--|
| _____ | _____ | 20. Giving or obtaining formal consultants to other professionals |
| 16 | | |
| _____ | _____ | 21. Contact with detailmen (sales representatives) |
| 17 | | |
| _____ | _____ | 22. Contact with other health professionals (meetings and conferences, etc.) |
| 18 | | |
| _____ | _____ | 23. Library reference services |
| 19 | | |
| _____ | _____ | 24. MEDLINE or other computerized information services |
| 20 | | |

8. How quickly do you normally need information to resolve a patient-care problem?

- | | | |
|-------|-------|-----------------|
| _____ | _____ | 4 hours or less |
| _____ | _____ | 4 - 8 hours |
| _____ | _____ | 8 - 24 hours |
| _____ | _____ | 24 - 48 hours |
| _____ | _____ | 48 or more |

CARD 2

9. How convenient is it for you to obtain the library materials you need?

- | | | | | | |
|-------|------------------|---|-----------------------|---|---|
| | <u>Very easy</u> | | <u>Very difficult</u> | | |
| | 1 | 2 | 3 | 4 | 5 |
| _____ | | | | | |
| 26 | | | | | |

CL INFORMATION QUESTIONNAIRE

- 27 10. How often do you use the library at UTMB for your information needs? Check one.
- _____ Once a week
- _____ 4 or more times per year
- _____ Infrequently (depending on problem or question)
- _____ Never
- 28 11. Have you had a MEDLINE search done in the past year?
- _____ yes _____ no
- 29 12. If your answer to the question above was yes, on the last such occasion you can remember, the information you received was: (Circle one)
- | <u>More than adequate</u> | | <u>Less than adequate</u> |
|---------------------------|---|---------------------------|
| 1 | 2 | 3 |
- 30 13. How did you request this information?
- _____ Personally (including phone or walk in)
- _____ Through someone else (e.g., secretary, assistant, etc.)

INTERVIEW

This is an interview to help the Library evaluate the Clinical Library Program. The CL Program began a year ago here at UTMB. The Library, through the Clinical Librarian, delivers a very specialized, intensive service. The CL can provide a new dimension of service to the members of the patient care team by learning their information needs first hand. The CL will then act as an interface between the team and their medical information needs. Similar programs across the U.S. have demonstrated the value of rapid, problem-oriented literature retrieval. The specific aims of this program are:

1. To identify and provide for the patient-related information needs of the health care team.
2. To cumulate information into a collection of documents of Clinical Library Service.
3. To evaluate the CL Program.
4. Facilitate use of the Medical Library.

In order to accomplish our objectives, we need your assistance. Your participation in this interview is completely voluntary. This is a major part of the evaluation of the CL Program. There is a slight risk that someone other than myself may know how you answered these questions; however, I am taking every measure to assure this does not happen. Your responses will be separated from the identifying information which I will ask you to fill out. The sets of data will be coded and kept separate. I alone will be in possession of both sets of information and they will be kept in my locked office. In my judgment, this is not particularly sensitive information but it ranks as generally informative. Again, your participation is completely voluntary. You may skip a question or stop me at any time.

Question: Are you willing to participate? ____ Yes ____ No

Do you have any comments or questions?
(Any comments made will be written below.)

Please fill out Page 2a. Thank you.
(Retrieve Page 2a and place in folder with the answer to this interview.)

Please answer the following questions as thoroughly as possible. From this point on, until the end of this questionnaire, all responses will be separated from the identifying information listed on Page 2a and coded to insure confidentiality.

Clinical Library Service
 INFORMATION QUESTIONNAIRE

PLEASE DO NOT
 WRITE IN THIS
 SPACE

CARD 1
 COLS

1-2

5

6-9

10

11-12

13-14

15

16

NAME _____ DATE _____

PRESENT TITLE:

STUDENT (Check both TYPE and YEAR)

TYPE:

YEAR:

_____ Medical	_____ 1st year	_____ Residency
_____ Nursing	_____ 2nd year	_____ Masters Program
_____ Allied Health	_____ 3rd year	_____ Other _____
_____ Other	_____ 4th year	

.....

