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# Impact of the Medical Library Assistance Act of 1965 on Health Sciences Libraries in the Pacific Northwest: an Interorganizational Approach

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**IMPACT OF THE MEDICAL LIBRARY ASSISTANCE ACT OF 1965  
ON HEALTH SCIENCES LIBRARIES IN THE PACIFIC NORTHWEST:  
AN INTERORGANIZATIONAL APPROACH**

**by**

**LEONOR INGRAHAM-SWETS**

**A dissertation submitted in partial fulfillment of the  
requirements for the degree of**

**Doctor of Philosophy  
in  
Public Administration and Policy**

**Portland State University  
1996**

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The abstract and dissertation of Leonoor Ingraham-Swets for the Doctor of Philosophy in Public Administration and Policy were presented May 9, 1996, and accepted by the dissertation committee and the doctoral program.

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## ABSTRACT

An abstract of the dissertation of Leonoor Ingraham-Swets for the Doctor of Philosophy in Public Administration and Policy presented May 9, 1996.

Title: Impact of the Medical Library Assistance Act of 1965 on Health Sciences Libraries in the Pacific Northwest: An Interorganizational Approach

Since the 1960's, the number of publications has increased at a phenomenal rate, and the introduction of the computer has resulted in greatly expanded technological advances in information processing and information access. The information delivery component of health sciences libraries has been transformed; and concomitantly, their interorganizational relations have been altered.

This research investigates the impact of a federally mandated information program. The Medical Library Assistance Act was passed in 1965 to support the escalating information needs of health

professionals. Also, a computerized access system for biomedical literature was introduced by the National Library of Medicine.

This study focuses on health sciences libraries in the Pacific Northwest, primarily Oregon and Washington, from 1965 to 1985 to determine how the Act impacted them.

Of the various theories in interorganizational relations, Raelin's legal-political model provides the most cogent framework.

One of his two types of mandated networks results from society-at-large placing its will on a group of organizations through the enactment of a law. As a decision maker with a mandate, the National Library of Medicine has changed the relationships of health sciences libraries through a hierarchical network, the Regional Medical Library Program.

This analysis is a combination of quantitative and qualitative methods and personal observation. Data were collected to determine the number of interlibrary loan transactions routed through the Regional Medical Library at the University of Washington and consortium grants from the National Library of Medicine. A survey of health sciences librarians in the Pacific Northwest was conducted to find out to which organizations they belonged, their familiarity with the Medical Library Assistance Act, and their first use of MEDLINE.



The results show that interorganizational relations among health sciences libraries in the Pacific Northwest increased after passage of the Medical Library Assistance Act of 1965. The confluence of the establishment of the Regional Medical Library network with the development of a computerized database, MEDLINE, made this component of the Medical Library Assistance Act a resounding success. Information technology also changed a hierarchical structure to a more lateral one, whereby health sciences librarians at all levels perform their own on-line database searching.

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## CHAPTER I

### INTRODUCTION

This research studies changes in information growth and technology within the context of medical libraries. The explosion of information, embodied in volume and technology, has been powerful and has brought about a tremendous upheaval in the manner whereby knowledge is disseminated.

In this study, I attempted to find out if interorganizational relations among health sciences libraries in the Pacific Northwest, in coping with information growth, increased during the period 1965-1985 after the passage of the Medical Library Assistance Act of 1965 and after the introduction of a computerized access system, MEDLINE, for the biomedical journal literature. I selected a legal-political model of interorganizational relations as a theoretical framework for my research.

To gather evidence of interorganizational relations, I collected data for 1965-1985 to determine the number of interlibrary loan transactions and consortium grants for health sciences libraries in the



Pacific Northwest. Furthermore, I conducted a survey of health sciences librarians in this area to find out about their professional interactions, their familiarity with the Medical Library Assistance Act, and their first use of MEDLINE.

"Information growth" deals with the increase in the written, generally scientific, knowledge which is dispersed through publication. Journals form a critical part of this dissemination process as they provide more recent research than do books.

"Information technology" addresses the computerized aspect of the knowledge and information explosion. The study of a federally mandated information program provides an opportunity to investigate a plethora of interrelationships among governmental agencies, research institutions, medical libraries, and developers of technology. Factors such as knowledge and information, and also public policy and financial constraints, play a crucial role in these interactions among libraries.

Since the 1960's, libraries have increasingly automated their operations as computers have become less costly and easier to use, and as databases have expanded. Applications related to the computer include online bibliographic databases for cataloging and reference services and union lists for locating journal titles as well as interlibrary loan referral and circulation systems.

In the field of health sciences, since the early Index Medicus<sup>1</sup> in print, via MEDLARS<sup>2</sup> (Medical Literature Analysis and Retrieval System) to MEDLINE<sup>3</sup>, and today's grateful med<sup>4</sup> online, health sciences libraries have demonstrated their flexibility in applying new ways of utilizing new technology to facilitate access to information.

"Medical libraries" or "health sciences libraries," as discussed in this study, include the traditional types: those which are part of a hospital or of an academic institution as well as the National Library of Medicine. Their various individual roles in the integration of the traditional information component with computer technology have been substantial. These roles, in turn, have affected their professional relations with their clientele of information consumer groups. Historically, physicians have been the predominant users as well as providers of funding of medical libraries. Physicians formerly had "doctors'" libraries in medical societies or hospitals, which were off-limits to other health professionals.

Gradually, as their professions developed, health administrators and other health professionals also have interacted with health sciences libraries. The exponential growth of knowledge and the concomitant complexity in obtaining information have made health professionals far more dependent on library services to define their

information needs and provide pertinent materials in filling these needs.

Following World War II, the biomedical information explosion was stimulated by a tremendous infusion of federal funds for scientific research and development. As a result, the user base of academic medical libraries was vastly increased by a cadre of researchers which placed pressure on the libraries to improve their resources. Better ways had to be found to cope with the information growth. Hospitals, with or without libraries, also appeared inadequate to meet the needs of their health practitioners for up-to-date medical information. This led to the passage of the Medical Library Assistance Act of 1965. The legislation was the outcome of two reports which are considered to be milestones in the evolution of biomedical research and communications.

In 1964, President Lyndon B. Johnson announced, in a Special Health Message to Congress, the establishment of a Commission on Heart Disease, Cancer and Stroke. Its purpose was "to recommend steps to reduce the incidences of these diseases through new knowledge and more complete utilization of the medical knowledge we already have."<sup>5</sup> Renowned Heart Surgeon Dr. Michael E. DeBakey, who was named chairman of the Commission, explained that those illnesses "account for more than 70% of deaths in the country"<sup>6</sup> and

"close to \$40 billion each year in lost productivity and lost taxes due to premature disability and death."<sup>7</sup> DeBakey presented his objective: "to develop a realistic battle plan leading to the ultimate conquest of the three diseases."<sup>8</sup>

As a result, the President's Commission on Heart Disease, Cancer and Stroke published The Report to the President: A National Program to Conquer Heart Disease, Cancer and Stroke. Its recommendations exhibited a successful blending of general concepts and broadly defined standards to specific numbers for expanding resources. The report included recommended figures for increased internships and journals. The report emphasized the need for

the establishment of a national network of regional centers, local and diagnostic treatment stations, and medical complexes designed to unite the worlds of scientific research, medical education, and medical care.<sup>9</sup>

The charge to medical libraries was to

assure all areas and all medical schools, scientists, and practitioners of the benefit of effective access to all medical data and information.<sup>10</sup>

The formation of a national medical libraries network would promote the flow of biomedical communication.

The Commission observed:

The rapid advance of electronic storage and retrieval systems is the brightest ray of hope in the otherwise cloudy picture of communications for research. But electronics cannot solve the problem alone.

The present state of most medical libraries in the United States is lamentable--largely because libraries have not received their due share of the greatly increased attention and funding for research.<sup>11</sup>

The second seminal report, The Status and Needs of Medical School Libraries in the United States, was a study of medical school libraries prepared in 1963 for the National Library of Medicine by Harold Bloomquist, assistant librarian of the Harvard Schools of Medicine and Public Health. Bloomquist studied the libraries of 86 accredited medical schools and schools of basic medical sciences to determine the impact of "changing requirements in medical research, education and practice on the collections, services and housing, and staffs of medical school libraries."<sup>12</sup> He documented the exponential increase in publication of research papers, escalating prices of scientific indices, and increased costs for better trained library personnel, without the concomitant expansion of the collections of medical school libraries. He used the number of books and journal titles as primary units of analysis.

Bloomquist cautioned that if medical libraries did not effectively provide information to users, scientific researchers would be forced

to go elsewhere, such as to the private sector, for their information. He recommended the development of a "regional reservoir library" whereby a large central resource library would collect materials in depth as well as make its resources and services available to medical libraries in the nation.<sup>13</sup> Accordingly, smaller libraries would acquire only core materials and rely on this hierarchical information system for other needed materials.

The Medical Library Assistance Act of 1965 embodied many of the recommendations of the DeBakey and Bloomquist reports. The National Library of Medicine's first permanent director, Colonel Frank Bradway Rogers, a physician and a librarian, played an instrumental role in the planning of the act. Martin Cummings, Rogers' successor and also a physician, was able to wield enough enduring political influence with Congress that the necessary expenditures were authorized. In 1956, the National Library of Medicine became part of the Public Health Service, but it possessed no authority to award grants. In 1964, Dr. Cummings was able to establish that the National Library of Medicine could independently issue grants. With this change and the successful development of the computerized bibliographic database of Index Medicus, the National Library of Medicine placed itself in the position as the expert and authority to develop and implement a remarkable array of innovative programs.

The most important program was the formalization of a biomedical communications network, with the creation of the Regional Medical Library Program, its crown jewel, in 1965.

Little research, however, appears to have been done on changes in interorganizational relations among health sciences libraries during this period of rapid informational and technological growth. It merits special attention because of the tremendous upheaval in information growth and technological applications. Library operations were drastically impacted. What happened when the user base of health sciences libraries substantially increased and changed? What kind of pressures were exerted upon libraries due to the information growth when more researchers produce more publications? What did information technology mean for medical libraries? How did their role evolve? How were their responsibilities redefined? How can this changing context best be explained? Were they forced to rely on technology in order to cope with user demand? An analysis of their functions and interactions of these libraries may explain these questions. "Interorganizational relations" addresses these relationships between organizations as a whole rather than from the individual or sub-unit perspective. Much has been written on this subject in the past fifteen years, but not specifically dealing with libraries.

In the field of interorganizational relationships, four models prevail: exchange, power-dependency, political economy, and mandate. These interorganizational concepts serve well to explain the nature of the primary functions of libraries.

Traditionally, libraries disseminate published print or non-print information by cataloging and classifying these materials and by making their collections of books, periodicals, and audiovisuals accessible to their clientele. Libraries serve as information resources to facilitate access to and use of information, be it for scholarly research, curriculum support, special interests, or leisure. Of special importance is the longstanding formal or informal agreement of resource sharing. Whenever a library cannot meet its users' needs from its own collection, it often can borrow from other libraries. Accordingly, libraries are inclined to depend upon each other for back-up in resources.

The structure of relationships among health sciences libraries is based upon resource sharing as it is unlikely that any single one of them possess on its own shelves all the journals and books their users need. Interorganizational relationships occur primarily because of a lack of self-sufficiency in collection materials which results in increased interdependency.



Interlibrary loan arrangements are crucial components of an adequate delivery of library services. Users request information. Although they prefer to obtain information immediately and on the spot, they accept a reasonable delay to receive photocopies of periodical articles or books. Geographic proximity of a library is a factor for a quick turnaround time. Arrangements can be informal or formal, free or with a charge. Libraries of a similar kind tend to borrow from each other. This may occur because they may share a similar mission, collection, and clientele. Moreover, locally, librarians of similar type institutions often know each other and belong to the same professional organizations. They feel more comfortable interacting with each other than with librarians outside their domain. However, since some libraries have far more substantial collections of books and journals than others, the smaller libraries may be dependent on the goodwill of the larger ones. If the process of borrowing materials is slow and cumbersome, a library may explore alternative agreements with other libraries for speedier delivery of materials.

Such relationships can be expressed, for example, through the volume and frequency of their interlibrary loan transactions. Therefore, the interlibrary loan mechanism could likely be a sensitive

gauge of the communications process among health sciences libraries.

In an exchange model, libraries are free to enter or exit any formal or informal network of reciprocal agreements. A power-dependency approach forces participants to interact under pressure from a more powerful organization. An economic view emphasizes that two scarce resources, money and authority, are distributed within an interorganizational network. A mandated network looks at the structural character of interorganizational relations. It is a legal-political edict which forms the basis of interaction among organizations.

The mandated network model is of special interest in analyzing the impact of the Medical Library Assistance Act and information technology upon health sciences libraries. Of special concern is the relationship between the National Library of Medicine, with a regional medical library as intermediary, with the health sciences libraries. The implementation of the Regional Medical Library Program by the National Library of Medicine in the Pacific Northwest will be investigated. To determine the program's impact, indicators of the structure of relations and change may be expressed by the presence or absence of membership by health sciences libraries in networks,

the growth in numbers of consortia, and the number of libraries funded by consortium grants during each of these periods.

The computerization of medical libraries also affected their interorganizational relations. The National Library of Medicine has been exceptional in its efforts to integrate information and knowledge with technology. Its MEDLINE is a prime example of applied research converted to practical applications utilized across the entire United States, whether by small hospital libraries or large medical complexes.

MEDLINE is the online version of Index Medicus and provides computerized access to more than 2,600 scientific, primarily English language, periodical titles. For example, a researcher or a physician requests a librarian to find information on a certain topic. The librarian, when possible, has a reference interview with the requestor to determine more closely what type of information is needed, whether there are seminal articles written on the topic, how broad and in what depth does the search need to be, and whether any limits can be set as to English language preference or human subjects only. The librarian may perform a MEDLINE search. A successful search may result in a computer printout with bibliographic citations pertaining to the subject and related topics. Those citations of interest to the requestor can be located in the library's

collection or obtained via interlibrary loan. Instead of a librarian having to do a subject search manually by perusing numerous printed volumes of indices, MEDLINE can provide access to one or more subjects at the same time by the utilization of Boolean searching. The latter method allows for one or more topics to be searched with an 'and' or 'or,' thereby greatly improving the comprehensiveness and speed in comparison with the single subject access of a manual search.

Not only has online database searching changed the ways libraries do business but also commercial online bibliographic utilities, which provide access to catalog information, make it easier to more quickly place materials on the shelves available for use. These advances have replaced the outdated procedures of each library doing its own cataloging and processing manually. Such a system also expedites interlibrary loan requests by listing which libraries possess the needed materials. However, reliance upon any of these systems creates a power-dependency based relationship. Once a library has subscribed for a number of years to one or more bibliographic utilities, with a substantial financial investment and long-range commitment, it may cut itself off from computerized resource sharing with libraries which belong to different vendors. As a result, libraries on different systems cannot easily access each

others' holdings, thereby diminishing their resource sharing capability.

#### JUSTIFICATION

This research will focus on the impact of a federally mandated information program on the interorganizational relations among health sciences libraries of the Pacific Northwest. The Medical Library Assistance Act of 1965 authorized the National Library of Medicine to provide grant funding (Public Law 89-291; Section 398) to develop a national system of regional medical libraries.

This law was enacted to correct the deficiencies in information resources available to researchers and physicians by strengthening library collections and by establishing a nationwide biomedical network for reference services and document delivery. A hierarchical system was developed with the intention to include the needs of the largest medical library as well as the smallest hospital library. Each participant was required to play its part to further the cause of scientific discovery and medical treatment. The Medical Library Assistance Act of 1965 effectively supported the recommendations of the National Program to Conquer Heart Disease, Cancer and Stroke.

Useful developments in computer technology occurred during the period the Medical Library Assistance Act was authorized. These technological advancements applied to library processes and procedures were greatly beneficial in enhancing the impact of the Regional Medical Library program. The convergence of information technology with information growth was the result.

It is hoped that insight gained from the study of the changing character of health sciences libraries in the Pacific Northwest, a likely result of this federal mandate and technological intervention, will form a model for understanding what has been occurring in other regions of the United States. This subject does not appear to have been closely examined or reported.

This study should be of assistance in the organizational decision-making and implementation processes concerned with information access and delivery, especially for the administrators, medical staff and librarians of hospital libraries. It demonstrates how an hierarchical network can distribute its services with depth and breadth, from the largest to the smallest units. Ready access to information is crucial for the biomedical community because it affects their primary responsibility of delivery of services for patient care, as well as the need for medical research. Health sciences

libraries play an instrumental role in this process. As a result, they make an explicit social contribution.

The public good appears to be well served by having libraries provide relevant and up-to-date information to physicians for their decision making in their treatment and care of patients. Researchers benefit by having information made readily available to provide background on studies done in their field of interest or related areas. Advances in medicine, be it short- or long-run, often make a major contribution to society by offering better ways to prevent illness, treat a disease, or prolong a healthy life.

The quantity and quality of needed access to information depends on the type of health sciences libraries, their purpose, their social and economic milieu, and their available resources. Information is equated with power within any organization. Allocation and control of resources is especially visible in libraries when dealing with collections of books and journals, and interlibrary loans for accessing these collections.

The interdependence of health sciences libraries as organizations creates a plethora of formal and informal relations in a fluid environment. This might not appear to be a change from the past, but the crucial difference is the increased number of agencies and a greater degree of specialization which fosters independence as well

as interdependence. This phenomenon, combined with the rapid growth in the volume of information and new computer technology, has given rise to a shift in power relations among health sciences libraries. A hospital administrator who does not understand the implications of this change will be at a disadvantage when dealing with issues of information access and delivery.

Having an information broker on the premises is a highly desirable asset. Hospitals are more likely to attract good physicians and other qualified personnel when they have strong library facilities and services. A vital library can keep its clientele up to date with the most recent developments in a field and provide the pertinent periodical articles. As a result, health professionals may not have to spend a significant amount of their time with the process of retrieval of information but instead can review and evaluate the materials they requested.

Information is not a cost-free commodity. Monetary resources for individual libraries are dwindling in proportion to an ever-expanding body of scientific and medical knowledge. However, federal, state, and local cutbacks in medical library funding and the increased costs of information have necessitated a stronger emphasis on local and regional resource sharing. Costs of online databases and interlibrary loan transactions continue to rise.



At the same time, the demand for information has especially increased in the area of health care delivery. Requests no longer come only from physicians, biomedical researchers and medical students, the traditional users of medical information. Requests now come also from other professional groups including nurses and health administrators, health care consumers such as patients and their families, interested laypersons, and patient advocates. Other allied health professionals, such as social workers and physical therapists, sought access to biomedical information as well.

Furthermore, a trend has surfaced towards "delibraryzation" which manifests itself by individuals performing their own online searching. The health care professional is no longer as dependent upon the traditional library services in fulfilling information needs as before the advent of computerized searching.

In addition, hospital administrators, in a constant struggle to have their institutions maintain a competitive edge, are questioning the current professional standards for hospital libraries in order to save money. As personnel costs continue to increase, it appears easier to downgrade library staff by cutting an accredited librarian position. Also, when given the choice between having to fund a piece of media equipment or strengthening a hospital library's

periodical and book budget, an administrator may likely select the first alternative.

All of these issues and pressures have a direct bearing on the interorganizational relationships of health sciences libraries.

Librarians, each on their own, can justify their role to the hospital administrator. However, they may do far better as a cohesive group.

### RESEARCH QUESTION

This study, which will focus on health sciences libraries in the Pacific Northwest, endeavors to respond to two issues.

- Impact of the implementation of a federally mandated medical information program, the Regional Medical Library Program, upon the interorganizational relations of health sciences libraries; and,

- Impact of uses made of computer technology.

The outcome of the study should provide the biomedical community with a better understanding of how to deal with current and future crises in coping with the proliferation of knowledge. A regional appreciation may be extrapolated to the United States as a whole.

A study of health sciences libraries in the Pacific Northwest, from 1960 to 1985, is important because it will show their evolution and effectiveness in context with the different networks they might belong to at various points in time. This research emphasizes the substantial changes librarians face in coping with the exponential increase in the publication of research papers and the demand which library users have placed upon institutions for information access.

The Pacific Northwest is a sensible choice for this study. It is comprised of Idaho, Montana, Oregon, Washington, Alaska (and British Columbia). Although geographically vast, the region has a limited number of health sciences libraries compared with other areas in the United States. Because of this sparsity, the basic trends and currents associated with the diffusion of information are more easily highlighted and the underlying principles more easily elucidated. However, the richness in having numerous interacting organizations is lost. This is far more likely to occur in the more populated areas in the United States where there are more library resources.