FACULTY/STAFF (Please fill out completely)

Department _____

Title/Rank _____

Years at UTMB _____

INTERVIEW
Part I

- 17 1. Have you had prior experience with CL programs?
This year _____ When was your first exposure to
CL-Date _____
- 18 Prior Experience? _____
Where?
Which Dept.?
Do you remember which year?
- 19-20
- 21-22 2. To how many professional organizations do you belong?
Please identify?
- 23-24 3. To how many professional journals do you subscribe?
Identify top 3 _____
- 25-30 4. This card is Question #4. Please indicate your opinion
concerning each item listed by placing an "X" in the box
which corresponds to your feelings?

(Hand cue card to the interviewee)
- 49-72 5. A list of information sources appear on this sheet.
Please circle a number from 1 to 5 indicating the
frequency with which you use these sources. A rating of
1 is "use very frequently, a rating of 5 is "use never."

(Hand the list to the interviewee)(#6 question)

4. Part of the CL's daily routine will be to accompany the clinical health care team on their rounds, their meetings and attend relevant seminars. Please indicate your opinion concerning each item listed below by placing an "X" in the box which corresponds to your feelings.

		Strongly Approve			Strongly Disapprove
<u>25</u>	a. The CL accompanying me on rounds				
<u>26</u>	b. The CL attending Department Seminars				
<u>27</u>	c. The CL attending staff meetings daily.				
<u>28</u>	d. The CL as a member of the health care team.				
<u>29</u>	e. The bibliographic files which the CL will generate and keep in a departmental file.				
<u>30</u>	f. CL selection of articles appropriate to my needs.				

CL INFORMATION QUESTIONNAIRE

6. A list of information sources appears below. Please rate the frequency with which you use these sources to meet your information needs, by circling a number from 1 to 5. A rating of 1 is "use very frequently" and rating of 5 is "use never."

INFORMATION SOURCES

		<u>FREQUENCY</u>				
		<u>Very Frequently</u>			<u>Never</u>	
<u>49</u>	1. Seminars, workshops and conferences	1	2	3	4	5
<u>50</u>	2. Exhibitions (e.g., at medical or other meetings)	1	2	3	4	5
<u>51</u>	3. Correspondence or postgraduate courses	1	2	3	4	5
<u>52</u>	4. Abstracts of papers	1	2	3	4	5
<u>53</u>	5. Directories and/or registries	1	2	3	4	5
<u>54</u>	6. Papers in professional journals	1	2	3	4	5
<u>55</u>	7. Articles in newspapers and magazines	1	2	3	4	5
<u>56</u>	8. Books	1	2	3	4	5
<u>57</u>	9. Radio and TV Programs	1	2	3	4	5
<u>58</u>	10. Catalogs (books, equipment, material, etc.)	1	2	3	4	5
<u>59</u>	11. Bibliographies (lists of books and journal articles)	1	2	3	4	5
<u>60</u>	12. Video, slide and tape programs	1	2	3	4	5
<u>61</u>	13. Private information files (personal library)	1	2	3	4	5
<u>62</u>	14. Current awareness or selective dissemination of information services: individualized information "packages" from library or commercial services.	1	2	3	4	5
<u>63</u>	15. Indexing Services (e.g., Index Medicus)	1	2	3	4	5

CL INFORMATION QUESTIONNAIRE continued

INFORMATION SOURCES		FREQUENCY				
		Very Frequently		Never		
<u>64</u>	16. Regular hospital rounds	1	2	3	4	5
<u>65</u>	17. Regular hospital meetings	1	2	3	4	5
<u>66</u>	18. Group discussions (study groups, journal clubs)	1	2	3	4	5
<u>67</u>	19. Informal discussions and contacts with other professionals	1	2	3	4	5
<u>68</u>	20. Giving or obtaining formal consultants to other professionals	1	2	3	4	5
<u>69</u>	21. Contact with detailment (sales representatives)	1	2	3	4	5
<u>70</u>	22. Contact with other health professionals (meetings and conferences, etc.)	1	2	3	4	5
<u>71</u>	23. Library reference services	1	2	3	4	5
<u>72</u>	24. MEDLINE or other computerized information services	1	2	3	4	5

INFORMATION SOURCES

73	1. Seminars, workshops and conferences
74	2. Exhibitions (e.g. at medical or other meetings)
75	3. Correspondence or postgraduate courses
76	4. Abstracts of papers
77	5. Directories and/or registries
78	6. Papers in professional journals (numbers contracted)
79	7. Articles in newspapers and magazines
4	8. Books
5	9. Radio and TV Programs
6	10. Catalogs (books, equipment, material, etc.)
7	11. Bibliographies (lists of books and journal articles)
8	12. Video, slide and tape programs
9	13. Private information files (personal library)
10	14. Current awareness or selective dissemination of information services: individualized information "packages" from library or commercial services.
11	15. Indexing Services (e.g., Index Medicus)
12	16. Regular hospital rounds
13	17. Regular hospital meetings
14	18. Group discussions (study groups, journal clubs)
15	19. Informal discussions and consultants to other professionals
16	20. Giving or obtaining formal consultants to other professionals
17	21. Contact with detailmen (sales representatives)

INFORMATION SOURCES continued

<u>18</u>	<u>22.</u>	Contact with other health professionals (meetings and conferences, etc.)
<u>19</u>	<u>23.</u>	Library reference services
<u>20</u>	<u>24.</u>	MEDLINE or other computerized information services

Question #7

How quickly do you normally need information to resolve a patient-care problem?

Card 2	<u>21</u>	<u>4</u>	hours or less
	<u>22</u>	<u>4 - 8</u>	hours
	<u>23</u>	<u>8 - 24</u>	hours
	<u>24</u>	<u>24 - 48</u>	hours
	<u>25</u>	<u>48 or more</u>	

INTERVIEW
cont. Part I

6. A list of sources which you may use in resolving patient care problems is provided. Please check ONLY the information sources you normally use in resolving a particular patient care problem.

(Hand the list to the interviewee)

73-79

4-20

7. How quickly do you normally need information to resolve a patient-care problem?

(Hand card #7 to interviewee)

21-25

Please check the category which is most appropriate for you. If you check the last category - 48 hours or more-please explain. (Record explanation)

CARD 2

8. Tell me about your use of the library?

a. Frequency of Visits? For what purpose.

26

b. Use of MEDLINE? (If not talked about in a.)

27

How did you request?

1. Personally
2. Through Assistant
3. Both
4. Other

28

9. What are your present perceptions of the library as an information source?

29

INTERVIEW
PART II

CARD 2 This portion of the interview is to be used for those persons who have answered Yes to Question #1 or who have had a CL in their divisions this past year.

Preface: This portion of the interview is concerned with your perceptions and activities resulting from the Clinical Librarian.

31 10. Since the CL has been involved with your department how well have your information needs been met? Example:
faster references, files are more up-to-date.

1. Not so well
2. Well
3. Very well

32 11. To what extent has the CL aided you in identifying your information needs?

1. Not so well
2. Well
3. Very well

33 12. What criteria did you use to determine the answer above?

- 1.
- 2.
- 3.
- 4.

34 13. In what ways has the presence of the CL changed the time you spend in seeking/utilizing information?

1. Freed up time
2. More time reading
3. Sought more than I would have otherwise

35 Do you have more time to meet your information needs? Please elaborate.

1. Yes
2. No

INTERVIEW
cont. PART II

- 36 14. Has this program - CL - made you aware of new sources of information previously not known? Can you attribute these to the CL Program? Please elaborate...
- 1 Yes
- 0 No
- 37 15. Has the CL Program increased your use of the on-line data bases such as MEDLINE, Cancerline, etc.? Please explain.
- 1 Yes
- 0 No
- 38 16. Do you request a search or does the CL?
- 1 CL
- 0 Person
- 39 17. Is this different from the time prior to the CL? (TO BE USED IF CL PROGRAM BEGUN)
- 1 Yes
- 0 No
- 40 If yes, what are the main differences?
- 0
- 1 Don't go to Library as frequently.
- 2
- 3
- 41 18. How frequently do you use the CL as a substitute for your library visits?
- 01 once/wk
- 02 4 x/yr
- 03 infrequently
- 04 never
- 05-09 other

INTERVIEW
cont. PART II

42 19. Do you consider this an important function for the CL?
Explain the reasons for your answers to the above question.