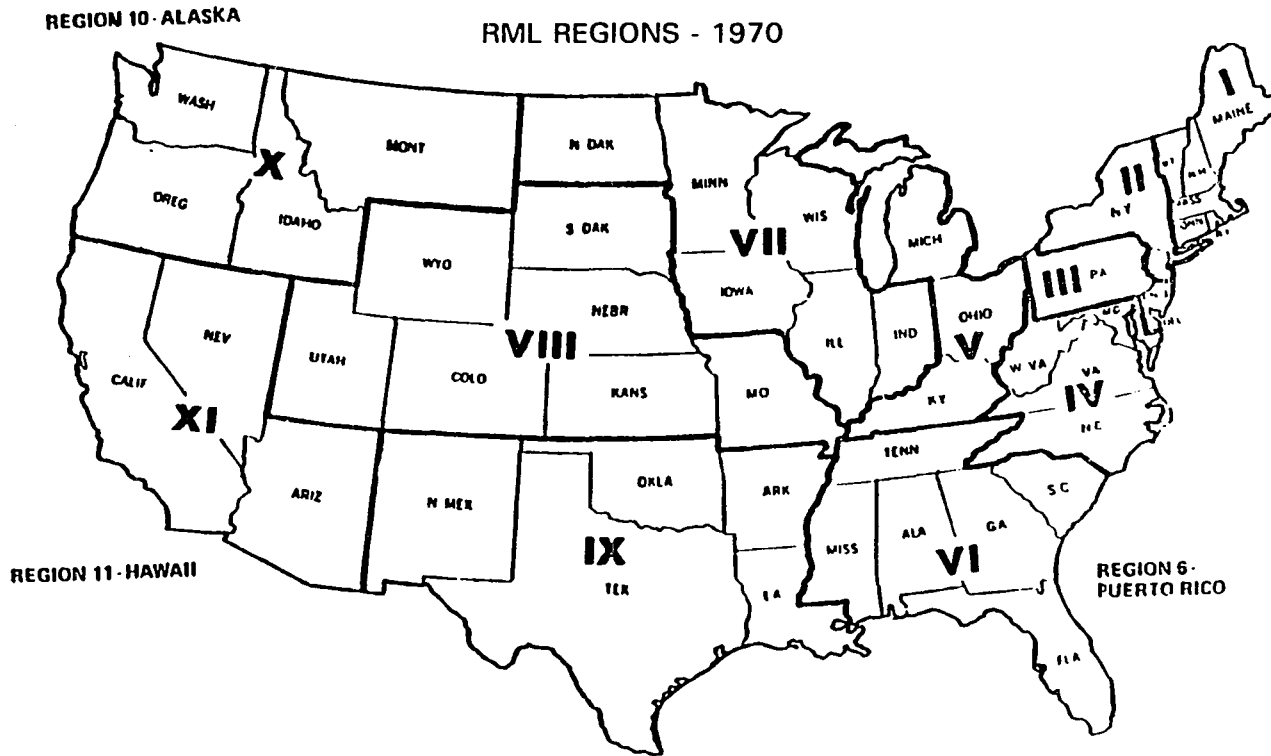
The health sciences libraries in the Pacific Northwest also fit within the framework of a federally mandated biomedical communications network. Of the eleven original regions in the national system, developed and directed by the National Library of Medicine, the Pacific Northwest and Alaska were designated as Region X

(Figure 1). This research involves looking at a multiplicity of organizations, from large academic health sciences centers to small hospitals. The interorganizational relations of regional to local libraries are examined.

These organizations are faced with two issues:

- under what conditions the organization is to utilize a commodity: information?
- under what conditions the organization is to utilize an expediting mechanism: computer technology?

FIGURE I



Source: The Regional Medical Library 1970--A Status Report, National Library of Medicine, Extramural Programs, 1970.

## ENDNOTES

### CHAPTER I

1. Index Medicus, begun in 1879 by John Shaw Billings, director of the "National Medical Library," is a monthly print index of more than 250,000 articles in over 2,600 medical journals.

2. MEDLARS (Medical Literature Analysis and Retrieval System), as developed by the National Library of Medicine, in 1964, was issued as a computerized (batch) database of Index Medicus to provide quicker and easier access to biomedical information.

3. MEDLINE (MEDLARS online) was made available by the National Library of Medicine in 1971. In 1988, four million searches of National Library of Medicine databases were done (Schoolman & Lindberg, "The Information Age in Concept and Practice at the National Library of Medicine," Annals, AAPSS, 495, January 1988, p. 119).

4. grateful-med consists of a user-friendly, limited version of MEDLINE geared to physicians.

5. U.S. President's Commission on Heart Disease, Cancer and Stroke. The Report to the President: A National Program to Conquer Heart Disease, Cancer and Stroke. (Washington, D.C.: U.S. Government Printing Office, 1964-65), Vol. 2, p. 2.

6. *Ibid.*, Vol. 1, p.xi.

7. *Ibid.*, Vol. 1, p.ii.

8. *Ibid.*, Vol. 1, p.ii.

9. *Ibid.*, Vol. 1, p.iii.

10. *Ibid.*, Vol. 1, p.75.

11. *Ibid.*, Vol. 1, p.25.

12. Harold Bloomquist, "The Status and Needs of Medical School Libraries in the United States," Journal of Medical Education, Vol. 38 (March 1963): p. 145-163.

13. Ibid., p. 145.

## CHAPTER II

### REVIEW OF THE LITERATURE

The review of the literature covers trends, theories and the state of the art of interorganizational relationships, interorganizational networks, library resource sharing, and diffusion of information (see Bibliography).

This first section discusses the research problem as written about in the literature of organizational theory. Alternative models of interorganizational relations are referred to as indication of other possible and pertinent approaches. By no means are all variations included, for example, transaction cost analysis.

### MODELS OF INTERORGANIZATIONAL RELATIONS

In the field of interorganizational relations, the four most common models are: exchange, power-dependency, political economy, and mandate.



The first is an "exchange" concept. Howard Aldrich in his article "Organizational Boundaries and Interorganizational Conflict,"<sup>1</sup> and Paul E. White in "Intra and Interorganizational Studies: Do They Require Separate Conceptualizations?,"<sup>2</sup> perceive interorganizational relations as an open system with autonomous organizations interacting for the purpose of exchanging resources.

Gerald Klonglan and co-authors in "The Nature and Impact of Interorganizational Relations" express this differently in stating that voluntary interaction between organizations takes place because they are interested in realizing individual as well as mutual goals.<sup>3</sup> Sol Levine and Paul E. White in "Exchange as a Conceptual Framework for the Study of Interorganizational Relationships," argue that this interrelationship is official, formal, and/or voluntary.<sup>4</sup>

Since libraries have a long tradition of freely sharing their collection of books and journals with each other through interlibrary loan arrangements, a model of exchanging resources was considered as framework for this study. However, it was rejected because the system put into place, as a result of the Medical Library Assistance Act, no longer allowed free entry and exit. The National Library of Medicine implemented a network that required adherence to a hierarchical protocol. If not followed, benefits would not be received,

such as easier access to a vast body of biomedical information or supplemental funding to strengthen a library's collection.

On the other hand, Stuart Schmidt and Thomas Kochan in "Interorganizational Relationships: Patterns and Motivations," advance a power-dependency approach whereby all potential participants are impelled to interact by pressure from a more powerful organization.<sup>5</sup>

The Regional Medical Library Program exhibited traits of a power-dependency relationship because of the legislative influence and financial clout the National Library of Medicine possessed. This model of interorganizational relations does not capture the research problem as satisfactorily as the mandated model which is discussed last.

Another position is economic, as promulgated by J. Kenneth Benson in "The Interorganizational Network as a Political Economy."<sup>6</sup> Interorganizational relations (IOR) is defined here as a political economy whereby two scarce resources, money and authority, are distributed within the interorganizational network.

As frequently is the case, even well-funded federal programs have limitations as to their expenditures. The National Library of Medicine distributed much of its support for the Regional Medical Library Program and related activities through grants. The immensity

of the process of establishing a nationwide biomedical information network demanded a large influx of money to achieve depth and breadth. The National Library of Medicine controlled the resources of money and authority. The "political economy" model, therefore, would be feasible to use if there did not exist another type which fits the particular issue under study better.

The last model is the "mandate" concept promulgated by Joseph Raelin. Raelin's theory was selected because it seemed to explain so well the events which led to the legislation of the Medical Library Assistance Act and its subsequent authorizations for its expansion of a biomedical information network. His interorganizational framework appears most elucidating. The attributes Raelin assigned to his model dovetail nicely with the characteristics of libraries in their interactions. It was striking how Raelin's "legal-political mandate" provides a contextual framework. Thus, by using this theory, the understanding of a complex but highly successful federal program is greatly improved.

#### RAELIN'S LEGAL-POLITICAL MANDATE

Joseph Raelin in "A Mandated Basis of Interorganizational Relations: The Legal-Political Network," emphasizes the structural

character of interorganizational relations.<sup>7</sup> His focus is on the legal-political mandate as basis for interaction between organizations, but he also incorporates the exchange and power-dependency models.

Raelin explores a mandated model of interorganizational relations even further. He distinguishes between two different types of mandated networks. The first one arises when organizations reach a mutually acceptable agreement to cooperate rather than being motivated by increasing their power. The second is the result of outside pressure, society-at-large placing its will on a group of organizations through the enactment of a law. When this specific legislation continues to be renewed, the legal-political mandate survives concomitantly. The Medical Library Assistance Act appears to fall within the context of the latter.

Raelin surmises that an exchange or power-dependency network precedes a legal-political network. This is applicable to the situation of the health sciences libraries in the Pacific Northwest where exchange as well as some power-dependency relationships were the norm before the Regional Medical Library program was started.

Although Raelin gives as an example the revenue sharing legislation enacted in the mid-1970's, the Medical Library Assistance Act

of 1965 appears to be compatible with his framework because it also was a nationwide network involving many types of participants, from a high federal agency to a local hospital library. The structure of a legal mandated network implies that rules and regulations set by a power authority should be adhered to by the organizations eligible to participate. The legislation puts in place the foundation for this. The intent of the Medical Library Assistance Act was the establishment of a hierarchical network to increase and equalize access to biomedical information to all health practitioners and researchers. A tiered resource sharing system of health sciences libraries was the vehicle for this.

Previously, a far different type of interorganizational relation existed between libraries in the Pacific Northwest. A fairly open system for exchange of library resources was in place, facilitated through the Pacific Bibliographic Center. This clearing house for information at the University of Washington was founded through a Carnegie grant in 1940 for participation by all types of libraries in the Pacific Northwest, including British Columbia. With the passage of the Medical Library Assistance Act, a federal agency superimposed a new structure. Expressed in other terms, a different form of interorganizational interaction came about which had not been there earlier. This powerful federal authority limited the types of libraries

which could participate, in this case to health sciences libraries. It separated this group from other libraries because of its specialization. Moreover, it geographically confined the boundaries of the network to the United States. A hierarchical relationship was mandated, which was put into action by a strict protocol.

Raelin's theory varies sufficiently from the other models discussed to merit standing on its own. His concept addresses a different reason for the basis of a network, the legal-political mandate.

Raelin appears to best explain the formalized network relations of medical libraries. He has identified five attributes of legal-political networks:

1) *Mandate/network distributional balance*

The intent of the mandate is compared with the actual distribution of influence (power and authority) and domain (allocation of resources among network participants).

Of Raelin's five characteristics, the first is the most distinctive and the least like other interorganizational relation interactions discussed. It implies that the viability of a network is dependent upon how closely the intent of specific legislation is followed. The term "influence" is used by Raelin as a dimension consisting of two parts: power and authority. Authority can be best defined by the

legitimacy of a network through the mandate. Power can be expressed by the actual clout behind the mandate to make it achievable. Without the latter, organizations can accept or ignore part of the regulations which were prescribed as a result of a mandate. Raelin uses the term "domain" to specify the boundaries of a network as it pertains to the distribution of resources. Participants quite likely are aware in advance what they commit themselves to.

## 2) *Evaluation*

This deals with performance, leadership and linkage (working relationships and communications among network participants).

Although these traits are found in other types of networks, the ground rules in this case are set by legislation and as such they differ markedly. Special emphasis is placed on how well the leadership performs.

## 3) *Competition and conflict*

The rivalry for the same or unspecified resources allocated by a third party is explored.

These dimensions are far more discernible in exchange or power-dependency models but are also applicable here to a certain

extent. In this context, distribution of resources have to follow legislative guidelines.

4) *Coordination*

The focus is on joint planning and implementation activities.

Unlike networks based on free entry and exit, a legal-political mandate often gives broad parameters of how a network should function.

5) *Effectiveness*

This considers whether the stipulations of the mandate have been properly met.

A legal-political mandate often has an evaluation component built in. This becomes especially important to justify renewals of the legislation with continuing funding.

How do the interorganizational relations between health sciences libraries in the Pacific Northwest manifest Raelin's attributes?

The mandate/network distributional balance looks at the intent versus the actual occurrences in the distribution of resources. In this study, it is the National Library of Medicine, as executor of the Medical Library Assistance Act, which authorized the programs and grants expenditures to health sciences libraries at the national level



for the regions. The National Library used the authority through the mandate. It increased its powerbase successfully by gaining congressional approval to directly issue grants. Accordingly, the National Library of Medicine increased its power.

For the Pacific Northwest, the Regional Medical Program, based at the University of Washington Health Sciences Center, dispensed funds as it deemed appropriate in its execution of the program directives. For the period 1965-1985, a shift in resource allocation took place among the participants, thereby changing the interorganizational relations between health sciences libraries in the region.

Raelin's second attribute is "evaluation." The National Library of Medicine clearly was the leader in devising a national strategy for a biomedical information network and expected regional medical libraries to be accountable for how monies were spent. The National Library of Medicine therefore put into place a set of hierarchical protocols for information delivery in order to standardize its evaluation process. The Regional Medical Library in Seattle was expected by the National Library of Medicine to assume the leadership role for health information delivery in the Pacific Northwest including coordinating activities, serving as a channel of communication between health sciences libraries in Region X and the National Library of Medicine, and gathering data.

This research intends to analyze the changing patterns of inter-library loans and channels of document delivery. Interlibrary loan transactions are quantitative measures which are not always reliable in collection and interpretation. Notwithstanding, they are solid indicators of interaction among health sciences libraries because of their high volume. They are commonly used in libraries as an evaluation tool to measure resource sharing and concomitant reimbursement.

The "competition and conflict" aspect Raelin forwards, turns out to be quite discernible when looking at the relationships between health sciences libraries vying for the same resources dispensed by the National Library of Medicine. However, it is limited to health sciences libraries because of the mandate's focus on increasing the dissemination of biomedical information. In the Pacific Northwest, this was especially noticeable in the mid and end of the 1970's.

Raelin's attribute of "coordination" is one of the underpinnings of the philosophy of libraries for its resource sharing (for example, books and journals). The vision of the National Library of Medicine, through the administration of the Medical Library Assistance Act, was based on a highly coordinated network. One of its goals was greater self-sufficiency at the smallest library as well as for its end users, physicians, and other health professionals. These activities

can be documented for health sciences libraries in the Pacific Northwest. However, in a legal-political network such as this one, there is greater standardization at all levels. In contrast, free entry and exit networks often deal with a number of different protocols.

The last attribute, "effectiveness," is very much supported by the framework the National Library of Medicine set up. The Medical Library Assistance Act would be a success if physicians, researchers, and allied health workers had their information needs met without too much delay. Interlibrary loan data are useful performance indicators to support if the stipulations of the mandate were met. Moreover, it is a major evaluative factor to receive renewals of the legislation. Through the fortuitous development of computer technology, the attainment of this objective became highly feasible.

In the Pacific Northwest, the turning point occurred when MEDLINE services were provided, directly or indirectly, by health sciences libraries at all levels of the hierarchy, from the regional medical library to the local level.

#### PRIOR RESEARCH

There exists prior research dealing with health sciences libraries which is relevant to a certain extent, but generally the literature has

been scarce. By far the most comprehensive source is the Handbook of Medical Library Practice. Volume III covers "Health Science Librarianship and Administration." Chapters on "Professional Organizations in Health Science Librarianship," "The National Library of Medicine," and "Interlibrary Cooperation among Health Science Libraries" paint an excellent, but broad, picture of medical librarianship.<sup>8</sup> The relevancy of this title and specific volume lies in the general overview it provides about the various relationships among libraries. However, it does not specifically address the interorganizational aspects as discussed by Raelin.

Donald Lindberg, current director of the National Library of Medicine, provides an historical perspective in "National Library of Medicine: The View at 150 Years."<sup>9</sup> He emphasizes how, since the mid-sixties, the National Library of Medicine has developed in new areas due to the capabilities computers and information technology offer. He perceives the Medical Library Assistance Act as quite successful, indicated by its frequent renewal and award of \$160 million in grants. The Regional Medical Library Network has had an effective impact on the delivery of health information with its 7 (previously 11) Regional Medical Libraries, 125 Resource Libraries (generally based at academic health sciences centers), and about 4,000 basic health sciences libraries. Lindberg also discusses

increases in grant funding for establishing consortia for subregional groups. Lindberg sets the framework for this research at the national level.

Lindberg co-authored an article with Harold M. Schoolman, "The Information Age in Concept and Practice at the National Library of Medicine."<sup>10</sup> Of special interest is the discussion as to whether information should be considered a common good or an economic commodity. In the past, the government has filled the role of collecting and dispensing information. With increased growth in computer technology, the commercial sector is questioning the appropriateness of this situation.

Lindberg explains the role the National Library of Medicine, as a public agency, has played in providing widespread access to biomedical information at a reasonable cost to promote research and patient care for a healthier populace. However, the success of the National Library of Medicine, achieved by a large influx of federal funds, is threatened by the private sector which considers it to possess unfair competitive advantage. Curbing the National Library of Medicine's biomedical information nationwide outreach may hamper the effectiveness of the Regional Medical Library program which is under study here.

Ray Palmer, a former executive director of the Medical Library Association, discusses the impact of the National Library of Medicine on health sciences libraries in his article, "Effect of Federal Program on Health Sciences Libraries."<sup>11</sup> He believes that since the great federal support in the past, as exemplified by the Medical Library Assistance Act, the government is providing less funding for the biomedical communications network. Palmer argues that the access to information has become more costly. He predicts that health sciences libraries will change their traditional role and become the crucial information transfer stations of their institutions.

Elliot Siegel, National Library of Medicine, traces the efforts of the National Library of Medicine, with special emphasis on automation.

In "150 Years of Medical Information Research," Siegel describes the evolution of medical research, beginning with Dr. John Shaw Billings' preparation of an index of the Catalog of the Library of the Surgeon General's Office to Index Medicus, published in 1879, and continuing with computerization of Index Medicus to MEDLARS and MEDLINE.<sup>12</sup> Currently, this comprehensive health sciences library reference work indexes more than 2,600 journals with over 250,000 citations annually.

Alison Bunting, in "The Nation's Health Information Network: History of the Regional Medical Library Program, 1965 to 1985," has written an eloquent overview of how the Regional Medical Library Program evolved.<sup>13</sup> Her study did not cover a discussion of some of the interorganizational dynamics as well as specific material dealing with the Pacific Northwest. The purpose of Bunting's study was to document the history of the program, not to address the specific interorganizational aspects.

A History of the National Library of Medicine: The Nation's Treasury of Medical Knowledge, by Wyndham Miles, gives a detailed account about the development of the Library of the Surgeon General's office around 1818/19 to the National Library of Medicine, so named in 1956. Of special interest is the wealth of background information he provides in how the National Library of Medicine interacted with the members of Congress. What is most relevant for this research is the selected statistical data from 1957 to 1976. Categories included are appropriations, size of collections, reference services provided, requests for interlibrary loans, serial titles received, and total grant and contract awards.<sup>14</sup>

Gerald Oppenheimer, in "Domus or Polis? The Location of Values," discusses the development of the "belief system" of the Medical Library Association and its members as it developed over

time.<sup>15</sup> He provides some insight into how this particular organization developed.

Since this research includes a survey of librarians asking to which organizations they belong, Oppenheimer's article on membership in the venerable health sciences organization establishes a useful context. The Medical Library Association was founded in 1898 and incorporated in 1934. It currently has more than 5,000 members, individuals or institutions. This organization has been on the forefront of developing improved access to research publications and information technology. Membership in this association validates professional status.

Changes caused by computer applications are discussed lucidly by Robert Braude in his article, "Impact of Information Technology on the Role of Health Sciences Librarians."<sup>16</sup> He contends that traditional librarian roles of selecting, organizing, and disseminating information are transformed by the tremendous impact of technology and that the educational preparation for librarianship is not adequate to meet these demands. He states, "Perhaps the greatest single impediment to the continued development of librarianship has been the traditional view that librarians manage the containers of information rather than the contents, the information itself."



Braude perceives the impact of information technology in two ways: different, non-traditional, forms of information packaging; and dissemination and information technology's effect on the way librarians perform their work. His discussion of the interaction of technology and health sciences librarianship indicates how much the profession is in flux. Braude's article is one of five from a symposium "Platform for Change: Medical Library Education in the Information Age." Although his remarks address the evolution of health sciences librarianship, he also looks to the future of the field.

The best source for corollaries with other allied health and library networks is Charles T. Townley's Human Relations in Library Network Development. He perceives library networks as open social systems. Charles Hildreth in "Library Networking in North America in the 1980's. Part 1: The Dreams; the Realities," deals with the concept of one national bibliographic network and how the four predominant bibliographic utilities, OCLC (formerly Ohio Colleges Library Consortium) now Online Computer Library Center, RLG/RLIN (Research Libraries Group/Research Library Information Network), WLN (formerly Washington Library Network), and Utlas have each gone their different ways.<sup>17</sup> This makes interlinking of their telecommunications systems difficult. It also hampers local and regional resource sharing among various types of libraries. Hildreth

believes the impact of stand-alone library automated systems, the trend of greater computer expertise among librarians, and a larger push for local resource sharing will affect these autonomous bibliographic utilities adversely. Hildreth addresses the broader perspective of library networks which share many similarities with the biomedical information network developed by the National Library of Medicine discussed in this research.

Abdul Miah, in his dissertation on automated library networking in community colleges in the United States, states that "networking activities are an outgrowth of the information explosion, the advancement of technology, the escalating costs of needed resources, and the varying level of services and resources available to individuals by reason of geographic location or socio-economic position."<sup>18</sup> Miah's article is relevant because its study of community college library networks parallels to some extent the issues surrounding the workings of the biomedical information network under study.

The creation of Area Health Education Centers, developed 20 years later than the Regional Medical Library Program, is viewed as a far more independent model and not within the scope of this study. Although the Area Health Education Centers provided some library

services, they were not part of the Medical Library Assistance Act legislation.

## ENDNOTES

### CHAPTER II

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## CHAPTER III

### EVOLUTION OF HEALTH SCIENCES LIBRARIES

#### PRE-1965

The evolution of health sciences libraries is closely connected with the advances made in medicine and the education of physicians. The Flexner Report on Medical Education, published in 1910, was instrumental in stimulating the development of medical school libraries. Hospital libraries were comprised of small working collections and restricted to use by doctors only. In the Pacific Northwest, the University of Washington Medical School and the University of Oregon Medical School each offered training for doctors in the region. Both institutions had nursing programs, but other hospitals, colleges, and universities offered nursing courses, too. The medical school libraries were almost totally dependent on the goodwill and interest of the deans of the medical schools. Not surprisingly, efforts were made towards resource sharing among various types of

libraries in the Pacific Northwest to supplement the holdings of their own collections.

This voluntary interaction resulted in the creation of the Pacific Northwest Bibliographic Center in 1940, housed at the University of Washington's Suzallo Library (and closed in 1991).<sup>1</sup> The center's purpose was to serve as a regional depository for information on the holdings in library collections. Each library would send a set of catalog cards for each item acquired. In turn, the Pacific Northwest Bibliographic Center would fill interlibrary loan requests for items not owned by the requesting library. This exchange worked well until more specialized and stronger networks made it obsolete. The value participating libraries attached to this regional center lessened due to other, usually better, opportunities. Libraries of the same type cooperated more closely, such as major university libraries or medical libraries, after the Medical Library Assistance Act of 1965.

As the interorganizational model of exchange is characterized, one by one, the members of the organization took advantage of their prerogative of free exit. The Pacific Northwest Bibliographic Center is an example of this. Libraries were requested but not required to participate. In the health care field, from the 1950's on, this was primarily due to the abundance of available federal funds for medical education and scientific research and the National Library of

Medicine's leadership role in the development of a nationwide biomedical communications network.

#### THE MEDICAL LIBRARY ASSISTANCE ACT OF 1965

The Medical Library Assistance Act of 1965--Public Law 89-291--was enacted on October 22, 1965, and brought about a crucial transformation in the diffusion of information in the sciences. Its implementation provided the structure for a biomedical communications network.

Part I laid out the plan for the assistance to medical libraries:

Sec. 390 (a) The Congress hereby finds and declares that (1) the unprecedented expansion of knowledge in the health sciences within the past two decades has brought about a massive growth in the quantity and major changes in the nature of biomedical information, materials and publications;

(2) there has not been a corresponding growth in facilities and techniques necessary adequately to coordinate and disseminate among health scientists and practitioners the increasing volume of knowledge and information which has been developed in the health science fields;

(3) much of the value of the ever-increasing volume of knowledge and information which has been, and continues to be, developed in the health science fields will be lost unless proper measures are taken in the immediate future to develop facilities and techniques to collect, preserve, store, process, retrieve, and



facilitate the dissemination and utilization of, such knowledge and information.

(b) It is therefore the policy of this part to

(1) assist in the construction of new, and the renovation, expansion, or rehabilitation of existing medical library facilities;

(2) assist in the training of medical librarians and other information specialists in the health sciences;

(3) assist, through the awarding of special fellowships to physicians and other practitioners in the sciences related to health and scientists, in the compilation of existing, and the creation of and utilization of additional written matter which will facilitate the distribution and utilization of knowledge and information relating to scientific, social and cultural advancements in sciences related to health;

(4) assist in the conduct of research and investigations in the field of medical library science and related activities, and in the development of new techniques, systems, and equipment for processing, storing and retrieving, and distribution of information in the sciences related to health;

(5) assist in improving and expanding the basic resources of medical libraries and their facilities;

(6) assist in the development of a national system of regional medical libraries each of which would have facilities of sufficient depth and scope to supplement services of other medical libraries within the region served by it; and

(7) provide financial support to biomedical scientific publications.<sup>2</sup>

This act was the result of a congressional response to two reports. In 1964, the Commission on Heart Disease, Cancer and Stroke was created to study how to provide better research for treatment and prevention of these diseases. Dr. Michael E. DeBakey, chairman of the Commission, emphasized the economic losses of worker productivity caused by heart disease, cancer and stroke in males. The report of the Commission recommended a national network. It also stressed that medical libraries take responsibility to provide the researcher as well as the practitioner with easy access to the most up-to-date information.

In 1963, Harold Bloomquist, assistant librarian of the Harvard Schools of Medicine and Public Health, published the results of his study of the libraries of 86 accredited medical schools and schools of basic medical sciences to ascertain effects of medical research on libraries. In his study, he tracked the exponential increase in publication of research papers, the growing costs of scientific indices, and the costs of employing well-trained library staffs. He warned that if medical libraries did not serve their clientele satisfactorily, researchers would seek other ways to meet their information needs.

Bloomquist proposed a national biomedical communications network with a hierarchical organization.

The implementation of the Medical Library Assistance Act reflected many of the suggestions made in the DeBakey and Bloomquist reports. The expanding role of the National Library of Medicine in this process warrants special interest. Under the leadership of Dr. Martin Cummings, the National Library of Medicine was able to convince Congress in 1964 that the library should be able to independently award grants rather than the Public Health Service. This change greatly increased the National Library of Medicine's authority. It also facilitated the implementation of the Medical Library Assistance Act with its diverse programs since there was one less bureaucratic level to deal with. Furthermore, the National Library of Medicine placed a strong emphasis on technological innovation. One of the outcomes was the creation of a computerized, highly enhanced version of Index Medicus which vastly expedited subject access to the biomedical literature. The development of the Regional Medical Library Program was one of the National Library of Medicine's greatest achievements in stimulating the flow of biomedical information for a vast geographical area through a well-constructed network.

Under the Regional Medical Library Program, the country was divided into twelve regions, each with a medical school library designated as the primary health information resource. Because of the political-legal mandate, it was not surprising that the University of Washington Health Sciences Library became the Regional Medical Library for Region X. Not only could it rely on the vast collection of the University of Washington's libraries, but also Senators Warren Magnusson and Henry Jackson occupied positions of considerable influence in Congress.

The University of Oregon Medical School Library (currently the Oregon Health Sciences University Library) in Portland had been an administrative organization independent from the University of Oregon in Eugene since 1934 because Portland and Eugene are about 110 miles apart and the medical school faculty and students did not have the easy access to an extensive academic research library collection as those at the University of Washington Health Sciences library had. Accordingly, the Pacific Northwest Regional Health Sciences Library at the University of Washington received \$639,000 as a result of the Medical Library Assistance Act of 1965, FY 1966-1970, and became operational October 1, 1968.<sup>3</sup>

To provide health professionals with up-to-date information, a hierarchical system of referrals was constructed whereby hospital

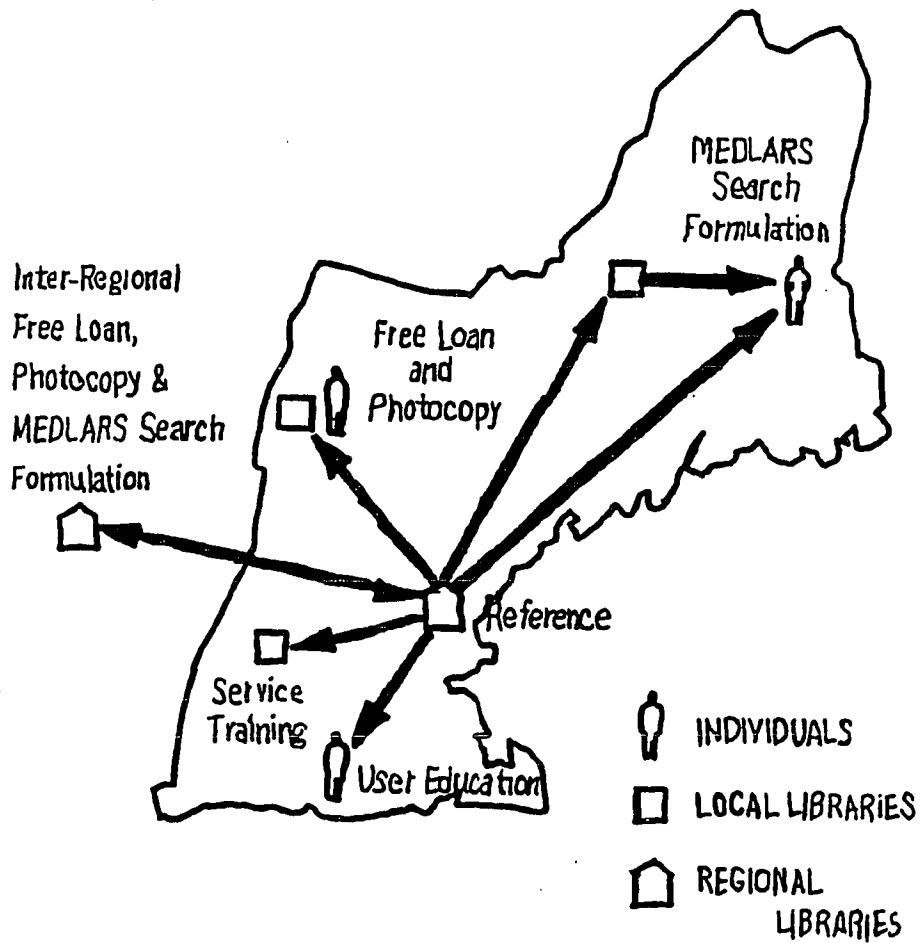
libraries would first send their requests for interlibrary loans and reference (including computerized bibliographic searching) to the medical school library within the state (Figure II). This institution, in turn, would forward unfilled requests for information to the regional resource library. If the latter could not satisfy the demand, it would be passed on the National Library of Medicine.

At the same time, an outreach program was implemented primarily to make physicians aware of how they could utilize this network and support the establishment or growth of their specific hospital libraries. This pyramid of information resources was comprised of National Library of Medicine and Center for Biomedical Communications, 11 regional libraries, 100 academic libraries, 500-600 local libraries (hospitals, medical societies, etc.).<sup>4</sup> For the period of July, 1965, to June, 1970, \$40.8 million was made available through the authorization of the Medical Library Assistance Act of 1965 by the National Library of Medicine for programs and network development of medical libraries.<sup>5</sup>

Of interest are the expenditures of the National Library of Medicine of \$1.65 million for FY1970:

- "42% for Interlibrary Loan Services
- 17% MEDLARS Demand Search Services
- 9% Education and Consultation primarily for local hospital libraries
- 7% Preparation of Union Lists

FIGURE II  
SERVICES OF REGIONAL MEDICAL LIBRARIES



Source: The Regional Medical Library 1970--A Status Report, National Library of Medicine, Extramural Programs, 1970.

6% Orientation and Information Programs

4% Reference Services

15% Other (Management and Overhead)"<sup>6</sup>

The Medical Library Assistance Act of 1965, and its subsequent renewals, served to strengthen the legitimacy, power, and authority of the National Library of Medicine. The network distributional balance was easily maintained due to the fact that the National Library of Medicine retained a tight control on the purse strings and monitored programs quite guardedly. Strict protocols were put in place not only for routing of requests and interlibrary loan reimbursements, but also for authorization for participation in MEDLARS/MEDLINE training, computer terminals, and MEDLINE codes. The codes were the authorized passwords to access MEDLINE. Only a limited number of codes were available due to the limitations of the computer system.

Contracts of the Regional Medical Libraries were reviewed by the National Library of Medicine every three to five years. A new Request For Proposal would have to be submitted by the Regional Medical Library, but until the late 1970's the original Regional Medical Library would usually receive the award. A change occurred when other medical libraries considered themselves strong enough to

compete for the award, especially when the original Regional Medical Library was not an academic health sciences library.

The National Library of Medicine would stipulate what was required, and the primary resource libraries were expected to implement change, such as reduced reimbursement for interlibrary loan transactions. A similar situation occurred in the relationships between the Regional Medical Library and medical school and hospital libraries.

The power-dependency basis of interaction was acutely evident, such as a formal and competitive request for proposal process, but it appeared generally to be viewed in a positive light.

With inadequate physical and human resources, health sciences libraries seemed willing to take whatever support the National Library of Medicine offered. The hierarchical coordination of efforts to serve the informational needs of health professionals looked to be remarkably successful (See Figure IV) from the number of interlibrary loans processed by the Regional Medical Library at the University of Washington. In 1974/75, the library part of the academic health sciences research center in the Pacific Northwest handled 22,000 transactions within the state of Washington. In 1975/76, it started levelling off to around 15,000. In Oregon, the number of interlibrary loans stayed around 2,500 for the same period. The National Library



of Medicine firmly established functional linkages. Without its strong leadership, this type of cooperation would likely have not been attained in such a relatively short span of time.

An exchange model would seem to have been far less effective; each state would have pursued its individual goals first rather than taking a regional perspective. Resources, especially journal holdings, would have to have been duplicated to a far greater extent if health professionals in the nation were to be effectively informed about state-of-the-art medicine and other sciences.

#### MID 1970'S TO EARLY 1980'S

The period from the mid-1970's to the early 1980's revealed some drastic changes in the organizational relations of health sciences libraries in the Pacific Northwest. This period shows a decrease hierarchically and an increase locally.

As health sciences libraries strengthened their collections as well as the expertise of their professional staff, dissatisfaction appeared to set in. The hierarchical structure, with forced dependency on the Regional Medical Library, often seemed redundant. The protocol of routing interlibrary loan requests via the primary resource library and then on to the National Library of

Medicine seemed cumbersome, especially when it was known that the Regional Medical Library did not own the item requested. The latter did, however, receive a large reimbursement for the transactions it processed while the libraries lower in the echelon actually did much of the bibliographic groundwork. Moreover, as demand for MEDLINE training increased, the National Library of Medicine was unable to keep up with the requests. Hospital librarians were placed on a waiting list and could attend only if their library owned a terminal.

Even if the requirements of a librarian receiving MEDLINE training and a library having a computer terminal had been met, the National Library of Medicine had imposed a moratorium on MEDLINE codes. The demands on the computer system of MEDLINE was greater than could be accommodated. This meant that a number of hospital libraries had to share a code, and could not perform online searching as the demand arose. Moreover, the National Library of Medicine started charging for MEDLINE in August, 1973, at \$6 per terminal connect hour.<sup>7</sup>

The hierarchical structure clearly laid out the domain of the National Library of Medicine and the Regional Medical Library. However, when federal funding appeared to be drying up and new challenges, such as the implementation of the IAMS (Integrated

Academic Management System) report for a high-tech biomedical communications network, seemed far more attractive, the National Library of Medicine modified its interpretation of its mandate and offered special grants to regions which increased their self-sufficiency. Competition for the Regional Medical Library program contracts increased, and a number of times the original primary resource library lost. Furthermore, subcontracts were negotiated between the National Library of Medicine, the Regional Medical Library, and other libraries in the region.

Still, this did not stem the tide of libraries wanting more control over their own destinies. In the Pacific Northwest, the political influence of the senators from Washington had waned due to the deaths of Warren Magnusson and Henry Jackson while in Oregon. Senators Mark Hatfield and Bob Packwood had gained more power, especially with congressional appropriations. In 1977, the Oregon Health Sciences University, formerly the University of Oregon Schools of Medicine, Dentistry, and Nursing, formulated a biomedical communications network plan for the state of Oregon, and received funding for implementation from the National Library of Medicine. The resulting Oregon Health Information Network paralleled in many ways the existing structure of the Regional Medical Library program. Oregon health sciences libraries had loosened the bonds of power-

dependency relations with the University of Washington Health Sciences Library. Instead, hospital libraries in Oregon now needed to rely more on the resources of Oregon Health Sciences University Library while at the same time the network grant provided them with opportunities to build greater self-reliance. Larger medical libraries were asked to be the resource library for a certain geographic area and received reimbursement for the interlibrary loan requests they filled from smaller hospital libraries.

During this period, interorganizational relations among the libraries exhibited a move towards an exchange mode within the framework of the biomedical communications network. This occurred not only in the Pacific Northwest, but throughout the nation. Academic health sciences library directors formed their own organization to interact with those who had similar goals and resource needs because of their specific environments. The Association of Academic Health Sciences Libraries Directors (AAHSLD) was founded in 1977. They sought to distance themselves from the Medical Library Association, with its large membership of hospital librarians, since they considered themselves having different needs as part of large academic research centers. They also perceived that a small but powerful special interest group, in dealing separately with the National Library of Medicine, would

more effectively resolve conflicts and obtain more funding, since they primarily represented the university researchers and faculty teaching medical students.

In the Pacific Northwest, the hospital librarians were the ones who wanted a change from the status quo. They were of the opinion that the current hierarchical structure was too constricting and not as beneficial to them as to the two large academic health sciences centers. Furthermore, through resource sharing and coordinated collection development, it appeared more timely and efficient to borrow directly from each other. They shifted from a hierarchical structure to a more lateral arrangement.

In 1976, hospital libraries in greater Seattle joined together to form the Seattle Area Hospital Libraries Consortium (SAHLC) but excluded the University of Washington Health Sciences Center Library. This organization, founded on common interest which these librarians considered different from a large academic health sciences center, based its membership on institutions, not individual librarians.

In Oregon, health sciences libraries decided to formalize their informal interactions by founding the Oregon Health Sciences Library Association in 1977. At first they limited membership to hospital libraries only, thereby seeking greater independence from the only academic health sciences library in the state. The effect of this

limiting membership to hospital libraries excluded the medical school libraries. There was a great flurry of activity to bring collections of less-than-adequate or new libraries to a reasonable level and to train staff.

There occurred a remarkable change in power relationships. Rather than being dependent on the Oregon Health Sciences University Library and the Regional Medical Library at the University of Washington, members of the Oregon Health Sciences Libraries Association organized themselves to rely far more on each other. The need for this closer cooperation and coordination of resource sharing arose out of the modification in the Regional Medical Library Program.

The National Library of Medicine decided it could no longer subsidize the cost of interlibrary loans within a state. Interlibrary loans which traditionally had been obtained free of charge between libraries, now only would be reimbursed for referrals for photocopies of journal articles out of state. The National Library of Medicine began enforcing greater self-sufficiency at the regional, state, and local levels. This was not unreasonable since a substantial amount of money was provided to build up local and regional collection since the Medical Library Assistance Act passed 12 years earlier.

In Oregon, the Oregon Health Sciences University Library, as a proactive response, applied directly to the National Library of Medicine for a Medical Library resource grant to establish a statewide, decentralized information network. It also was an effective strategy to become more independent from the Pacific Northwest Regional Health Sciences Library. The intent was to change the existing haphazard patterns of information retrieval and document delivery into a more formalized structure. Until then, health professionals could use their local hospital library for their information needs. However, if they perceived local resources and services insufficient, they went directly to the Oregon Health Sciences University or the Regional Medical Library. Too frequently, the local hospital library was left out of the loop.

In August 1978, the National Library of Medicine awarded a three-year grant of \$231,000 to the Oregon Health Sciences Libraries Association but with the library director of the Oregon Health Sciences University Library as principal investigator.

The Oregon Health Information Network was different from the Regional Medical Library network in that it required the support and signing off of the hospital librarians in the state in order to receive federal funding. This was critical for the hospital librarians to gain status as viable players in the field of information delivery. The

hospital librarians' strong disapproval meant to counteract the Oregon Medical Association arrangement with the Oregon Health Sciences University. By providing gift funds to the university, members of the Oregon Medical Association were entitled to free services for MEDLINE and interlibrary loans. Why would a physician want to pay for copies of articles in journals not available at his local hospital library when he could go directly to "Pill Hill" and get it for free? Hospital librarians objected that they were bypassed. Moreover, in this manner health professionals also circumvented the hierarchical network of the biomedical communications network put into place by the National Library of Medicine. As such, it was contradictory to the intent of the Medical Library Assistance Act.

The hospital libraries in the Portland area, due to their close proximity to the Oregon Health Sciences University, were especially impacted. They, however, had organized themselves as the Portland Area Health Sciences Librarians. Of the 21 hospitals in Portland, 12 had libraries which were also members of the Oregon Health Sciences Libraries Association.<sup>8</sup>

The Oregon Health Information Network sought to address the above issues by having health professionals and/or their institutions subscribe to a service for document delivery. This could be the provision of photocopies of journal articles or the loaning of books.

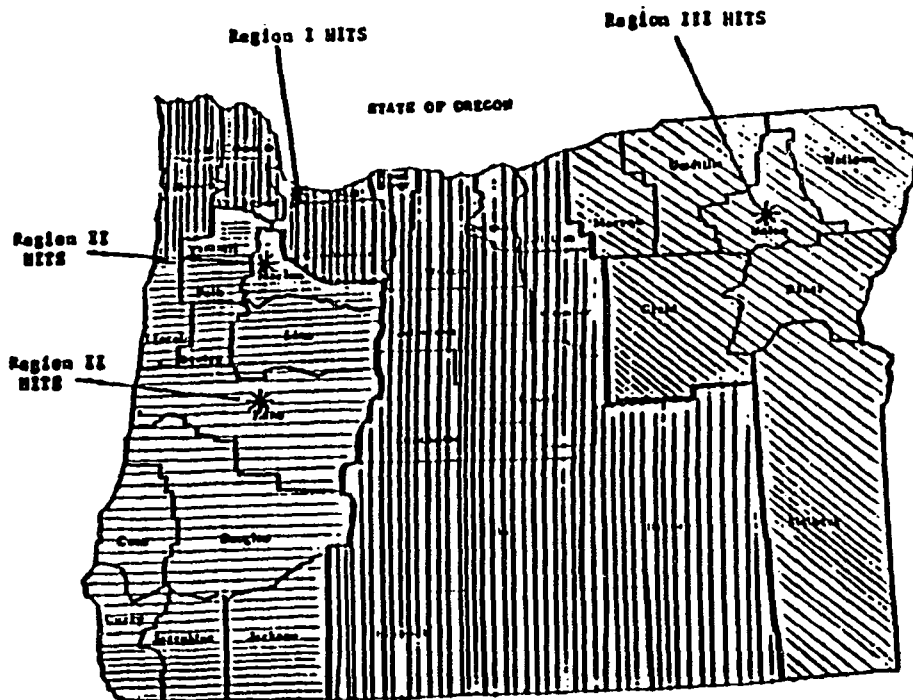


A hierarchical network was developed which divided the state into three large geographical areas, similar to the Health Services Agencies districts (Figure III). The major resource library in each of these sections was designated the Health Information Transfer Stations (HITS). HITS I was based at the Oregon Health Sciences Library and covered the Portland metro area and the vast counties in the middle of Oregon. Sacred Heart Hospital Library in Eugene was the node for the Willamette Valley and the coast. The librarian in charge also had an MD degree, and she was highly respected. The HITS III was housed at Eastern Oregon State College and working with CoMED, Council for Medical Education and Development, provided resource support to the hospitals in the area.