- 1 Yes
- 0 No
- 2 Partially

43 20. Do you look at information brought to the Unit by the CL? Yes No

- | | | | | |
|-------|---|----------------------|---|-------------------|
| | 1 | References in file, | 5 | Bibliographies |
| 1 Yes | | retrospective | 6 | Texts |
| 0 No | 2 | Clinical topics file | 7 | Summary/Abstracts |
| | 3 | Interlibrary Loan | | |
| | 4 | Others | | |

44 21. How frequently do you use these sources? Times per week/month etc.

- | | | | |
|---|--------------|-------|-------|
| 1 | once/wk | 05-09 | other |
| 2 | 4 x/yr | | |
| 3 | infrequently | | |
| 4 | never | | |

45 22. What changes in the CL Activity for your unit would you like to see?

- 0 None
- 1 Attendance Clinics
- 2 Teaching Rounds Attendance
- 3 Refine/Define Information from CL
- 4
- 5

46 23. What would you say are the strong points of the CL program?

- 0 None
- 1 Time saved
- 2 More reading from journal articles
- 3 Reading access

47 24. What would you say are the weak points of the CL Program?

- 0 None
- 1 Information needs defining
- 2 Contact pt CL

STATISTICS WORK SHEET

Dept. or Division: _____

Total Number of Searches: _____

Analysis by: _____

Status:	Y.T.D.	Setting:	Y.T.D.
Attending/Faculty	_____	Rounds	_____
Fellows	_____	Conference	_____
Resident	_____	ICU	_____
1st Yr. Res.	_____	Informal/Phone	_____
Med. Student	_____	Informal	_____
Nurse	_____	/Library	_____
Other	_____	Informal	_____
		/Hospital	_____
		Note	_____
TOTAL	_____	Informal/Other	_____
		TOTAL	_____

Purpose:	Communication of Information Need:
Acute Pt. Care (6 Hr.)	Direct Request _____
Less Acute Pt. Care (6-24 Hr.)	Perceived _____
Conference	Anticipated _____
Publication	TOTAL _____
Education	
Research	Recurrent Questions: _____
Other	
TOTAL	

STATISTICS WORK SHEET continued

Files:	Type of Search:
MEDLINE prime _____	Manual only _____
MEDLINE non prime _____	Computer only _____
Backfiles _____	Both _____
Other NLM _____	TOTAL _____
Commercial _____	
TOTAL _____	

JOURNAL SOURCES 1980
Frequency of Utilization List

75	New England Journal of Medicine
71	Journal of Pediatrics
65	Pediatrics
49	Lancet
46	American Journal of Diseases of Children
35	Journal of American Medical Association
34	British Medical Journal
27	Diabetes
26	Annals of Internal Medicine
24	Acta Paediatrica Scandinavica
21	American Journal of Medicine
21	Nephron
19	Archives of Internal Medicine
18	American Journal of Psychiatry
17	Archives of Disease in Childhood
15	Kidney International
15	Southern Medical Journal
14	Pediatric Annals
14	Journal of the Neurological Sciences
14	Clinical Nephrology
13	American Journal of Physiology
12	Pediatric Research
12	Pediatric Clinics of North America
12	Journal of Clinical Investigation
11	Annals of Surgery
11	Archives of Neurology
11	Developments in Biological Standardization
10	Advances in Experimental Medicine and Biology
10	Journal of Allergy and Clinical Immunology
10	Journal of Pediatric Surgery
10	Surgery
9	Annals of Allergy
9	Journal of Urology
9	Transplantation
8	Cancer
8	Chest
8	Contributions to Nephrology
8	Diabetologia
8	European Journal of Pediatrics
8	Journal of Family Practice
8	Neurology
8	Urology
7	British Journal of Haematology
7	Canadian Medical Association Journal
7	Developmental Medicine and Child Neurology
7	Drugs
7	Journal of the American Academy of Child Psychiatry