In the spring of 1979, the three large hospital libraries in Portland raised grave concerns about the Oregon Health Sciences University being the HITS for that area. The latter responded that this was provisional until a statistical study was completed as to the patterns in interlibrary loan transactions. By May, Portland area hospital libraries shared the responsibility of being a transfers station.

Through this arrangement, the role of the Oregon Health Sciences University Library was primarily as back up and gateway to the collections of the Pacific Northwest Regional Health Sciences Library and the National Library of Medicine. The regional library in

**FIGURE III**  
**OREGON HEALTH INFORMATION NETWORK**



*Legend: HITS I [diagonal lines] HITS II [horizontal lines] HITS III [vertical lines]*

**Region I HITS:**

- Emmanuel Hospital Library**  
2801 N. Centesheim Ave.  
Portland, Oregon 97227  
(503) 280-4696
- Good Samaritan Hospital Health Sciences Library**  
1015 N.W. 22nd Ave.  
Portland, Oregon 97210  
(503) 229-7336
- St. Vincent Hospital Health Sciences Library**  
9205 S.W. Barona Rd.  
Portland, Oregon 97225  
(503) 297-4411, ext. 2255
- Dental Library**  
U.O.W.S.C.  
611 S.W. Campus Drive  
Portland, Oregon 97201  
(503) 225-8822

**Region II HITS:**

- Salem Hospital Health Sciences Library**  
P.O. Box 14001  
Salem, Oregon 97309  
(503) 370-5177
- Sacred Heart General Hospital Library Services**  
P.O. Box 10905  
Eugene, Oregon 97440  
(503) 686-8837

**Region III HITS:**

- Eastern Oregon State College Library**  
La Grande, Oregon 97850  
(503) 963-2171

Source: Oregon Health Information Network: a Statewide Plan, Summary Progress Report, 08/01/78 to 7/31/79, University of Oregon Health Sciences Center Libraries, 1979.

Seattle gave their support and expertise, and shared information they had collected since the Medical Library Assistance Act was authorized. A union list of serials was produced to indicate which libraries owned which journal titles and holdings. This greatly expedited the interlibrary loan process.

All the same, health sciences libraries in Oregon were still concerned about the level of input and involvement in decision making they had. The Regional Medical Library had reconstituted its Regional Advisory Committee in 1979 without representative of a hospital library. This was later rectified. It showed, however, that high-level administrators were not sufficiently attuned to the operations at the line level. As is wise in building up an influential support base from its clientele, it did include people who would enhance the committee's political and professional stature.

The Oregon Health Information Network set up a statewide advisory committee comprised of administrators of hospitals, health agencies, government officials, state librarians, directors of continuing education at the Oregon Health Sciences University, and the Oregon Nurses Association. Again, no hospital librarians were included.

Strong support from the Oregon Health Sciences Libraries Association was highly desirable for the success of the Oregon

Health Information Network grant. This organization was well equipped to do so. It articulated its goals clearly. Quite important was that they provided training for existing library personnel as well as for the new hospital libraries being established. Furthermore, it formulated good standards as compared to those for the Joint Commission on Accreditation of Hospitals which were more like guidelines.

Several years later, hospital libraries in Washington followed the suit of the Oregon Health Sciences Libraries Association by establishing the Washington Medical Librarians Association. Again, as they had been in Oregon, librarians at the University of Washington Health Sciences Library, being academic, were excluded. A point of interest is that the association in Oregon perceives its base within its parent organization, composed predominantly of hospitals. In the state of Washington, a similar organization, the Washington Medical Librarians Association, stresses membership of the individual. Even the Portland greater metropolitan area created its own organization, but its primary purpose was for interlibrary loans. They started a courier system among the libraries for faster access to journal articles, be they photocopy or hardbound.

## INFORMATION TECHNOLOGY

The impact of automation on medical libraries also affected their interorganizational relations. A shift took place. These libraries could no longer easily enter into an informal or formal interlibrary loan agreement with libraries of a different type. The framework devised by the National Library of Medicine mandated a hierarchical protocol which needed to be adhered to if medical libraries wanted to reap any benefits such as funding generated by the passage of the Medical Library Assistance Act for collection building or expansion of services.

The National Library of Medicine was, and still is, exceptional in its efforts to integrate information and knowledge with technology. Its MEDLINE system is a prime example of applied research converted to practical applications utilized over the entire United States, whether by small rural hospitals or large medical complexes.

Libraries, with the advantages of new computer technology at their fingertips, found themselves changing from cumbersome and detailed manual processes, be it cataloging of books or manually searching the periodical literature for information, to computerized information systems. The major constraints were lack of money to purchase materials and equipment and the lack of training for staff.

Computer terminals were costly, as were the services of a bibliographic utility such as OCLC or Washington Library Network. Still, libraries considered it advantageous to use one of these vendors since not only would the vendor provide cataloging of materials and related processes but also a library's collection would be entered into a database which they held in common with other libraries. The drawback was to enter into a contract with one vendor and know, once the library's cataloging records were included and maintained, any change would be costly in time and money. Outsourcing was a good choice, however, because staff time could be used in more productive ways than detailed cataloging of the same materials which other libraries were also cataloging.

Online database searching gained in popularity as librarians became more comfortable with the searching and retrieval methodology. Librarians may have received formal training in computerized searching, may have been informally instructed by a colleague, or may have been self-taught. Once librarians obtained these skills, it was likely that the demand for their reference services increased as soon as researchers, physicians, and other biomedical professionals became aware of the benefits a MEDLINE search reaped.

Unlike during the early years of the regional bibliographic centers, libraries now have interdisciplinary, nationwide access to collections. They can even interact with libraries abroad, especially with the national libraries of Great Britain and France.

Another technological breakthrough was the photocopier. First developed in 1938, by Chester Carlson, it became the great expediter for library resource sharing. According to Wyndham Miles, the National Library of Medicine had been using photocopier since the late 1930's.<sup>9</sup> This popular device, teamed with the fax machine, even further decreased the turnaround time of interlibrary loan requests and document delivery.

## 1980'S AND BEYOND

The complexity public organizations face in dealing with each other to achieve their own organizational goals, based on their own value systems, is mirrored in this mandated biomedical communication network, administered by the National Library of Medicine. The political environment, the economy, and the society's prevalent beliefs all exert influence upon libraries. Each of these has to continually evaluate its purpose and determine with which other organizations it needs to maintain or establish linkages to fulfill its

individual role. Many of them have exhibited a chameleon-like quality to survive and be effective. The microcomputer, especially as prices have declined, encourages self-sufficiency. It also implies that anyone who has his or her own terminal and modem can directly access online information databases, without needing libraries as intermediaries. The National Library of Medicine is marketing directly to physicians a user-friendly, online (MEDLINE-based) system, with promise of a document delivery component in the near future. As goals evolve over time, organizations change, and so do their interorganizational relations.



## ENDNOTES

### CHAPTER III

1. Janice Thomas, "Pacific Northwest Bibliographic Center" in Encyclopedia of Library Information Science, Vol. 44, Supplemental 9, p.233-242.

2. U.S. Public Law 89-291. Medical Library Assistance Act. 89th Congress. October 22, 1965. Sec. 390(a). Extensions in 1970, 1973, 1974, 1985.

3. Martin M. Cummings and Mary E. Corning, "The Medical Library Assistance Act: an Analysis of the National Library of Medicine Extramural Programs, 1965-1970," Bulletin of the Medical Library Association, Vol. 59 (July 1971), p.386.

4. Ibid., p.387.

5. Ibid., p.375.

6. Ibid., p.384.

7. Wyndham Miles, A History of the National Library of Medicine: The Nation's Treasury of Medical Knowledge, 1982, p. 388.

8. Oregon Health Information Network. State Advisory Committee Agenda. Appendix 1. Salem, Oregon. November 14, 1978.

9. Wyndham Miles, op. cit., p. 458

Miles also discusses the issue of photocopying journal articles as it pertains to copyright. In 1968, Williams & Wilkins filed a suit against the government claiming that the National Library of Medicine and the National Institutes of Health had infringed on its copyright. The National Library of

Medicine barely won this case in 1975. As a result, a new "fair use" copyright law was passed in 1976, revising the 1909 law.

## CHAPTER IV

### RESEARCH METHODS

#### HYPOTHESES

To capture as closely as possible the effects of the impact of the Medical Library Assistance Act of 1965 and the interorganizational relations of health sciences libraries, various ways of analysis were explored. Process and outcomes or a mix of these are the generally accepted expressions of research. Possible approaches considered for this study included evaluating the process followed by the Pacific Northwest Regional Health Sciences Library as to its operationalization of the Medical Library Assistance Act, or the oversight of the National Library of Medicine. Other options were to look at outcomes such as the cost-effectiveness of this act or measure end-user satisfaction, especially physicians. A detailed comparison of the stated objectives of the legislation, and its subsequent renewals, with the outcomes in this specific region was definitely an interesting topic to pursue but will be only addressed

here when appropriate. A survey of hospital administrators in the Pacific Northwest may have provided a quite different view of the impact of the Medical Library Assistance Act and the role librarians played, but may not have captured the dimension of librarians and information technology as fully.

The specific interest here lies in this latter aspect. The fortuitous confluence of the passing of the Medical Library Assistance Act and the development of practical applications of computer technology in converting Index Medicus to a machine readable database, resulted, in my view, in a paradigm shift. This was one of the critical cases where computers were to play a pivotal role in information retrieval and changed the way libraries cataloged, processed, and made accessible information resources. The National Library of Medicine focused on the development and distribution of computerized access to the biomedical journal literature and a supporting interlibrary loan mechanism. It implicitly forced librarians to become network participants as well as computer literate in order to meet the needs of health professionals.

A formal implementation model such as Mazmanian and Sabatier's multivariate implementation was not selected since Raelin's approach was more satisfactory for this research (see Bibliography). The emphasis in this research is not as much on the

central coordinator and highest level of policy and decision making, the National Library of Medicine, but on those at the lower ranges of the hierarchical network, the librarians at hospitals and academic health sciences centers. The extent of successful integration of the legislated objectives into the services of health sciences libraries becomes apparent with the use of Raelin's model.

In view of the above, the following three hypotheses appear to be the best reflection of the dramatic changes taking place during the period under study.

#### HYPOTHESES

- I. The increase in interorganizational relations between health sciences libraries during the period between 1965 and 1985 is the result of a legal-political mandate included as part of the Medical Library Assistance Act of 1965, and the institutional relationships within the system of networks authorized by the Act.
- II. The increase in interorganizational relations activity among health sciences libraries is the result of the increased utilization of computer technology.

- III. Introduction of the MEDLINE computerized access system to biomedical journal literature, brought about an increase in interorganizational relations activities between health sciences libraries, allowing for an enhanced coordination and dissemination of periodical literature.

### METHODS INTRODUCTION

To understand the change in the relations of health sciences libraries in the Pacific Northwest a legal-political mandate is selected as the focus of this study. The structure of relationships between health sciences libraries is based upon resource sharing. Inter-organizational relationships occur primarily because of a lack of self-sufficiency in collection materials, and because of the great costs associated with acquisitions which result in increased interdependency. This can be best expressed through their interlibrary loan interactions. The interlibrary loan mechanism functions as a sensitive gauge of the communications process among health sciences libraries.

As a result of the passage of the Medical Library Assistance Act in 1965, the National Library of Medicine put in place a federal biomedical communications network. Its purpose was to improve

information delivery to the health care professional. The nation was divided into eleven regions. The Pacific Northwest became Region X. This area was comprised of Alaska, Idaho, Montana, Oregon and Washington. The National Library of Medicine awarded the Regional Medical Library Program contract to the University of Washington Health Sciences Library on June 1, 1968, with a starting date of operations of October 1, 1968.

#### RAELIN'S LEGAL-POLITICAL MANDATE

The change in network distribution of resources and power due to the impact of the Regional Medical Library program is examined for the period 1968 to 1985 in order to determine the relative differences within that period. This research investigates the shift in the relations between libraries brought about by the implementation of the Medical Library Assistance Act of 1965. It may confirm that the Regional Medical Library program appropriately fits and can be explained by Raelin's interorganizational framework.

Raelin believes that, in addition to the most common inter-organizational concepts of exchange, power-dependency, and political economy, there exists a fourth distinct one--a mandated network. The latter arrangement can come about either by formal

agreement or legislation. As Raelin writes, "The mandate is an expression of an interorganizational decision shaped by either a personal effort on the part of a set of organizations interested in mutual advancement or by an institutional effort imposed on a set of organizations by the larger society."<sup>1</sup>

Another issue is the permanence of networks. Just like an organism, they evolve over time, and many cease to exist once they have outlived their usefulness or purpose. Participants may no longer need to depend on the network because of better alternatives. For libraries, the impact of computer technology changed the type of networks they joined and/or networks modified themselves to incorporate information technology. What makes a mandated network somewhat different is that it can last as long as legislation is renewed. The Medical Library Assistance Act, with its numerous renewals, is a good example of this.

In his explanation of formalized network relations, Raelin has identified five components of legal-political networks as discussed earlier. However, only three of the five parts will be used as a guide in this study. Raelin's attributes of evaluation and effectiveness may be areas of future research but will be left out for now. The other characteristics for the purpose of this study are more to the point and overlap evaluation and effectiveness.



1) *Mandate/network distributional balance*

This is defined as a comparison of the mandate with the enactment of distribution of influence (power and authority) and domain (allocation of resources among network participants). Although power is complex to measure, authority can be assessed by looking at which prerogatives the Medical Library Assistance Act and the National Library of Medicine allowed, and how they were implemented. This may be expressed by the authority to make grants and issue contracts and sub-contracts, backed up by a substantial, legislated budget. Shifts in resource sharing patterns, especially for interlibrary loans, often are indicative of the relationships between organizations.

The specific purposes of Regional Medical Libraries, as stipulated by the Medical Library Assistance Act of 1965, are to improve access for all health professionals to documents "comprising the scientific record of medicine," to avoid costly duplication, and to reduce competition for scarce library materials. The Regional Medical Library Program mandated the distribution of resources in a prescribed and formal manner, as formulated by the National Library of Medicine.

2) *Competition and conflict*

Vying for the available resources from a single source creates tension among the applicants. The Regional Medical Library reports are a good source for culling out this type of information since they record requests for proposals, sub-contracts, and negotiated reimbursement requirements. The National Library of Medicine also made grants available to health sciences libraries which were not directly under the purview of the Regional Medical Library. As federal awards, these are part of the public record.

3) *Coordination*

Shared development and implementation is being considered. These activities are researched by reviewing the Regional Medical Library's reports to determine the protocol developed for document delivery and the extent to which health sciences libraries were active participants in this process.

## DATA COLLECTION

Data were collected for the time period from 1960 to 1985 in order to include the following pivotal events:

- 1) 1968, when the Pacific Northwest Regional Medical Library was awarded the contract and became operational (October 1, 1968);
- 2) 1978, when the National Library of Medicine placed a moratorium on MEDLINE codes; and
- 3) 1985, twenty years since the Medical Library Assistance Act was authorized, three years before the Pacific Northwest Regional Medical Library celebrated its 20th anniversary.

The year 1968 marked the awarding of the Regional Medical Library contract for Region X, although it was not fully operational. Therefore, it demonstrates the status of health sciences libraries in the Library Assistance Act. The year 1978 represents the midpoint of the period under study as well as a major change in interorganizational relations among health sciences libraries. The National Library of Medicine imposed a moratorium on MEDLINE codes. The computer system to run MEDLINE had reached its capacity. This announcement hampered access to biomedical information since many medical libraries, especially those in medium-sized and small hospitals, could not perform their own MEDLINE searches for their physicians, and had to rely on their colleagues.

Primary written sources such as reports and grants, as well as secondary data have been studied. The Pacific Northwest Regional

Health Sciences Library Service, the Oregon Health Sciences University Library, and the Oregon Health Sciences Library Association have given their consent to access available and pertinent data, including:

Medical Library Assistance Act, 1965 & renewals;

The Regional Medical Library 1970: A Status Report, and Serhold Participants in Region 6 (list of serial holdings in libraries), published by the National Library of Medicine, Extramural Programs; and

Grant Proposal and Minutes of the Statewide Advisory Committee published by Oregon Health Information Network.

-Pacific Northwest Regional Health Sciences Library Service.

## SURVEY

The survey is intended to provide pertinent data to support the hypotheses.

A survey on the impact of the Medical Library Assistance Act of 1965 was conducted to study the effect of a federally mandated information program on the interorganizational relations between health sciences libraries within the Pacific Northwest. The questionnaire was confined to 2 1/2 pages to encourage a high response rate.

Since this research deals with a specifically targeted population, bias exists but is acceptable. The names were taken from the membership list of the Pacific Northwest Regional Chapter of the Medical Library Association. To supplement this, other library lists were consulted to contact people previously working in the Pacific Northwest region. From personal recollection, some additional librarians were asked to respond.

A number of categories were addressed.

- Name, position, current place of employment in a public or private institution, and number of years employed.

This provided pertinent information about the type of institution, be it an academic health sciences center, hospital or other, and also in which state its library was located. An analysis of responses divided by state was important for determining if there were a significant number of librarians in each state to allow for comparison between states or if this study had to be limited to certain states.

- Highest level of education

Of special interest was the question of whether those surveyed possessed a Master's in Library Science and if they graduated before or after the Medical Library Assistance Act was passed. Training was an important component of this legislation. Data may support

Raelin's concern with the mandate versus actual occurrence in the fulfilling of the mandate. A substantial increase in the number of professional librarians in the Pacific Northwest would confirm that graduate training was received and likely stimulated by the National Library of Medicine.

- Dates of employment in health sciences libraries in the Pacific Northwest

Impact of the Medical Library Assistance Act may be further assessed by date comparing the number of librarians employed after 1965, in the 1970's, and in the early 1980's. This question also addressed Raelin's mandate/network distributional balance. The responses may show that more librarians with a Master's in Library Science were employed not only at the two academic health sciences centers, the University of Washington, and the Oregon Health Sciences University, but also at hospitals in the major cities and towns. This may mark a shift in expertise which previously was based at the academic health sciences centers and larger hospitals, to a more general distribution throughout Oregon and Washington.

- Membership in associations, networks and consortia, and number of years

This category provided information on how many, if any, organizations health sciences librarians belonged to. It also addressed Raelin's attribute of "coordination" as in the case of

consortia, or "competition and conflict" as may be reflected in the increase of the number of local organizations. Local, state, and regional organizations may have different and conflicting purposes for the resources available from the National Library of Medicine.

Memberships imply shared interests and goals as well as recognition of status. It also entails working together to resolve common concerns; and, at times, jointly lobbying for legislative action such as subsequent renewals of the Medical Library Assistance Act. To be effective, a critical mass of members is needed. Smooth coordination among the members makes an organization effective in responding to perceived threats by being pro-active.

Competition and conflict can be gauged by the type of organizations in which librarians have membership. A large academic health sciences center library serves a different clientele (supporting research and teaching) and has different needs (in-depth biomedical journal and book collection as well as resource sharing with large academic libraries throughout the United States) than small hospital libraries (small core collection of books and journals, and resource sharing among libraries locally and regionally). While the academic libraries in their membership in associations seek resources to improve access to like libraries across the nation, the smaller ones in their organizations desire support from the National Library of

Medicine to develop their local resource sharing network and obtain direct access to some of the resources provided hierarchically such as requests for interlibrary loans.

- Information technology:
  - First use of the computer and purpose
  - Online database training
  - Online database searching
  - Databases used

The development of applications for computerized indexing of the biomedical periodical literature by the National Library of Medicine was concomitant to the passage and implementation of the Medical Library Assistance Act. However, when librarians, and in what numbers, in sparsely populated areas such as the Pacific Northwest first began to take advantage of this information technology may be gathered from the responses.

Raelin's issues of "coordination" and "network distributional balance" may be supported by tracking the spread in use of a computerized information network in Oregon and Washington. Successful applications of information technology imply that libraries are working with the same computer system or have a feasible interface. The greater the standardization, the easier it is for users, librarians, and their clientele, to retrieve information. Librarians need specialized training to master use of the computer, but most importantly, online database searching. An optimum distributional



balance can be achieved ultimately by having computer terminals available at all sites and an experienced cadre of librarians to perform online database searches. Responses to the survey may show a trend from mastery of computers and online database searching polarized at the academic health sciences libraries to a more general distribution to most health sciences libraries in Oregon and Washington.

Since one of the other goals of the Medical Library Assistance Act was to provide easy access to information to physicians and health professionals in the most remote areas, the National Library of Medicine developed a computerized biomedical information retrieval system which became increasingly sophisticated in depth and broadness of coverage as well as more user friendly. The improvements in ease of use may have influenced that the training in MEDLINE searching could be accomplished in shorter time. Workshops at locations other than at the National Library of Medicine made training more accessible to librarians.

- Participation
  - Union lists of serials
  - Consortium grants and/or sub-contracts

The success of a hierarchical biomedical information network such as the Regional Medical Library Program depended on full cooperation and standardization. Surveying how many librarians

took part in the joint efforts also may support Raelin's network theory, especially the "network distributional balance" and "coordination."

The compilation of a union list of serials requires that each library supply the same standardized information, including the journal titles and run of years the library owns, and location of the journals and circulation policies. Any deviation in the set up of list of the periodical holdings makes it of far less value. The more libraries participate in a union list, the more benefits to all because of greater coverage and concomitant resource sharing possibilities.

- Familiarity with the Medical Library Assistance Act of 1965
- Impact of the Regional Medical Library Program

These two questions were an attempt to measure if librarians were familiar with the legislation of the Medical Library Assistance Act. The second one addressed if librarians were aware of the benefits resulting from the Act.

The results may also support Raelin's view about the "intent of the mandate" versus the "actual distribution" and "domain." I was interested to find out if indeed health sciences librarians who appeared to heavily take advantage of a sophisticated biomedical information network knew of its origins. Although they may have been aware of the paucity of information resources in Oregon and

Washington, were they cognizant of this being an issue of concern throughout the United States and the subsequent legislation leading to the Medical Library Assistance Act of 1965? The intent may not have been known specifically by many librarians but it may be that the actual benefits were obvious such as a highly coordinated and fairly efficient interlibrary loan process and online searching of biomedical databases.

- Participation in follow-up interview

This facilitated gathering of additional information if the need arose by having a record of those indicating willingness.

- Date of birth and gender

Since librarianship tends to be perceived as a typical female profession except at top level administrative positions at large and/or academic centers, responses to this question may provide insight as to the correctness of this view.

A pilot test was done with several health sciences librarians. Their comments were very helpful in expanding the survey by one page to reorganize it into clearer categories, give more space to write an answer, and add a few new pertinent questions. A questionnaire was sent in February, 1993, to 169 of the 230 health sciences librarians in the region who were members of the Pacific Northwest Regional Chapter of the Medical Library Association to determine

their participation in networks. The 33 members residing out of the Pacific Northwest were not included in the analysis since they are not part of the specific population under study. Since the Medical Library Assistance Act pertained only to the United States, the 28 Canadian (British Columbia) members of the Pacific Northwest Regional Chapter of the Medical Library Association are outside the scope of this research. Due to the sparsity of the number of health sciences librarians in Alaska (7), Idaho (13), and Montana (19), the study is limited to the 130 health sciences librarians in Oregon and Washington. For the purpose of the comparison, Washington and Oregon have a representative number of librarians.

A network might be a legally mandated one, such as the Regional Medical Library Program, or any type of library consortium formed on a voluntary basis due to common interest. The inter-organizational relations among health sciences libraries may be measured by assessing the change in network interaction of individual libraries. The information generated in the completed surveys provide responses to questions aimed at demonstrating the change in character of library relations. Respondents indicated if they were familiar with the implementation of the Medical Library Assistance Act through the Regional Medical Library program.

To determine the impact of the Regional Medical Library Program, indicators of the structure of relations and change may be expressed by the presence or absence of membership by a health sciences library in networks, by the growth in numbers of consortia, and by the proportion of organizations funded by consortium grants during each of the periods. Other factors for consideration are:

- the purpose of each of the networks;
- the reason why a library joined;
- satisfaction with the Regional Medical Library Program; and
- modes of communication, types and number of memberships

to which health sciences libraries belong.

Key associations involved are: the Idaho Health Libraries Network, the Oregon Health Sciences Libraries Association, the Oregon Health Information Network, the Pacific Northwest Chapter of the Medical Library Association, the Portland Area Health Sciences Librarians, the Seattle Area Hospital Library Consortium, and the Washington Health Sciences Librarians Association.

Unstructured, informal interviews have taken place with more than 15 key actors: the past and present directors of the University of Washington Health Sciences Library and Information Center; the present director of the Oregon Health Sciences Center; selected past and present professional staff of the Pacific Northwest Regional

Health Sciences Library Service, based at the University of Washington; selected past and present members of the Pacific Northwest Regional Health Sciences Library Service Regional Advisory Committee; selected past and present statewide coordinators of health libraries and information networks for Idaho, Montana, and Oregon; past and current members of statewide health sciences libraries/librarians consortia; selected past and present staff of the National Library of Medicine, especially those in Extramural Programs; and professional colleagues in the field.

The focus of this research is on the following:

**Mandate/network distributional balance**

**Indicator:** Change in document delivery patterns; information materials not in health sciences libraries obtained via interlibrary loan;

National Library of Medicine, as authorized by the Medical Library Assistance Act, subsidizes the Regional Medical Library at the University of Washington for interlibrary loans in the region.

**Measure:** % of requests filled and referred in state, region or nation;

# of union lists of serials available in area, state, region or nation

**Data source:** Regional Medical Library reports, Oregon Health Information Network reports

Mandate/network distributional balance and technological

mandate

**Indicators:** Change in MEDLARS/MEDLINE search capacity; % of librarians participating in MEDLINE training

**Measures:** % of libraries with in-house online reference services and referred searches

**Data source:** Regional Medical Library reports

Competition and conflict

**Indicators:** Change in subcontracting pattern; change in membership in organizations

**Measures:** % of health sciences libraries organizations; % of libraries receiving consortium grant funding;

# of Master's in Librarianship degrees

**Data source:** Regional Medical Library and association reports; survey data; National Library of Medicine Extramural Program data on consortium grants

Coordination

**Indicators:** Change in resource sharing patterns

**Measures:** % of health sciences libraries participating in developing a union list of serials; % of health sciences libraries submitting a consortium grant; % of interlibrary loan and document delivery transactions

**Data source:** Regional Medical Library Reports; National Library of Medicine Extramural Program data

Furthermore, my experience during 1973-1981 as a medical librarian at the Oregon Health Sciences Center and Council of Library Resources/National Library of Medicine Management Intern at the University of Washington Health Sciences Center provided this study with personal observations.



## ENDNOTES

### CHAPTER IV

1. Joseph A. Raelin, "A Mandated Basis of Interorganizational Relations: The Legal Political Network," Human Relations 1980, p. 58.

## CHAPTER V

### FINDINGS

#### DATA ANALYSIS OF SURVEY

In 1993, a questionnaire was sent to 169 of the 230 health sciences librarians in the Pacific Northwest region comprised of Alaska, Idaho, Montana, Oregon and Washington. The 33 members out of the region but within the United States were excluded from the survey as were the 28 members residing in British Columbia.

One response was received from Alaska; three from Idaho; and two from Montana. Due to the relatively few number of health sciences libraries and responses by librarians in Alaska, Idaho, and Montana, the focus of this study is on Oregon and Washington. The response rate was 52%. Of 130 librarians in these two states, 68 filled out the survey. The lowest response ( $n = 5$ ) was for "First Year of Use of Database." Furthermore, the number of respondees for Oregon and Washington is almost equally split. Two former Oregon health sciences librarians and one previously in Washington also filled

out the questionnaire since they were employed in Region X during that time.

Because of the low number of responses from Alaska (1), Idaho (3), and Montana (2), an analysis of aggregate results would not be greatly significant. However, this is offset by data from 1970/71 through 1978/79 showing the interlibrary loan activity among health sciences libraries within Region X for Alaska, Idaho, Montana, Oregon, and Washington in capturing their interorganizational relations.

SPSS (Statistical Package for Social Sciences) software program was used to manipulate the raw data gleaned from the survey. More than 200 tables were created measuring the interaction of a number of variables. There were 7,582 values accumulated across all variables; 948 value labels for each variable. Frequency of occurrence was of major interest to ascertain similarities in librarians' training, computer use, and organizational membership.

The responses to the questions in the survey have been analyzed to capture many dimensions. Fifteen tables have been selected for inclusion to indicate relationships since they tie in with the framework set by Raelin's mandated network theory. They were chosen for adequate number of responses, not whether they did or did not support my thesis.

Status: Library status by state; public or private

Higher Education: Highest level of education by state

Gender: by state

MEDLINE: First year of use by state

Other databases: First year of use by state

Union: Have you participated in union list? (by state)

Participation: Have you participated in consortium grant? (by state)

MLA: Medical Library Association membership by state

OSHLA: Oregon Health Sciences Libraries

OHIN: Oregon Health Information Network

PNWMLA: Pacific Northwest Chapter/MLA by state

SAHLC: Seattle Area Hospital Libraries Consortium by state

WHSLO: Washington Health Sciences Librarians

Other organizations: Other organizations, consortia, network by state

MLAA: Familiar with the MLA Act of 1965? (by state)

Library Status by MLAA: Familiar with the MLA Act of 1965?

Higher Education: Highest level of education by MLAA

Familiar with the MLA Act of 1965? (by individual)

RMLP: Regional Medical Library Program impact?

These tables will elucidate dimensions of this study. The National Library of Medicine aimed its first funds received through the authorization of the Medical Library Assistance Act of 1965 to improve services of health sciences libraries in the following areas: interlibrary loan, MEDLARS searching, consultation to local hospital libraries, creation of union lists, reference assistance, publicizing of its services and the staff infrastructure to support these.

The three hypotheses have been tested in various ways. The relation between the implementation of the Medical Library Assistance Act and the interorganizational relations among health sciences libraries is represented by changes in resource sharing patterns as well as in personnel.

#### HYPOTHESIS I

**The increase in interorganizational relations between health sciences libraries during the period between 1965 and 1985 is the result of a legal-political mandate included as part of the Medical Library Assistance Act of 1965, and the institutional relationships within the system of networks authorized by the Act.**

The data concerning interlibrary loan activity culled from the Regional Medical Library Reports reflect this change. In 1968, when the Medical Library Assistance Act was implemented in the Pacific

Northwest, 3,122 interlibrary loan transactions were filled within Region X. Raelin's mandate/distributional balance, dealing with influence (power and authority) and domain (allocation of resources among participants) can be expressed by the number of interlibrary loan transactions.

In 1980, the Pacific Northwest Regional Medical Library provided an overview of annual interlibrary loan transactions from 1970/71 through 1978/79. It reported five categories (See Appendix C):

Requests received, by state (thousands)

Requests by state, as percentage of total from region

Requests received, by disposition (thousands)

Disposition of requests, as percentage of total

Percentage referred, of requests from each state

The first category is most important because the change it shows in requests received by the Regional Medical Library from each of the states in Region X.

<u>Requests</u>	<u>Alaska</u>	<u>Idaho</u>	<u>Montana</u>	<u>Oregon</u>	<u>Washington</u>
1970/71	12%	8%	8%	4%	67%
1971/72	9%	9%	10%	5%	67%
1972/73	13%	9%	9%	6%	64%
1973/74	21%	10%	6%	7%	57%
1974/75	22%	14%	5%	8%	52%
1975/76	22%	17%	6%	9%	47%
1976/77	26%	20%	8%	11%	36%
1977/78	21%	19%	8%	13%	39%
1978/79	20%	17%	9%	16%	39%

Regarding requests received from health sciences libraries by state over this entire period, the state of Washington consistently had the largest number of transactions. Alaska also initiated a substantial number of interlibrary loans each year. From 1973/74, these exceeded 20% of the total regional requests received.

This increase coincided with the satellite communications network developed at the Lister Hill Center for Biomedical Communications of the National Library of Medicine for medical instruction in Washington, Alaska, Montana, and Idaho (WAMI). According to Miles' history of the National Library of Medicine, these classes taught at the University of Washington Medical Center were also beamed to universities in Alaska, Montana, and Idaho to first year students. This also may account for the rise in Idaho interlibrary loan requests.

By 1977/78, the requests from Alaska and Idaho taper off. Interlibrary loan demand from Oregon show a steady increase. Maybe this was stimulated by the launching of the Oregon Health Information Network in 1978; 13% of interlibrary loan requests jumped to 16% the next year.

These data document the increased interaction between health sciences libraries in the Pacific Northwest for interlibrary loans and

document delivery to health professionals. This activity fulfills the intent of the Medical Library Assistance Act.

The bar graph in Appendix C tracking the disposition of the interlibrary loan requests shows that from 1970/71 to 1978/79, 64% or more of the requests were filled by the Regional Medical Library as photocopies of journal articles. Actual loans of original materials amounted to 10% or less. Most interesting is the increase in requests referred to libraries outside of Region X. Often these were routed to the National Library of Medicine.

Over time, the percentage of referred interlibrary loan requests increased. In 1974/75, there is a major shift, from 12% to 19%. As health professionals became more aware of this biomedical information network, they requested more MEDLINE searches and, concomitantly, needed copies of journal articles cited.

With the continuing expansion of medical knowledge as well as the proliferation of publications, stronger need for resource sharing evolved because no library seemed to be self-sufficient enough to meet all demands. The interlibrary loan requests, as percentage of total requests received, which were returned unfilled hover around 5% or lower until 1975/76, then it rises but never above 10%.

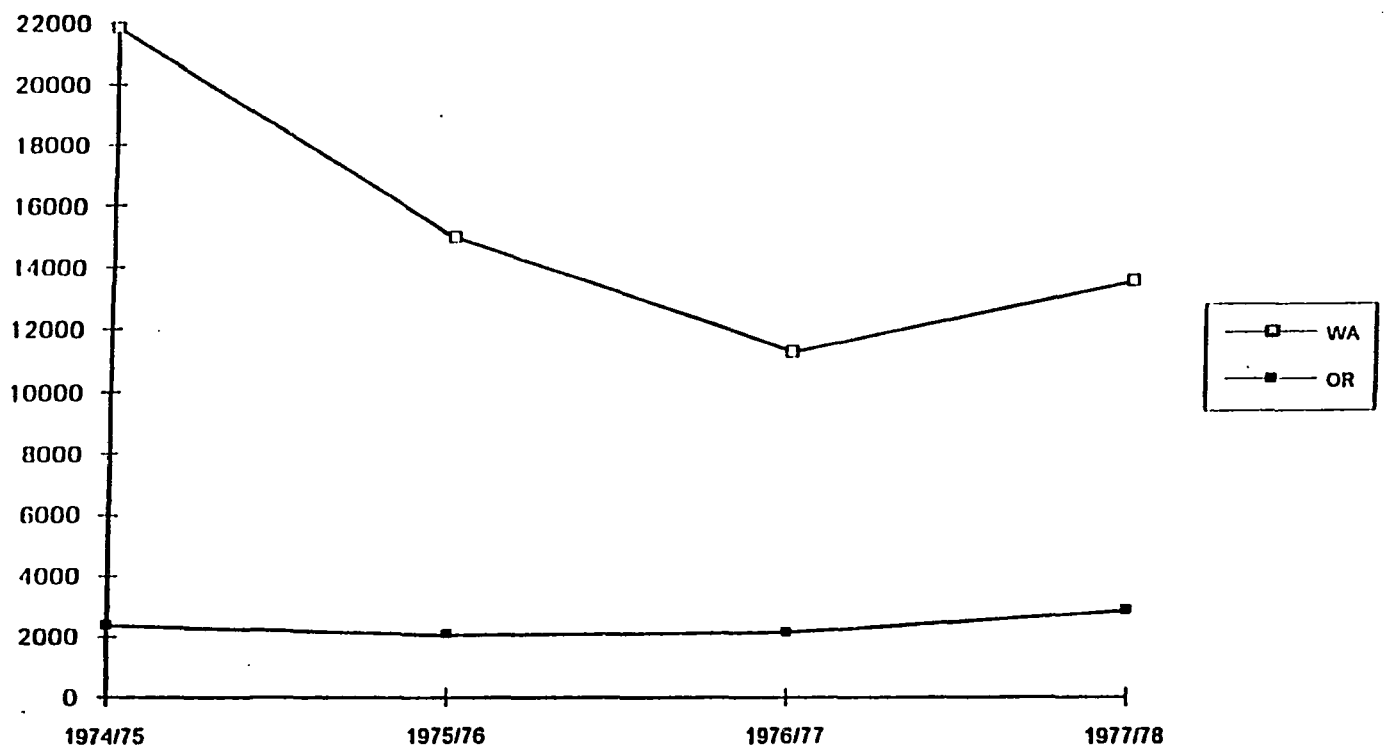


The figure tracking the percentage of requests referred from each state of the Regional Medical Library clearly exhibits a substantial rise in interlibrary loan activity from Alaska, Idaho, Montana, and Oregon. Washington is far ahead in percentage of transactions.

For 1974/75, 45,065 interlibrary loan transactions were received. The increase is 1,343% from the 3,122 of the 1968 data. However, 22,000 (52%) were for institutions in the state of Washington, but only 2,398 (5%) for Oregon. For 1977/78 a total of 36,160 requests were handled; 10,625 (29%) for the state of Washington and 2,845 (8%) for Oregon (Figure IV). It appears that in the earlier years, the Pacific Northwest Regional Medical Library, which received its funding from the National Library of Medicine and administered the Regional Medical Library Program for Region X, allocated more resources to health sciences libraries in Washington.

This may be explained by the greater familiarity with the program in the state of Washington. It might also have been because the Regional Medical Library was based at a big, renown university in a large city. The decline in Regional Medical Library interlibrary loans from 22,000 to 10,000 (46%) is in part the result of greater local resource sharing. Specifically, this was due to the availability of local union list of serials, one time only collection

FIGURE IV  
REGIONAL MEDICAL LIBRARY NUMBER OF INTERLIBRARY LOANS



development grants for a minimum core collection of Abridged Index Medicus periodicals.

Training of health sciences librarians can be assessed from the questions in the survey of health sciences librarians. One of the mandates of the Medical Library Assistance Act was better educated library personnel. It was meant to ensure that there was qualified staff in place in more than just the large academic centers or hospitals. The survey of February, 1993, shows that of the 68 respondents, more than 45% in Washington (21) and 54% in Oregon (25) possess a Master's in Library Science. This professional expertise fits with the intent of the Medical Library Assistance Act but with some reservation, due to 46 responses.

The question asking which year a Master's in Library Science was granted received a limited response, possibly because the inquiry was not phrased clearly enough. It, therefore, cannot be considered a generalizable finding. The solitary reply from Oregon specified that a Master's in Library Science had been awarded in 1984. In the state of Washington, 11 of 21 accredited librarians provided the year of graduation. For 1965-69, two librarians received their graduate degrees; for 1970-75, four; for 1976-80, three; and for 1985-89, two. It is of some significance that 33% (7) of the respondents in the state of Washington with a Master's in

Library Science received their degrees between 1970-80 when the Medical Library Assistance Act came into effect.

The University of Oregon Library school was closed in 1978. The University of Washington continues through its Graduate School of Library and Information Science to offer a master's degree.

It also reflects Raelin's dimension of "competition" and "conflict". With professional librarians throughout the biomedical communications network for Washington and Oregon, libraries are better set up to handle their own interlibrary loans and database searching rather than routing all requests through an hierarchical network. This enables health sciences librarians to deal directly with the National Library of Medicine for certain program funding. In this manner, they may compete and be in conflict with the preferences of the Pacific Northwest Regional Health Sciences Library for the same resources.

## HYPOTHESIS II

**The increase in interorganizational relations activity among health sciences libraries is the result of the increased utilization of computer technology.**

Data have been compiled on when health sciences librarians first used computers and for what purposes. The results of four separate questions have been combined, i.e., the use of computers for MEDLARS/MEDLINE, cataloging, word processing, and other database searching.

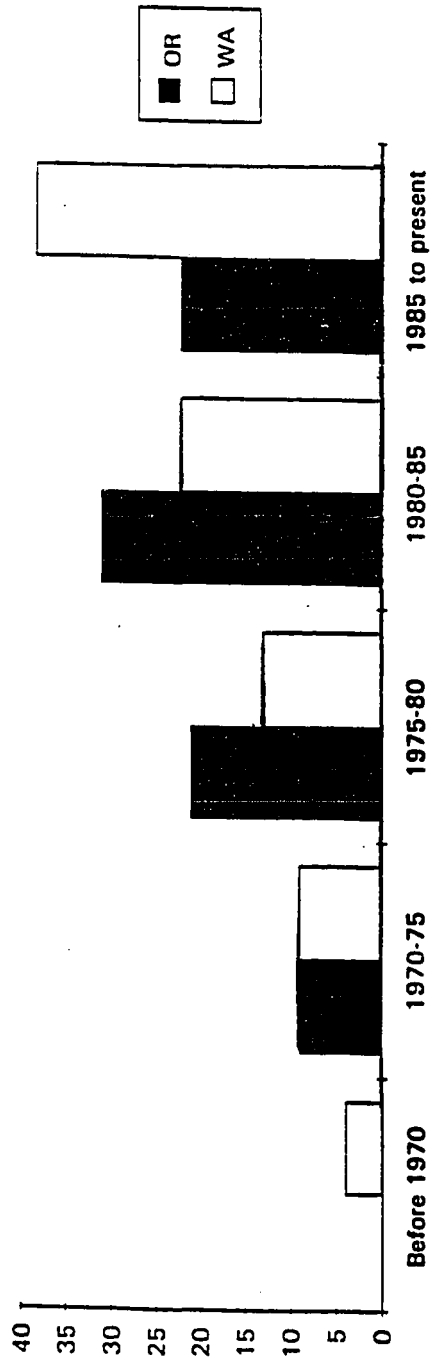
From the data from the Regional Medical Library reports, it appears that before 1970, only four health sciences librarians were using computers for database searching (MEDLARS). These were in Washington; Oregon appears to have had none. From 1970 on, librarians in both states began using computers, steadily increasing until it levels off from 1985 on. The survey shows that 48 of the respondents in Washington and 61 in Oregon have used a computer at the time of the survey, February, 1993. (Figure V).

In 1971 MEDLINE, MEDLARS online, becomes available to health sciences libraries where librarians received formal training from the National Library and have the equipment in place in their library.