7 Journal of Immunology
7 Journal of Laboratory and Clinical Medicine
7 Journal of Medical Ethics
7 Journal of Neurosurgery
7 Medical Journal of Australia
7 Medicine
7 Paediatrician
7 Thrombosis Research
7 Transplantation Proceedings
7 Yale Journal of Biology and Medicine
6 Cancer Research
6 Cancer Treatment Reports
6 Clinical Orthopedics and Related Research
6 Journal of Medical Education
6 Journal of Medical Genetics
6 Psychological Bulletin
6 Psychosomatics
6 Radiology
6 Transactions - American Society for Artificial Internal Organs
5 Advances in Prostaglandin and Thromboxane Research
5 American Journal of Obstetrics and Gynecology
5 American Journal of Pathology
5 American Review of Respiratory Disease
5 Archives of Ophthalmology
5 Archives of Surgery
5 Blood
5 Clinical Chemistry
5 Family Process
5 Federation Proceedings
5 Hospital Progress
5 JACEP (Journal of the American College of Emergency Physicians)
5 Journal of Biological Chemistry
5 Journal of Chronic Diseases
5 Journal of Computer Assisted Tomography
5 Journal of Infectious Diseases
5 Journal of Neurology
5 Journal of Physiology
5 Journal of Thoracic and Cardiovascular Surgery
5 Mayo Clinic Proceedings
5 Nature
5 New Zealand Medical Journal
5 Obstetrics and Gynecology
5 Postgraduate Medicine
5 Science
5 Transactions of American Neurological Association
4 Acta Haematologica
4 Acta Medica Scandinavica
4 Acta Neuropathologica
4 Advances in Nephrology from the Necker Hospital
4 American Journal of Hospital Pharmacy
4 American Journal of Roentgenology

4 Annals of Neurology
4 Archives of Pathology and Laboratory Medicine
4 Australian and New Zealand Journal of Psychiatry
4 British Journal of Clinical Practice
4 British Journal of Psychiatry
4 Canadian Journal of Surgery
4 Child Development
4 Clinical Allergy
4 Clinical and Experimental Dermatology
4 Clinical Science
4 Comprehensive Therapy
4 Early Human Development
4 Journal of the American Dietetic Association
4 Journal of Nervous and Mental Disease
4 Journal of Neurology, Neurosurgery and Psychiatry
4 Laboratory Investigation
4 Orthopedic Clinics of North America
4 Perspectives in Pediatric Pathology
4 Scandinavian Journal of Infectious Diseases
4 Seminars in Thrombosis and Hemostasis
4 Social Science and Medicine
4 Special Education/Forward Trends
4 Texas Medicine
4 Urologic Clinics of North America
3 Acta Oto-laryngologica
3 Advances in Pediatrics
3 American Family Physician
3 American Heart Journal
3 American Journal of Clinical Pathology
3 American Journal of Gastroenterology
3 American Journal of Hematology
3 American Journal of Ophthalmology
3 American Journal of Public Health
3 Annual Review of Medicine
3 Antimicrobial Agents and Chemotherapy
3 Australian and New Zealand Journal of Medicine
3 Australian Paediatric Journal
3 Biology of the Neonate
3 Critical Care Medicine
3 Cellular Immunology
3 Childs Brain
3 Clinical Chimica Acta
3 Clinical and Experimental Immunology
3 Clinical Genetics
3 Clinical Pharmacology and Therapeutics
3 European Neurology
3 European Urology
3 Experientia
3 Gastroenterology
3 Helvetica Paediatrica Acta
3 Irish Journal of Medical Science

3 Johns Hopkins Medical Journal
3 Journal of Abnormal and Social Psychology
3 Journal of Antimicrobial Chemotherapy
3 Journal of Cardiovascular Surgery
3 Journal of Child Psychology and Psychiatry
3 Journal of Rheumatology
3 Journal of School Health
3 Laryngoscope
3 Life Sciences
3 Medical Clinics of North America
3 Medicine, Science, and the Law
3 Metabolism, Clinical and Experimental
3 Military Medicine
3 Nutrition and Metabolism
3 Physical Therapy
3 Quarterly Journal of Medicine
3 Scandinavian Journal of Haematology
3 Seminars in Hematology
3 Western Journal of Medicine
2 Acta Endocrinologica
2 Acta Radiologica Diagnostica
2 Advances in Internal Medicine
2 Advances in Neurology
2 American Journal of Clinical Nutrition
2 American Journal of Tropical Medicine and Hygiene
2 American Journal of Veterinary Research
2 Analytical Biochemistry
2 Annals of the New York Academy of Sciences
2 Annals of Thoracic Surgery
2 Annual Review of Pharmacology and Toxicology
2 Annual Review of Physiology
2 Annual Review of Dermatology
2 Arthritis and Rheumatism
2 Atherosclerosis
2 British Journal of Anaesthesia
2 British Journal of Surgery
2 Cell and Tissue Research
2 Child Psychiatry and Human Development
2 Child Welfare
2 Circulation
2 Clinical Biochemistry
2 Clinical Immunology and Immunopathology
2 Clinical Nuclear Medicine
2 Clinical Research
2 Clinical Science and Molecular Medicine
2 Clinical Toxicology
2 Clinics in Perinatology
2 Current Problems in Pediatrics
2 Diabetes Care
2 Ethics in Science and Medicine
2 European Journal Pharmacology

- 2 Fertility and Sterility
- 2 Geriatrics
- 2 Human Genetics
- 2 Indian Journal of Medical Research
- 2 Indian Pediatrics
- 2 Infection
- 2 International Journal of Cancer
- 2 International Journal of Dermatology
- 2 International Journal of Epidemiology
- 2 International Journal of Psychiatry in Medicine
- 2 Journal of Adolescence
- 2 Journal of American Psychoanalytic Association
- 2 Journal of the Biological Photographic Association
- 2 Journal of Chromatography
- 2 Journal of Clinical Endocrinology and Metabolism
- 2 Journal of Clinical Microbiology
- 2 Journal of Clinical Pathology
- 2 Journal of Consulting and Clinical Psychology
- 2 Journal of Epidemiology and Community Health
- 2 Journal of International Medical Research
- 2 Journal of Perinatal Medicine
- 2 Journal of Personality and Social Psychology
- 2 Journal of the Reticuloendothelial Society
- 2 Medical and Pediatric Oncology
- 2 Monographs in Human Genetics
- 2 Morbidity and Mortality Weekly Report
- 2 Mt. Sinai Journal of Medicine
- 2 Muscle and Nerve
- 2 Neuropaediatric
- 2 Neurosurgery
- 2 Nutrition Reviews
- 2 Pediatric Radiology
- 2 Perceptual and Motor Skills
- 2 Postgraduate Medical Journal
- 2 Primary Care
- 2 Proceedings of the Clinical Dialysis and Transplant Forum
- 2 Proceedings of the National Academy of Science
- 2 Proceedings of the Society of Experimental Biology and Medicine
- 2 Progress in Liver Diseases
- 2 Psychological Medicine
- 2 Psychological Reports
- 2 Psychoneuroendocrinology
- 2 Psychosomatic Medicine
- 2 Recent results in Cancer Research
- 2 Scandinavian Journal of Clinical and Laboratory Investigation
- 2 South African Journal of Surgery
- 2 Transfusion
- 2 Virchows Archiv. B. Cell Pathology
- 1 Acta Cytologica
- 1 Acta Microbiologica Academiae Scientiarum Hungaricae
- 1 Acta Oto-Rhino-Laryngologica Belgica