### HYPOTHESIS III

**Introduction of the MEDLINE computerized access system to biomedical journal literature, brought about an increase in**

**FIGURE V**  
**DATE OF INITIAL COMPUTER USE**



interorganizational relations activities between health sciences libraries, allowing for an enhanced coordination and dissemination of periodical literature.

The Medical Library Assistance Act promoted greater resource sharing among health sciences libraries in an hierarchical network. With this structure, the larger and better developed libraries were expected to provide support for information resources the smaller ones could not supply to their clientele. However, an hierarchical structure may at times be cumbersome and therefore less efficient in meeting immediate needs of the physician, researcher, or allied health professional. For example, if a librarian knew that a journal title was held at a specific, local library but could not directly request the journal article from that library because of the established process, not only could it take longer but it also was frustrating.

Raelin's attribute of "coordination" comes into play here. Joint activities are an indicator of coordination. In this study, consortium grants and union list of periodical holdings have been considered. Data have been extrapolated from the survey to health sciences librarians in Washington and Oregon for consortium grants, union lists of periodical holdings, and MEDLINE usage. Before 1970, there appears to be little activity. From 1970 to 1975, librarians in the state of Washington took greater advantage of the consortium grants

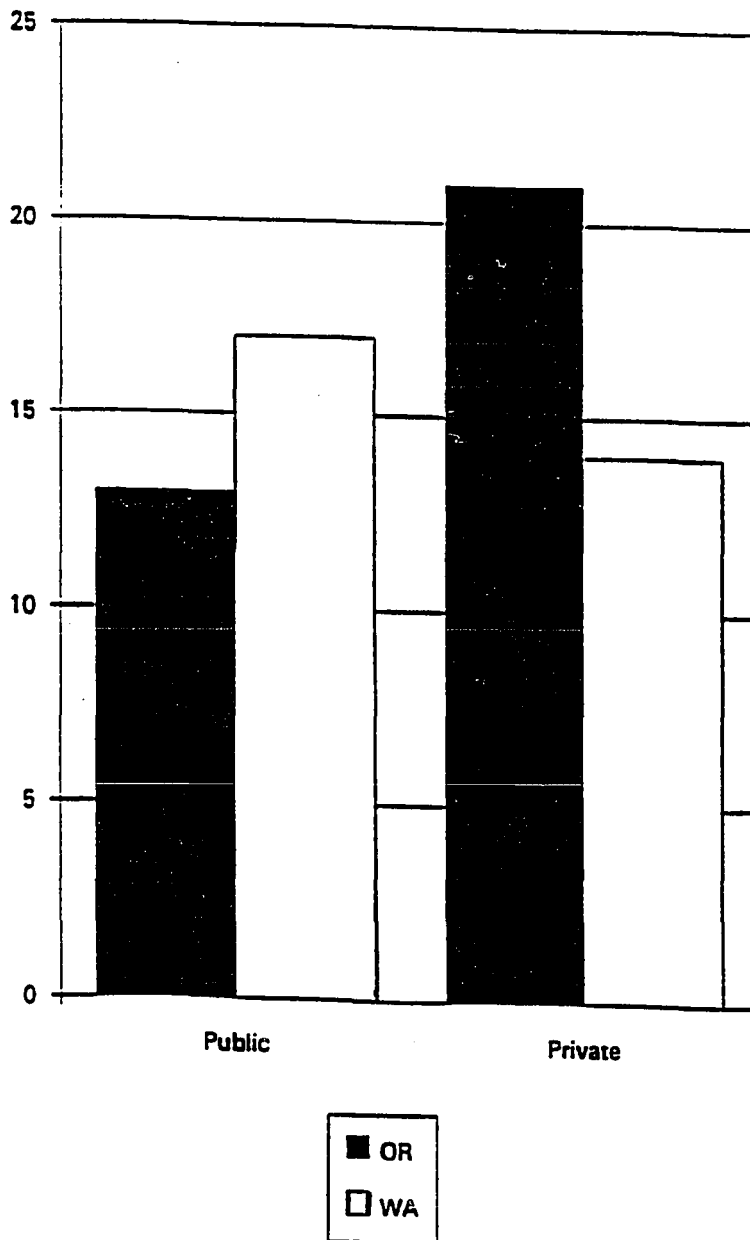
offered by the National Library of Medicine. During the period 1975-80, more than twice as many librarians (16) in Oregon participated in MEDLINE use, consortium grants, and/or union list of serials projects than in Washington (6).

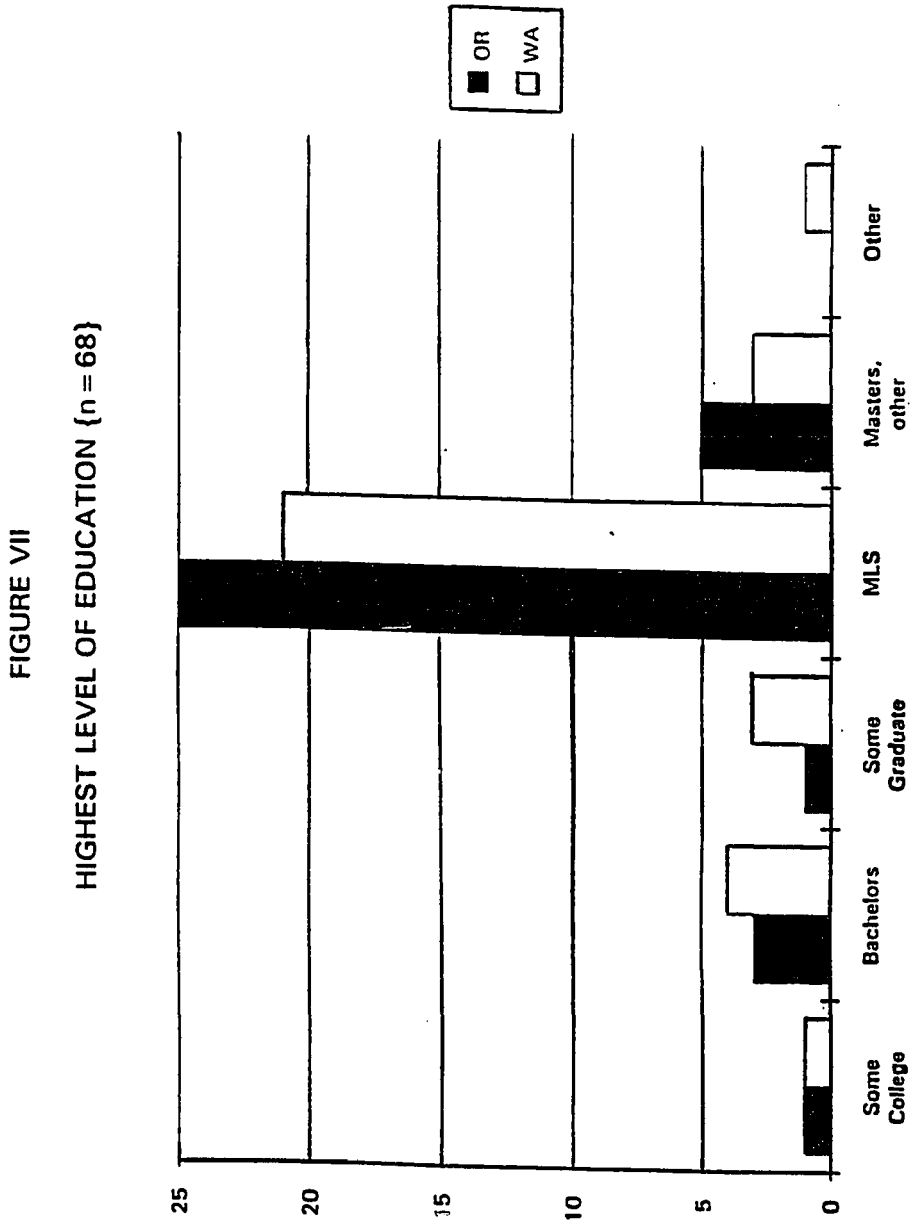
The information in "Library Status" was compiled to determine if the institutions which employed those surveyed were private or public (Figure VI). As shown in the 65 responses, Oregon has more responses in the private sector and Washington slightly more in the public area. In Oregon, the difference is about 33%: 13 public and 21 private. For the state of Washington, it is less pronounced: 17 and 14. These data are interesting as background information.

The "Highest Level of Education" figure reflects an important component of the Medical Library Assistance Act. The Act's purpose was to have better trained and educated library personnel to assist researchers and practitioners in meeting their information needs (Figure VII). Of the 68 respondents, 46 possessed a master's in librarianship. For Oregon, this was 25 persons; for Washington, 21. Other master's degrees numbered to 8. All but one of the 68 respondents went to college; two had some college. All others had more education. Data regarding when graduate degrees were obtained were not gathered.



FIGURE VI  
LIBRARY STATUS {n = 65}





This figure indicates that this part of the Medical Library Assistance Act was very well implemented. Opportunities in medical librarianship grew. Availability of grants for building library collections as well as accreditation became factors for putting pressure on the administrators of the institution to hire a professional librarian. The American Hospital Association made specific reference to libraries and their staffing in their Policies and Statements of 1975.

The Regional Medical Library had an active outreach program whereby hospital administrators were lobbied to establish or strengthen their library and its staff. The importance of having well-educated staff, preferably a librarian with a master's in the field, was emphasized for improved delivery of patient care and research.

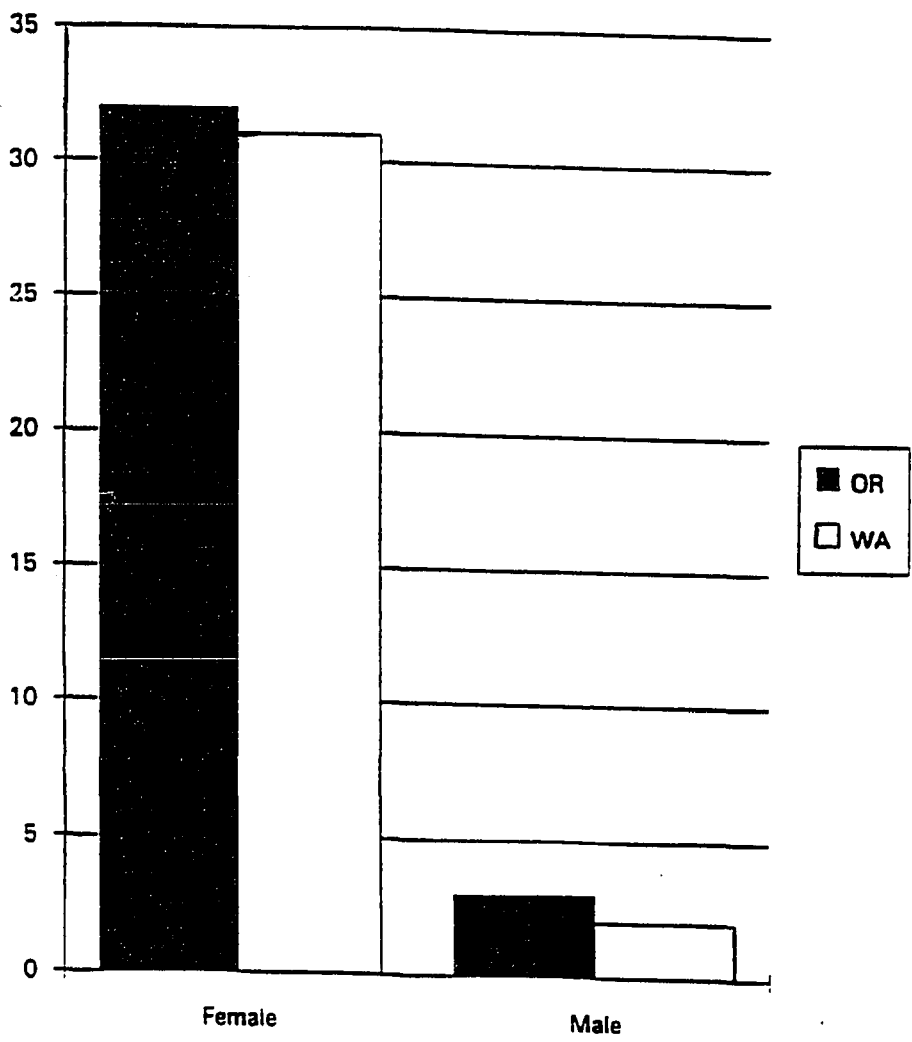
Workshops were given to the existing staff to increase their subject expertise and make them familiar with the biomedical information resources and Regional Medical Library services through the newly created network. One has to bear in mind that at that time both "accredited" library schools, the University of Oregon and University of Washington, offered master's programs in librarianship. Access to a library school in state provided an opportunity for those who desired to obtain graduate education in the field. The University of Oregon closed its library school in 1978.

Librarianship used to, and still often is, perceived as a predominantly female profession. The data compiled on "Gender" supports that contention. Of the 68 respondents, five were male (Figure VIII).

During the time the preliminary research was done, University of Washington Health Sciences Library and the Oregon Health Sciences University had male directors. In the 1960's and 1970's, many of the academic libraries had male directors with female librarians reporting to them. This trend has changed somewhat due to programs developed to encourage career movement.

To increase the number of medical librarians to qualify for a directorship, the Council on Library Resources jointly with the National Library of Medicine provided a management intern fellowship in 1978. The concept was that of a mentorship; the chosen candidate would be matched up and work closely with an appropriate academic health sciences center library director. The goal was to prepare librarians with potential for a directorship. This program ran for three consecutive years with three interns each. Six females and three males participated. This fellowship was an excellent way for female middle management librarians to get to the top. As one of the recipients of the second year awards and placed at the University of Washington, I received an excellent insight to the

FIGURE VIII  
GENDER {n = 68}



workings of the Regional Medical Library Program and spent several weeks at the National Library of Medicine. Of the nine interns, three females are now library directors at an academic health sciences center; three males and one female continued to work in the health sciences libraries; one female left the profession, and one is currently director of a community college library with nursing, dental hygiene, and pharmacology technician programs.

Gender may have affected the interorganizational relations of health sciences libraries in the Pacific Northwest. The University of Washington Health Sciences Library director and the Regional Medical Library Program director were both male and had been there since the inception of the Regional Medical Library program in the Pacific Northwest. The library consultant for the Regional Medical Library was also male. Only the reference librarian doing MEDLINE searching was female.

In 1976, the female head librarian of the Oregon Health Sciences Library retired and was replaced by a young male director. A few years later, the Oregon Health Information Network was founded with grant money; and a male librarian was hired to manage this outreach program. At the same time, very few hospitals employed male librarians. In quite a few hospitals, the library and

the medical records were handled by the same person, a clinical staff member, usually female.

Therefore, one notices in both academic health sciences centers male directors and male administrators of the Regional Medical Library and Oregon Health Information Network programs while hospital librarians were predominantly female. This was not a unique situation, and parallel situations could be found in other states as librarians membership lists have shown. What is interesting to note from personal observation is that information technology, as expressed by MEDLINE searching, was performed by the majority of female librarians. Male directors often did not gain this expertise due to administrative responsibilities or did not keep those skills up.

The academic library directors were responsible for carrying out the directives from Washington, D.C., as issued by the National Library of Medicine and controlled the distribution of monies, such as reimbursement for interlibrary loan transactions. An hierarchical framework was the mode of operation until the hospital librarians in both states formed their own associations to stimulate and strengthen a more lateral information resource sharing network and be less dependent on the Regional Medical Library at the University of Washington Health Sciences Center and the Oregon Health Sciences Library.

A most telling figure is the "First Year of Use of MEDLINE" (Figure IX). There were 49 respondents to this crucial question of the survey. Before 1970, no one used MEDLINE. Between 1970 and 1975, twice as many searched MEDLINE in Washington (4) than Oregon (2). For 1975-80, this is the reverse: Oregon (8) and Washington (4). There exists insufficient data to determine if there were more recent library school graduates employed in the state of Washington in 1970-75 than in Oregon, and the reverse for 1975-80.

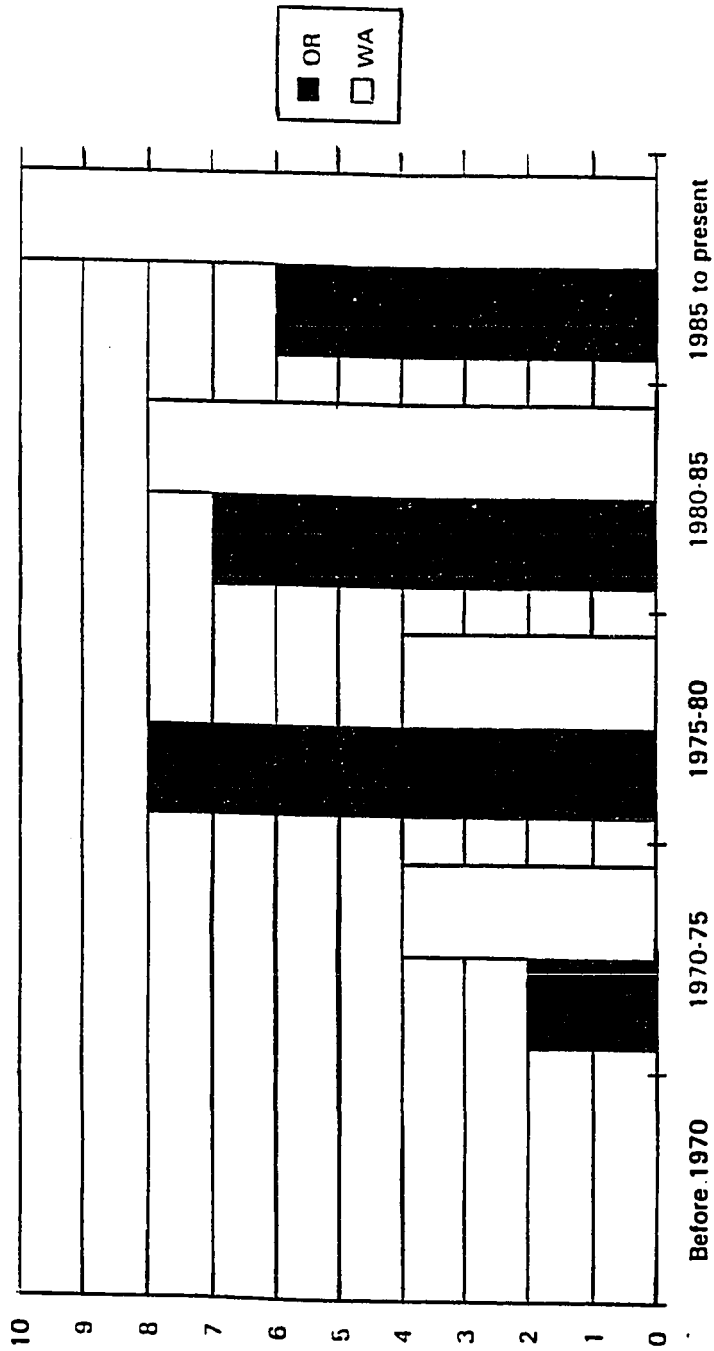
The first use of MEDLINE also more than doubled in comparison with the previous period. In the period 1980-85, the number of first use is about equal: Oregon (7) and Washington (8). From 1985 to 1992, the increase of first use appears to be more gradual.

MEDLINE was the premier database in the biomedical field. It had evolved into an on-line computerized retrieval system from the venerable printed subject listing to the scientific periodical literature, Index Medicus, via the batchmode of MEDLARS (see Chapter I, Endnotes 1-3).

The question of the use of MEDLARS, the earlier version of MEDLINE, was not specifically asked but would not have greatly changed the reported results before 1970 since very few librarians in the Pacific Northwest were trained in its use.



FIGURE IX  
 FIRST YEAR USE OF MEDLINE {n = 49}



For 1970-75, it may well be that because the Regional Medical Library program was based in Washington state that MEDLINE training received a higher priority there. Also, there was at first an extensive two- to three-month training program required by the National Library of Medicine before a librarian was allowed to search MEDLINE and obtain the appropriate computer terminal. Not many librarians could afford to be away for such a duration. Furthermore, there was a long waiting list for the training sessions. The computer terminals at that time were a costly investment.

The 1975-80 period appears to reflect the demands of health sciences librarians in Oregon to become more independent of the Regional Medical Library and Oregon Health Sciences University. Librarians successfully lobbied for increased availability of MEDLINE training workshops as well as computer terminals.

With these different time periods, one can track the increased expertise in on-line database searching of librarians as well as the greater dissemination and use of computers to access the expanding biomedical information. This trend supports the mandate of the Medical Library Assistance Act for better trained library personnel. It also fits in with the changing interorganizational relations of health sciences libraries in the Pacific Northwest. When the Oregon Health Sciences Association was founded, more librarians in Oregon

received MEDLINE training and experienced their first use in searching this biomedical database. In the same period, hospital librarians throughout the United States demanded access to MEDLINE training and computers.

Only five affirmative responses were given when asked when first year use of another database took place (Figure X). This result is not surprising in view of the fact that the MEDLINE was by far the preferred database of use because of its extensive coverage of the biomedical journal literature written in the English language. This was the kind of information needed by the researcher for further exploration and by the physician for patient care. Moreover, the National Library of Medicine, as mandated by the Medical Library Assistance Act, had put into place a strong hierarchical framework where benefits were only reaped if one stayed within this organizational structure.

To the question, "Have You Ever Participated in a Union List?" 65 of the possible total of 68 responses answered (Figure XI). Most noteworthy is that 58 health sciences librarians, 29 in Oregon and 29 in Washington, had participated in a union list of serials.