1 Acta Paediatric Belgica
 1 Acta Physiologica Polonica
 1 Acta Physiologica Scandinavica
 1 Adolescence
 1 American Journal of Epidemiology
 1 American Journal of Human Genetics
 1 American Journal of Occupational Therapy
 1 American Journal of Psychology
 1 American Journal of Surgery
 1 American Journal of Surgical Pathology
 1 American Pharmacy
 1 American Surgeon
 1 Anaesthesia and Intensive Care
 1 Anaesthesia and Analgesia
 1 Anesthesiology
 1 Annales de Biologie Clinique
 1 Annales de Dermatologie et de Syphiligraphie
 1 Annales de Genetique
 1 Annales of Emergency Medicine
 1 Annals of the Rheumatic Diseases
 1 Annals of the Royal College of Surgeons of England
 1 Annals Conference on Research in Medical Education
 1 Antibiotics and Chemotherapy
 1 Archives of Biochemistry and Biophysics
 1 Archives Francaises de Paediatric
 1 Archives of General Psychiatry
 1 Archives of Otolaryngology
 1 Archives of Sexual Behavior
 1 Archives of Toxicology
 1 Artificial Limbs
 1 Australasian Journal of Dermatology
 1 Australasian Nurses Journal
 1 Behavior Genetics
 1 Biken Journal
 1 Biochemical Society Transactions
 1 Biochemistry
 1 Biochimica et Biophysica Acta
 1 Birth Defects
 1 Brain
 1 British Heart Journal
 1 British Journal of Dermatology
 1 British Journal of Radiology
 1 British Journal of Social and Clinical Psychology
 1 Bulletin of the Hospital for Joint Diseases
 1 Bulletin of the Medical Library Association
 1 Bulletin of the Menninger Clinic
 1 Bulletin of the Psychonomic Society
 1 Bulletin of the W H O
 1 Canadian Anaesthetists Society Journal
 1 Canadian Hospital
 1 Canadian Journal of Public Health

1 Canadian Nurse
1 Cardiovascular Clinics
1 Cell
1 Children
1 Children Today
1 Ciba Foundation Symposia
1 Clinical Proceedings of the Childrens Hospital
1 College and Research Libraries
1 Comprehensive Psychiatry
1 Computerized Tomography
1 Computers and Biomedical Research
1 Corrective Psychiatry and Journal of Social Therapy
1 Current Medical Research and Opinion
1 Cutis
1 Dermatologica
1 Developmental Psychology
1 Drug Metabolism and Disposition
1 Ear, Nose, and Throat Journal
1 Endocrinologia Japonica
1 Endokrinologie
1 Endoscopy
1 Enzyme
1 European Journal of Cancer
1 European Journal of Clinical Pharmacology
1 European Journal of Immunology
1 European Journal of Nuclear Medicine
1 Folia Haematologica
1 Forensic Science International
1 Gerontologist
1 Gut
1 Haemostasis
1 Heart and Lung
1 Hormone and Metabolic Research
1 Hospital Practice
1 Hospital Topics
1 Human Organization
1 Human Pathology
1 Immunology
1 Immunological Reviews
1 International Pharmacopsychiatry
1 International Urology and Nephrology
1 In Vitro
1 Infection and Immunity
1 International Journal of Biochemistry
1 International Journal of Bio-Medical Computing
1 International Journal of Nuclear Medicine and Biology
1 Journal of Advanced Nursing
1 Journal of Applied Psychology
1 Journal of Bone and Joint Surgery
1 Journal of Cell Biology
1 Journal of Cell Physiology