A union list of serials is a compilation of all the titles and holdings of serials owned by the participating libraries. Union lists can be for certain geographic area or in a specific subject field such

FIGURE X  
 FIRST YEAR USE OF OTHER DATABASE {n = 5}

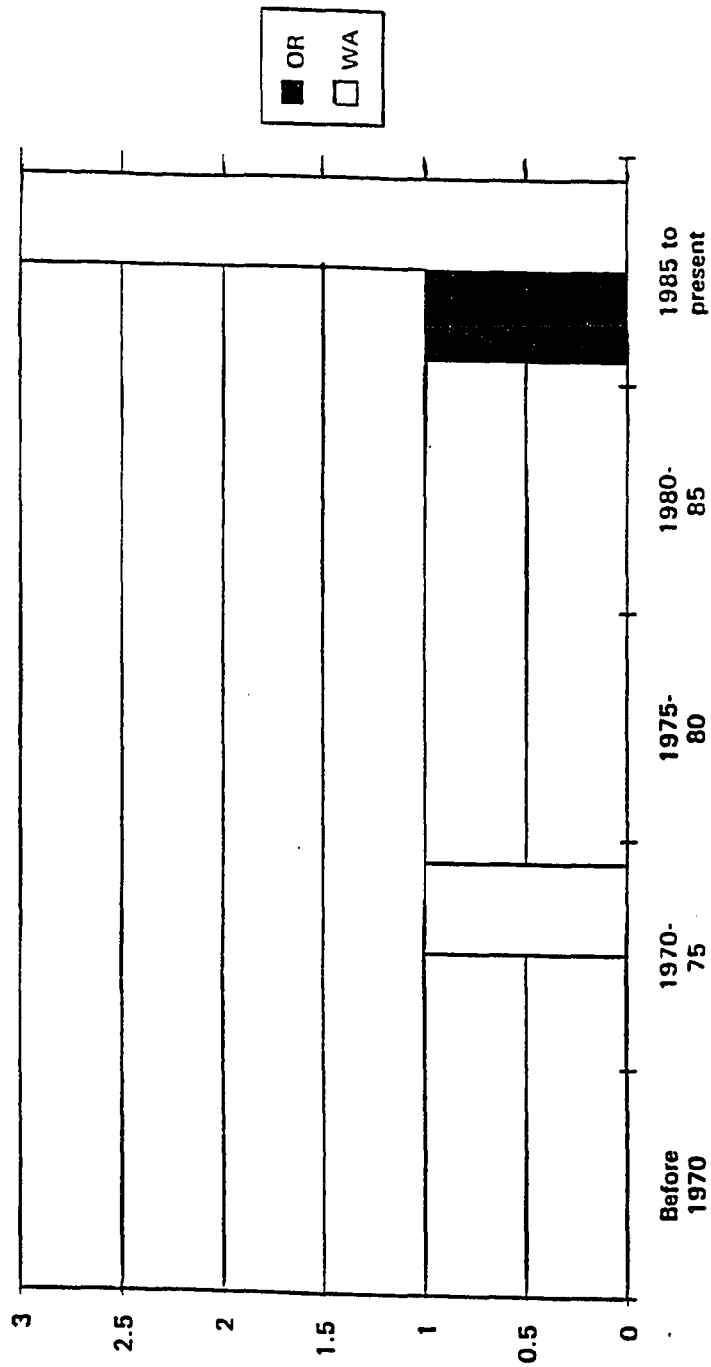
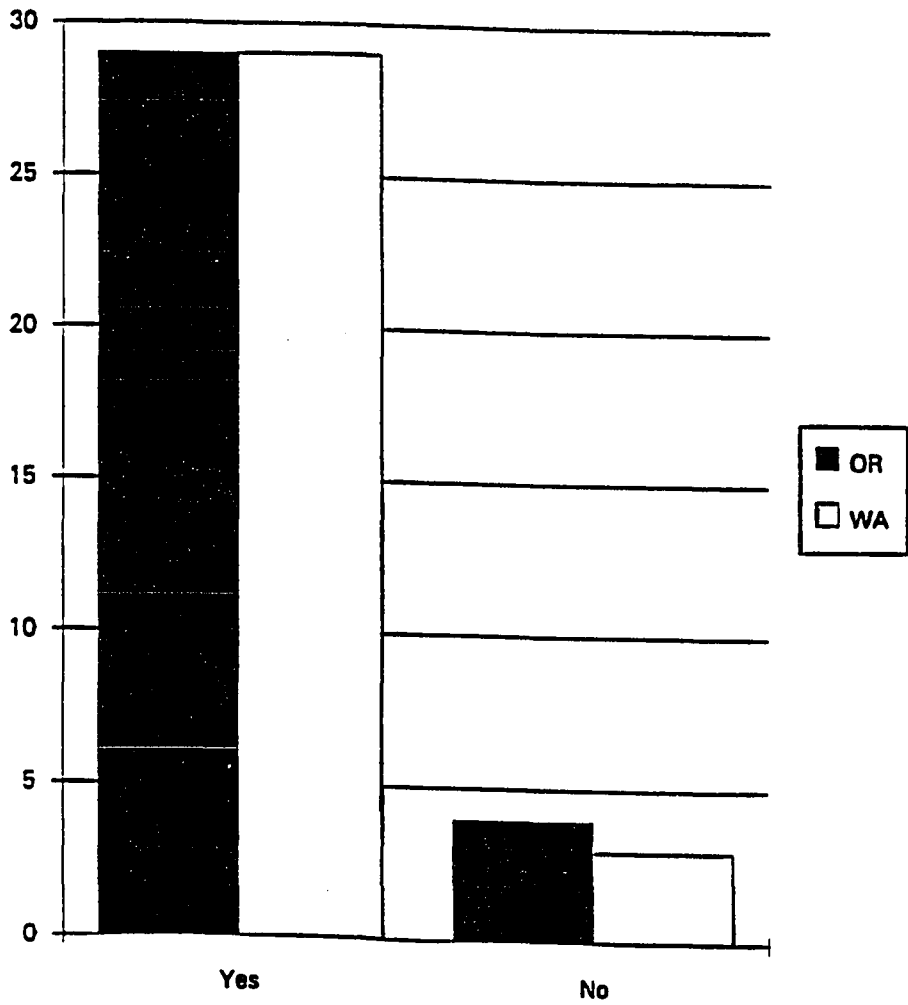


FIGURE XI

HAVE YOU PARTICIPATED IN A UNION LIST? {n=65}



as health sciences or both. Since union lists of serials provided information on which library subscribed currently to a journal title and how far back, other libraries could route an interlibrary loan request for an article in that journal directly to the owning library.

The importance of this data lies in that it is a strong indicator that resource sharing was a critical component of delivery of library services. The information explosion necessitated informal or formal agreements between libraries for collection development. No library could afford to purchase, process, and shelve all the titles and volumes that were published any longer. Cooperation, structured or not, was essential.

In the health sciences field physicians, researchers, and allied health personnel rely heavily on the journal literature because of the more up-to-date information it covers.

Having an alphabetical arrangement of periodical titles and holdings in a computer database made access and use much easier. The creation of a union list by hospital libraries on a state or local basis in the Pacific Northwest documents a shift from an hierarchical to a more lateral network. These libraries rely more on each other for their journal collections as the first resource to fill requests before sending them on to the Oregon Health Sciences University Library or the Pacific Northwest Regional Health Sciences Library.

The data on "First Year of Participation in a Consortium Grant" are important although the number of responses are fairly low (26) (Figure XII). It shows a flurry of activity for 1975-1980 in the State of Oregon as compared with Washington (8 and 2). During this period, the Oregon Health Sciences Libraries Association is formed. From 1980 on, Oregon librarians continue to participate more in consortium grants. Oregon Health Information Network (OHIN) may have been another stimulus for this because there was a structure in place to provide coordination, support, and expertise in the preparation and writing of a consortium grant.

In tracking "Membership Affiliations" it is not surprising that the majority of librarians responding in Oregon and Washington belonged to more than one organization for health sciences libraries or librarians (Figure XIII). National and regional chapters of a national association, state and local memberships are all represented. Membership in the Medical Library Association, the national professional group, amounted to 32 (47%) from Oregon and 29 (43%) from Washington of the 68 respondents. For the Pacific Northwest Chapter of the Medical Library Association the count is slightly higher: 34 for Oregon and 33 for Washington. This small increase may be the result of the limited budget very small libraries have for travel, if any at all.

**FIGURE XII**  
**FIRST YEAR OF PARTICIPATION IN A CONSORTIUM GRANT {n=26}**

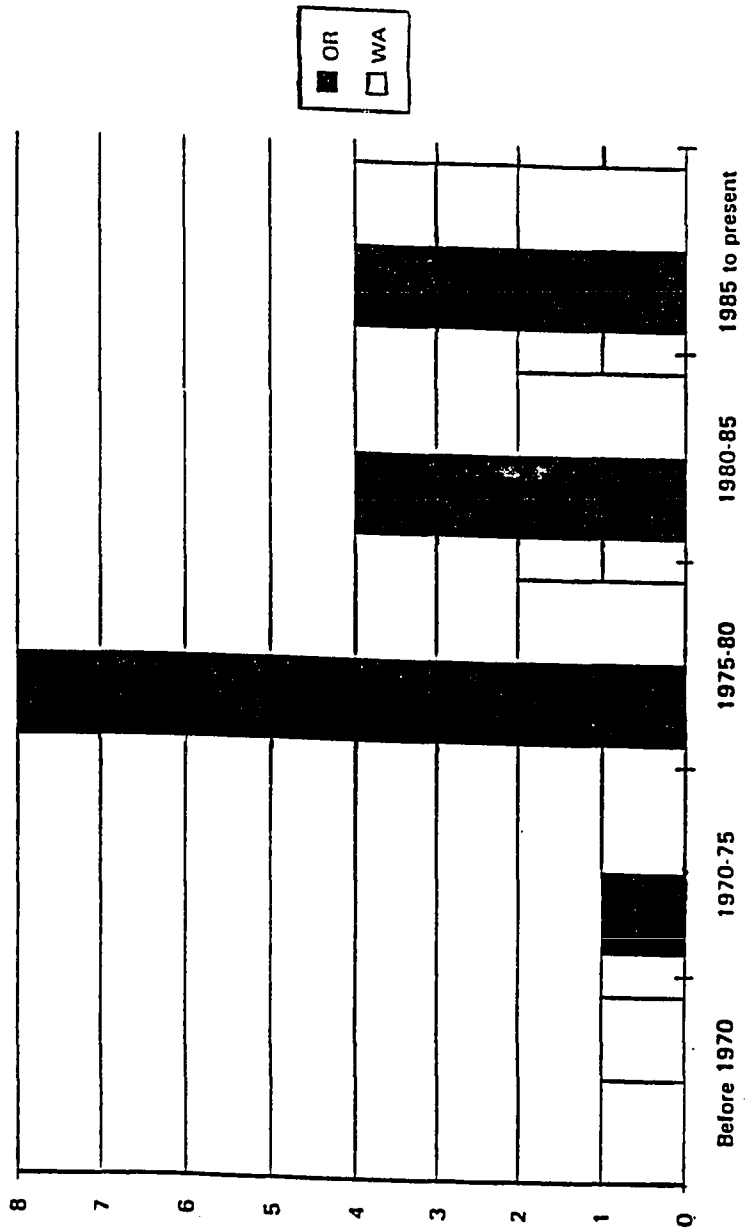
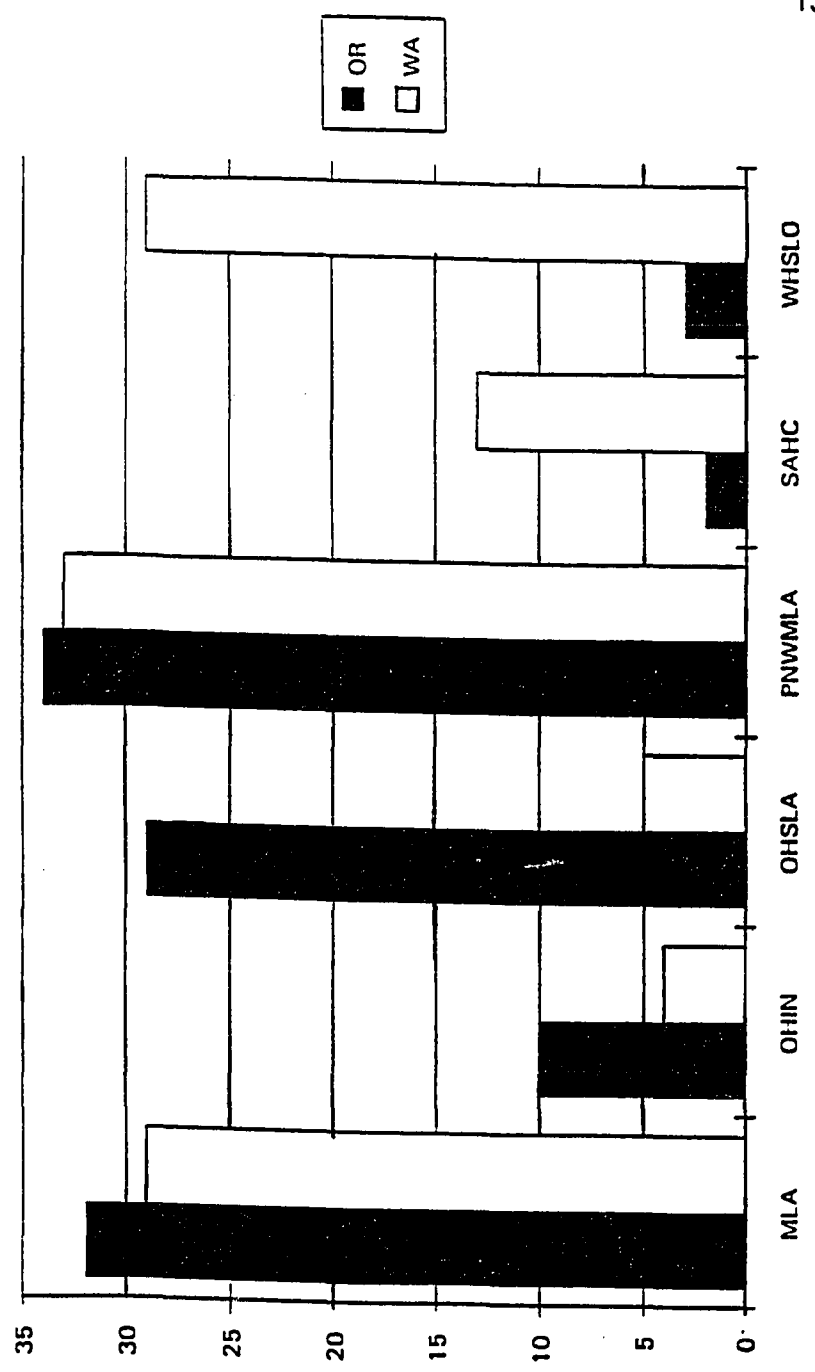




FIGURE XIII  
MEMBERSHIP AFFILIATIONS



The statewide organizations, Oregon Health Sciences Libraries Association and the Washington Medical Librarians Organization, each have 29 (43%) members from their own state. The five librarians (7%) in the state of Washington being members of an organization in Oregon may be explained by proximity to the Portland metropolitan area which often includes Clark County. Another explanation was that interested librarians, for example staff of the Pacific Northwest Regional Health Sciences Library, joined in order to receive newsletters from these organizations in their region. Three Oregon members in Washington Health Sciences Organization may be interested librarians from the Oregon Health Sciences University or persons who had moved from one state to the other.

Ten respondents in Oregon and four in Washington belonged to the Oregon Health Information Network. Seattle Area Hospital Consortium was comprised of 15 members, two from Oregon.

Although the institutions libraries belong to generally compete for the same clientele, be it patients or students, librarians have a long history of cooperation to share each other's resources since no one can afford to buy or store all that is published. Limitations of budget and space are an ongoing concern for libraries. Borrowing library materials is not necessarily limited to a defined geographic area. Many factors play a role such as type of materials, urgency of

need, availability, speed of delivery (mail, TWX), cooperative agreements, and any charges.

In the Pacific Northwest, with a rather sparse number of health sciences libraries as compared with the East Coast of the United States, meetings play a crucial role. Not only are there far fewer libraries in Oregon and Washington but also they tend to be geographically remote from each other and not as large in collection and staff as those states with dense metropolitan areas.

Meetings, whether local, state, regional, or national, allow for an exchange of ideas, a sharing of common concerns and solutions. A sense of belonging prevails, especially for those in a one- or two-person library. As such, meetings stimulate interorganizational relations.

Critical mass in membership is important when dealing with government agencies to effect change. In this case, the National Library of Medicine is an exceedingly powerful organization with vast resources of monies, staff and collections. It also received the strong support of seasoned and influential senators and congressmen as well as prominent physicians.

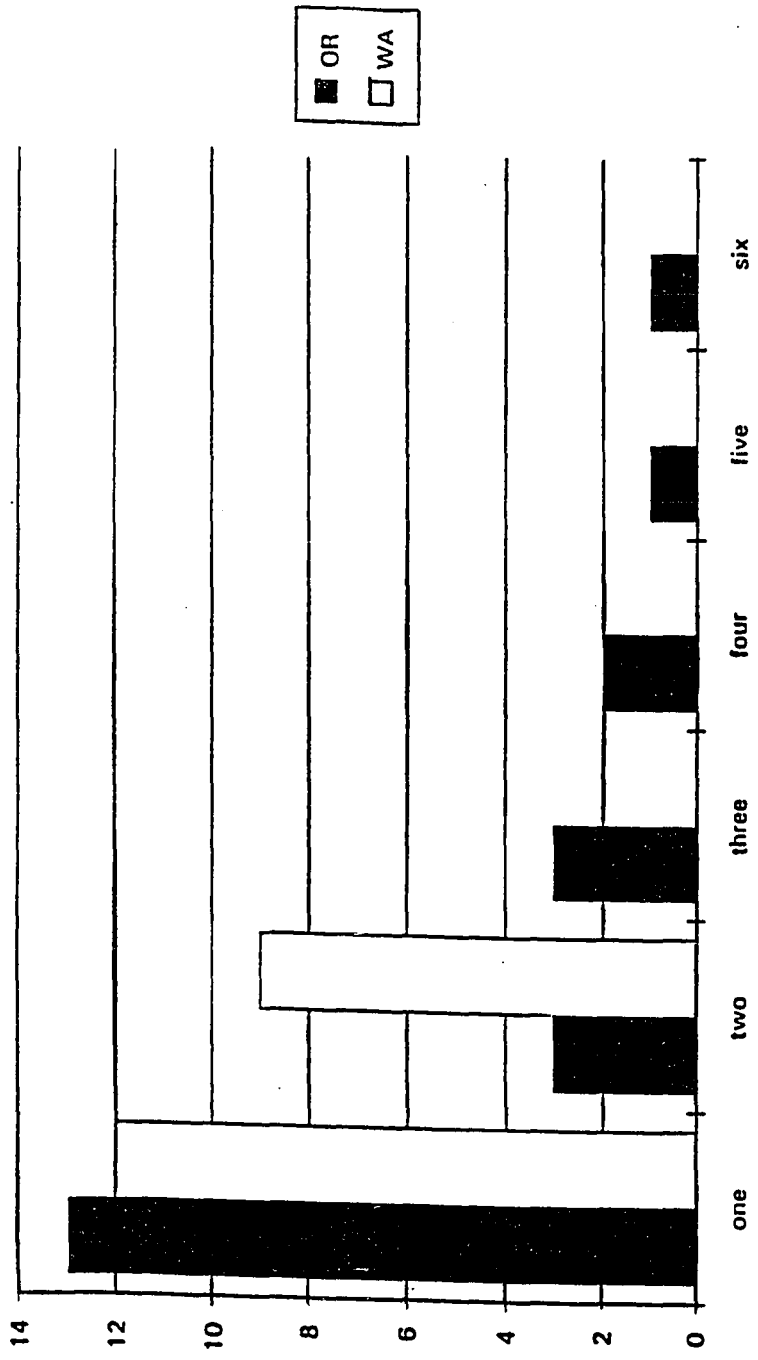
The Pacific Northwest Regional Medical Library plays a prestigious role in the education of physicians and other health professionals in the state and information for health delivery.

Still, it was the hospital librarians who lobbied the National Library of Medicine to relinquish the moratorium on MEDLINE codes. The figure with "First Year Use of MEDLINE" supports the success of this effort. However, without the founding of grassroots associations such as in Oregon and Washington, health sciences librarians may not have been as successful.

The data dealing with "Other Membership Affiliations" are sparse (Figure XIV). Of those surveyed, 44 joined other organizations than those discussed earlier in health sciences librarianship. The majority belonged to a single other association: 13 in Oregon and 12 in Washington. Membership could be, for example, in one of the other national, regional, state, or specialized library organizations. Pacific Northwest Library Association, Oregon Library Association, Washington Library Association, American Society for Scientific Information, Oregon Educational Media Association or American Library Association are all likely possibilities.

It is not clear why nine respondents from Washington are members of two additional associations in comparison with only three for Oregon. An educated guess is that both the University of Washington Health Sciences Library, including the Regional Medical Library, and Oregon Health Sciences University Library are part of large academic institutions which have their separate organizations.

FIGURE XIV  
OTHER MEMBERSHIP AFFILIATIONS (n = 44)



Membership in AAHSLD, Association of Academic Health Sciences Libraries Directors, and AAMC, Association of American Medical Colleges, come first to mind.

What this figure does tell, as compared with the previous one dealing with membership in health science library organizations, is that librarians belong to associations formed for their special interest at the local, state, regional, and national level.

In tallying the results for "Familiar with the MLA Act of 1965?," the high response rate of 68 was more than satisfactory: 35 from Oregon and 33 from Washington (Figure XV). Thirty-four knew about the Act: 19 in Washington and 15 in Oregon. However, it was striking that 34 persons were not familiar with the Medical Library Assistance Act: 20 of these from Oregon. The larger number for Oregon may be explained by the fact that the Regional Medical Library Program was based in Seattle at the University of Washington and therefore those in Oregon did not receive the same kind of publicity about the educational and financial benefits as in Washington.