1 Journal of Clinical Chemistry and Clinical Biochemistry
 1 Journal of Clinical Pharmacology
 1 Journal of Communication Disorders
 1 Journal of Dairy Science
 1 Journal of Dialysis
 1 Journal of Experimental Medicine
 1 Journal of Health and Social Behavior
 1 Journal of Histochemistry and Cytochemistry
 1 Journal of Human Nutrition
 1 Journal of Immunogenetics
 1 Journal of Immunological Methods
 1 Journal of Learning Disabilities
 1 Journal of the Medical Association of Thailand
 1 Journal of Medicine
 1 Journal of Molecular Biology
 1 Journal of the National Cancer Institute
 1 Journal of Neuropathology
 1 Journal of Neuropathology and Experimental Neurology
 1 Journal of Nuclear Medicine
 1 Journal of Neurosurgical Nursing
 1 Journal of the Oslo City Hospitals
 1 Journal of Otolaryngology
 1 Journal of Pathology
 1 Journal of Personality Assessment
 1 Journal of Pharmaceutical Sciences
 1 Journal of Psychology
 1 Journal of Psychosomatic Research
 1 Journal of Surgical Research
 1 Journal of Surgical Oncology
 1 Journal of Toxicology and Environmental Health
 1 Journal of Trauma
 1 Journal of Tropical Medicine and Hygiene
 1 Kinderaertzliche Praxis
 1 Klinische Wochenschrift
 1 Lung
 1 Maternal-Child Nursing Journal
 1 Medical Aspects of Human Sexuality
 1 Medical and Biological Engineering and Computing
 1 Medical Hypotheses
 1 Medical Letter on Drugs and Therapeutics
 1 Modern Law Review
 1 Mutation Research
 1 National Cancer Institute Monographs
 1 Neuropsychobiology
 1 Neuroradiology
 1 Nutrition Reports International
 1 Obstetrical and Gynecological Survey
 1 Otolaryngology Clinics of North America
 1 Pathologie Biologie
 1 Pathology Annual
 1 Pediatric Nursing
 1 Pharos

1 Proceedings of the Nutrition Society
1 Progress in Biochemical Pharmacology
1 Progress in Neurobiology
1 Prostaglandins
1 Psychiatria Clinica
1 Psychoanalytic Study of the Child
1 Psychonomic Science
1 Psychophysiology
1 Rehabilitation Literature
1 Resuscitation
1 Royal Society of Health Journal
1 Scandinavian Journal of Gastroenterology
1 Scandinavian Journal of Immunology
1 Scandinavian Journal of Respiratory Diseases
1 Scandinavian Journal of Rheumatology
1 Scandinavian Journal of Social Medicine
1 Scandinavian Journal of Thoracic and Cardiovascular Surgery
1 Seminars in Oncology
1 South African Medical Journal
1 Stroke
1 Surgery Annual
1 Surgery, Gynecology and Obstetrics
1 Surgical Clinics of North America
1 Surgical Forum
1 Symposium on Adolescent Medicine
1 Times Educational Supplement (London)
1 Thoracic and Cardiovascular Surgeon
1 Tohoku Journal of Experimental Medicine
1 Toxicology and Applied Pharmacology
1 Transactions of the American Association of Genito-Urinary
Surgeons
1 Transactions of the Association of American Physicians
1 Tropical and Geographical Medicine
1 Upsala Journal of Medical Sciences
1 Urologia Internationalis
1 Urological Research
1 Urological Survey
1 Visual Education
1 Vision Research

VITA

Elizabeth King Eaton was born in New York City on December 23, 1943, the daughter of Phoebe Dimock King and Robert Douglas King. She completed her first through third grades at the 7th Army School in Stuttgart, Germany. The remaining grammar school grades and high school were completed at Hicks Memorial School of Tolland, Connecticut and Ellington High School of Ellington, Connecticut. In 1961, she entered Hood College and received her Bachelor of Arts degree in May, 1965. During the following years, she was employed as a Research Assistant at the Massachusetts General Hospital, Boston, at St. Bartholomew's Medical College, London, at the Harvard Biological Laboratories, and at the Rheumatology and Zoology Departments, University of California, Los Angeles (UCLA). She entered Library School at the University of California, Los Angeles, in 1971 and graduated in August, 1972. She was employed as an Information Analyst at Brain Information Services, UCLA, until December 1973. From March 1974 until September 1982, she was employed as the Associate Director for Public Services, Moody Medical Library of University of Texas Medical Branch at Galveston, Texas. In 1976 she entered the University of Texas Graduate School of Biomedical Sciences at Galveston. Her present employment is with Tufts University, Boston, MA, where she is the Health Sciences Library Director.

Permanent Address: 287 Hanover Street, #8
Boston, MA 02113

This dissertation was word processed by Adams Publishing Group, Newton,
MA