In dividing the answers of those surveyed on "Familiar with the MLA Act of 1965?" in categories for public and private, the high response rate (69) was interesting because it indicated a marked difference (Figure XVI). Librarians at public institutions (20)

FIGURE XV

FAMILIAR WITH THE MLA ACT OF 1965 {n = 68}

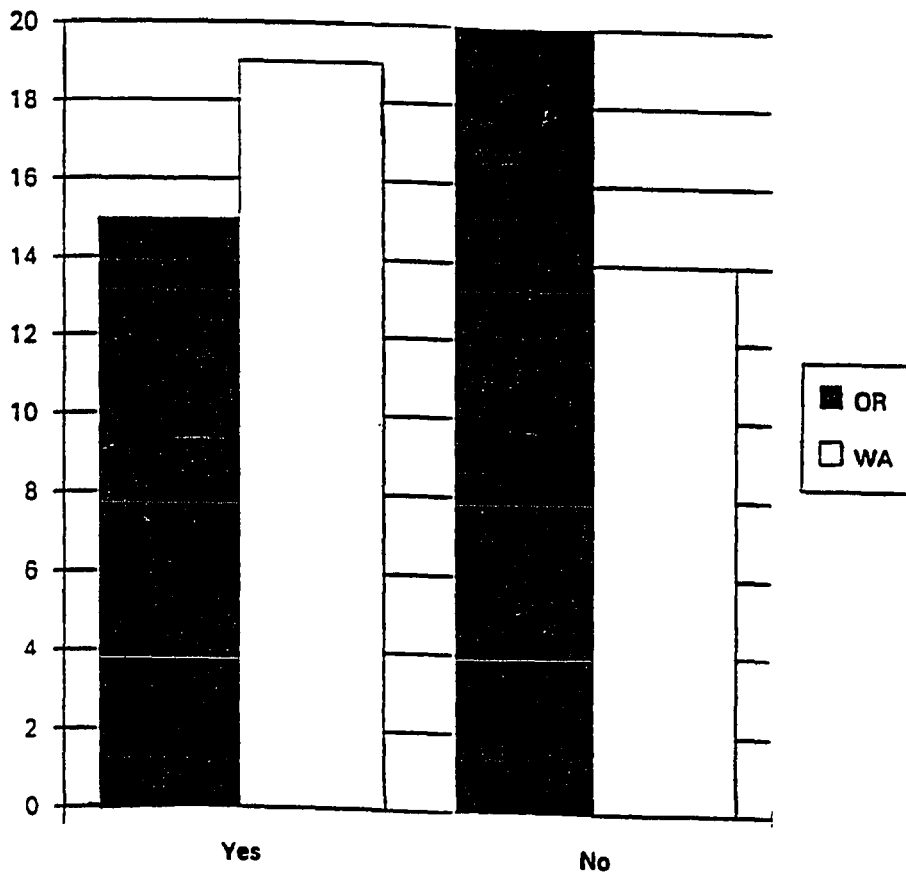
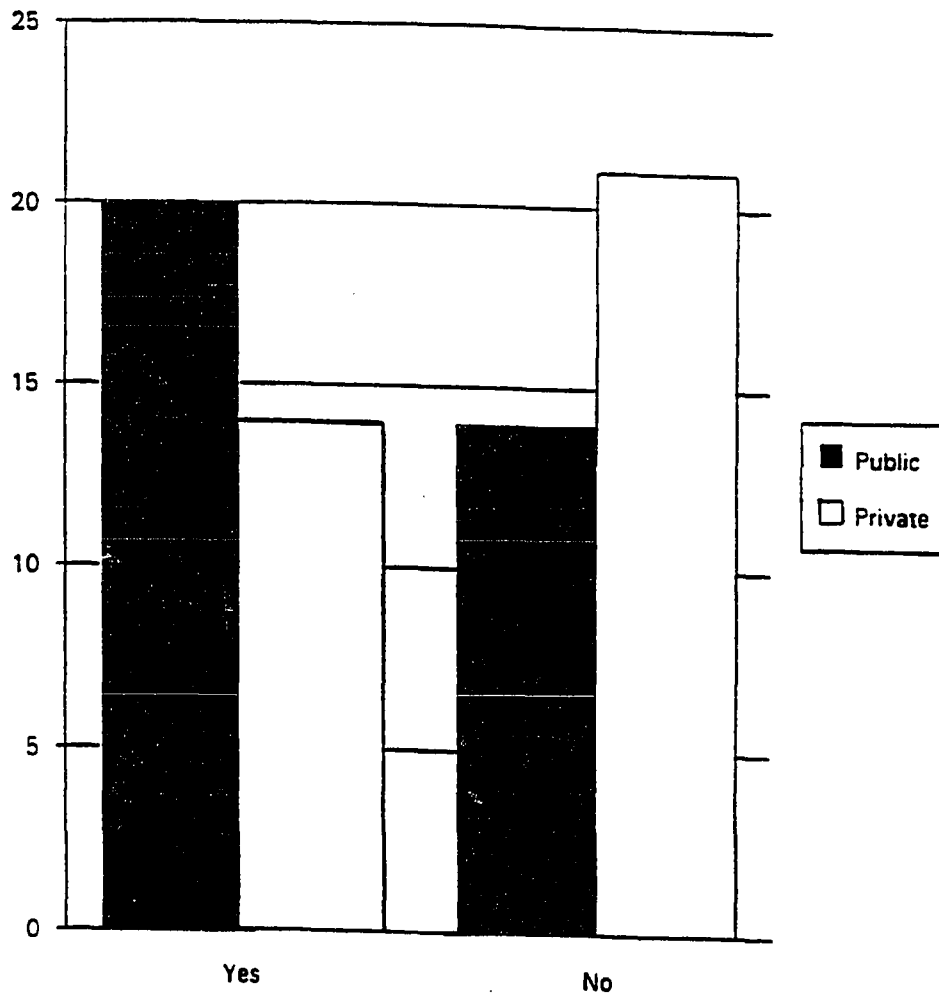


FIGURE XVI

FAMILIAR WITH THE MLA ACT OF 1965 {n = 69}





appeared to be more familiar with the Act than private (14). This may be partly explained that both academic health sciences centers and Veteran's Administration Hospitals are public entities, be it either state or federal.

In correlating education with "Familiar with the MLA Act of 1965?," of the 73 responses, 49 came from those with a Master's in Library Science (Figure XVII). Of this group, 27 were in the affirmative; 22 were not familiar with the Act. This result was not what was expected from those with a professional degree, even though 28 years had passed since the first authorization of the Medical Library Assistance Act took place.

In the other groups--some college, bachelor's, some graduate, other master's, other--differences were less pronounced.

This question in the survey addresses the focus of this research: "Had the Regional Medical Library Program Impact?" (Figure XVIII) i.e., on the interorganizational relations between health sciences libraries in the Pacific Northwest. Of the 68 respondents, 61 persons gave a resounding yes: 32 in Oregon and 29 in Washington. Only three in Oregon and four in Washington gave a negative response. This may have been since the respondents were not familiar with the Regional Medical Library Program or knew it

FIGURE XVII  
FAMILIAR WITH THE MLA ACT OF 1965 {n = 73}

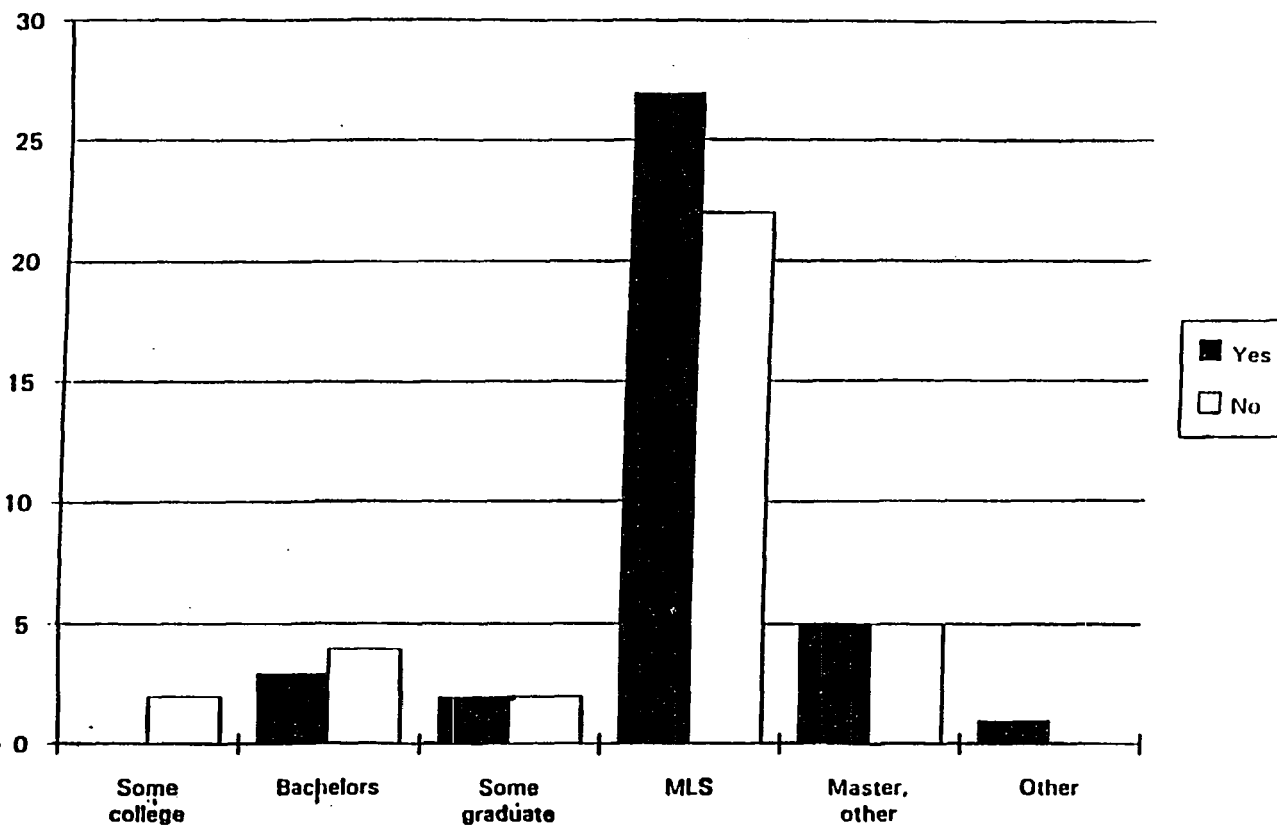
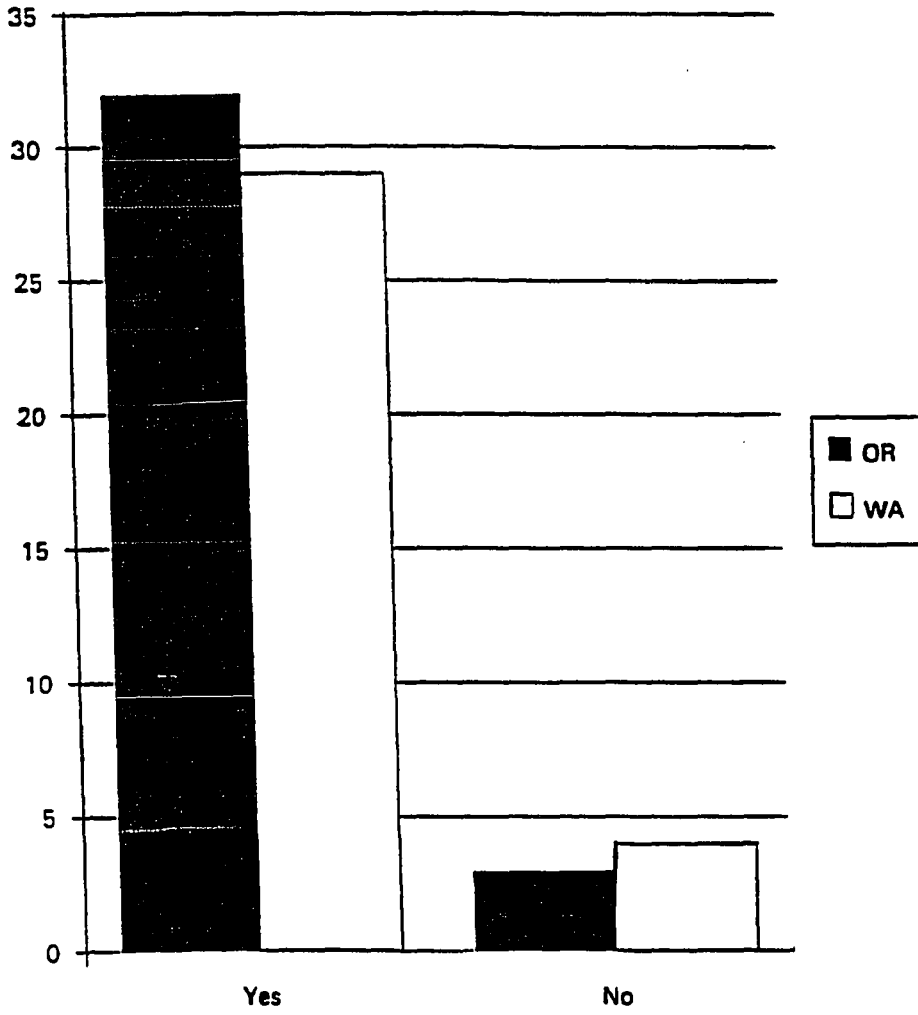


FIGURE XVIII

HAD THE REGIONAL MEDICAL LIBRARY PROGRAM IMPACT?

{n = 68}



under this name or that it came from a library which was not directly affected by it.

This was one of the questions in the survey which most satisfactorily supported the topic studied. It implies that implementation of the Medical Assistance Act did affect librarians. As other data here have shown, health sciences librarians benefitted from the biomedical information network put in place by the National Library of Medicine through its Regional Library Medical Program.

#### SUMMARY OF FINDINGS

As the data have shown, in the Pacific Northwest the interorganizational relations between medical libraries, influenced by the implementation of the Medical Library Assistance Act, provided an excellent opportunity for research. Raelin's model of the legal-political mandate contributed greatly to exploring this dimension.

Prior to the establishment of the Regional Medical Library Program, health sciences libraries may or may not have had an active relationship with other health sciences libraries. The Pacific Northwest Bibliographic Center, based at the University of Washington, was the crucial clearinghouse for interlibrary loans requests. Many of the smaller hospitals did not have formal libraries

and/or inadequate collections of journals and books. In their resource sharing efforts, interlibrary loan patterns appear to be random and negotiated ad hoc.

The Pacific Northwest Bibliographic Research Center, based at the University of Washington Suzzallo Library, functioned as the central resource for filling and forwarding interlibrary loan requests. In the field of health sciences, quick access to periodical articles is most critical for supporting medical research and patient care. The Medical Library Assistance Act mandate, with its hierarchical network for health sciences libraries, broke past patterns and set up new ones, with routing for requests from local to state to regional to national resources.

From 1968 until about the mid-seventies, it seemed that the attitude of most health sciences libraries was to accept whatever financial support and influx of resources the National Library of Medicine and its Regional Medical Library Program offered. Subsidized interlibrary loans, at no cost to the requestor, were a welcome relief to meet the information demands of physicians, researchers and allied health professionals.

The multitiered structure for routing a interlibrary loan request for a journal article at first included a strict hierarchical protocol. Library patrons submitted their requests to their own library, which

passed unfilled ones on to the designated local resource library, which in turn forwarded unmet requests to the Pacific Northwest Regional Health Sciences Library. If this institution did not have the journal in its collection, the request would be forwarded to the National Library of Medicine.

An institution's level of cooperation during implementation of the Medical Library Assistance Act depended on its relationship with the Pacific Northwest Regional Health Sciences Library. For the academic health sciences and hospital libraries in Washington, the volume of interlibrary loans was high. In Oregon, it was substantially lower. This may be partly explained by the adequacy and strength of the Oregon Medical School Library journal collection.

From the mid-seventies until about 1983, a shift occurred whereby some health sciences libraries perceived the National Library of Medicine as trying to run their operations through the Regional Medical Library. The National Library of Medicine was regarded as the all-powerful authority which controlled the flow of money and other resources. The Regional Medical Library was thought by some health sciences librarians to "play favorites." Furthermore, the National Library of Medicine no longer subsidized in-state document delivery. As a result, libraries had to start charging. In consequence, separate organizations were created to foster direct resource

sharing among each other. These organizations were both statewide and local.

Oregon Health Sciences Libraries Association was one of the first to be founded as a result of a statewide grassroots movement. This group played a very active role in the improvement of biomedical information services and delivery in a state where attitudes of "urban" versus "rural", "West" versus "East" (of the mountains), as well as "medical school" versus "hospital" have created barriers.

The Oregon Health Information Network, developed through a grant from the National Library of Medicine in 1978, put into place a far reaching statewide hierarchical information network. Its emphasis was on local self-sufficiency, which were backed up by resources libraries and then through the Regional Medical Library network. The difference between this arrangement and the start up of the Regional Medical Library Program was that now hospital librarians were directly involved in the grant and possessed enough clout to negotiate terms more acceptable, and favorable, to them.

Portland health sciences librarians joined forces to provide faster turnaround time of document delivery (i.e., journal issue or, most commonly, a photocopy of an article) by sharing the cost of a courier system. In the state of Washington, the Seattle Area

Hospital Libraries Consortium was formed in 1976, at first with deliberate exclusion of the Pacific Northwest Regional Medical Library. Washington Health Sciences Librarians formed an organization in 1980 to stimulate statewide improvement of medical library resources. In 1981, the Regional Medical Library, jointly with the Washington State Library, proposed a Washington Health Information Planning Group to develop a statewide plan for coordinated health information delivery.<sup>1</sup>

The rather sudden proliferation of new organizations likely occurred to offset the hierarchical regionalism of the Regional Medical Library, as promulgated by the National Library of Medicine.

From about 1983 to 1985, health sciences libraries appear to have reached a stage whereby they took advantage of, through negotiation, only what they considered good for themselves from the National Library of Medicine and the Regional Medical Library.

Again, the Oregon Health Sciences University Library took a pro-active approach in the Fall of 1985 by submitting a grant to the Fred Meyer Charitable Trust for \$200,000 to develop a prototype electronic library network to link biomedical practitioners to the biomedical libraries in Oregon and Southwest Washington. Worth mentioning is that funding from a local foundation rather than a federal agency was pursued. This is an indicator that with increas-



ingly useful applications of information technology on library operations and subsequent demand, competition for funds at the federal level becomes fierce, and alternatives have to be explored.

Provisions of MEDLINE searches by health sciences librarians in the hospital library to physicians and other health professionals became most important. The MEDLINE and related database training updates were, and still are, provided by the expert Regional Medical Library staff.

The National Library of Medicine, on the other hand, was aiming for a reasonable self-sufficiency of health sciences libraries at the regional and local level. Libraries which did not previously participate in a consortium grant to share resources were encouraged by the National Library of Medicine to apply for one. The compilation of lists of periodical titles held at each library was instrumental for resource sharing and document delivery within a specified geographical boundary. The National Library of Medicine continued to modify its policy on reimbursement for interlibrary loans. After years of giving substantial subsidies, it shifted its priorities with emphasis on computer applications. In providing less support for basic interlibrary loan services, greater local self-sufficiency of libraries was expected.

Various factors came into play. One was the National Library of Medicine requirement that 30 readily available core journals, indexed in Abridged Index Medicus, be owned by local health sciences libraries, and that 100 such journals be subscribed to by resource libraries. Another factor was the increased availability of MEDLINE terminals and database trained librarians at the local health sciences libraries. Other types of institutions also provided MEDLINE access. According to the 1984 Bowker Annual of Library and Book Trade Information, 2,100 institutions in the United States offered MEDLINE services and 2.4 million searches were referred.<sup>2</sup> A third factor was the considerable impact of IAMS, the Integrated Academic Management System report, which addressed the integrated, technological possibilities of a biomedical information network, as envisioned by Nina Matheson and Bill Cooper in 1981. This resulted in a shift away from subsidies for interlibrary loans of periodical articles to an integrated information retrieval system.

The Medical Library Assistance Act of 1965 and its subsequent renewals have more than fulfilled its mandate to improve the quality of resources available to medical libraries and to provide researchers, as well as the health practitioner, with up-to-date biomedical information. The impact of the legislation as implemented by the National Library of Medicine was highly successful and far reaching.

The concomitant rapid development of computer technology was fortuitous and greatly facilitated the delivery of improved information services. The interorganizational relations among various libraries also changed drastically. The National Library of Medicine provided MEDLARS training to librarians; but in the beginning, few could be accommodated for a learning period of several months. The demand for training continued to rise as MEDLARS capabilities became known.

When MEDLINE replaced MEDLARS in the early 1970's, more pressure was placed on the National Library of Medicine to provide training and terminal access. Once opportunities for learning online bibliographic database searching in the health sciences became more readily available, many health sciences librarians quickly mastered these skills. Consulting efforts of Regional Medical Library Programs had been quite successful in establishing or expanding existing library facilities in hospitals. Special emphasis was placed on having a trained librarian, with a master's degree in library science, in charge, as well as a core collection of biomedical journals and books.

Instead of being constrained by a hierarchical structure, health sciences librarians now had access to online bibliographic database searching which provided them a direct, computerized entry into the periodical literature. Furthermore, the development of union lists of

serials, in print or online, greatly facilitated access to journals cited. With these improved information tools, librarians further developed their expertise and offered greatly enhanced services to their clientele of health professionals (Figure XIX).

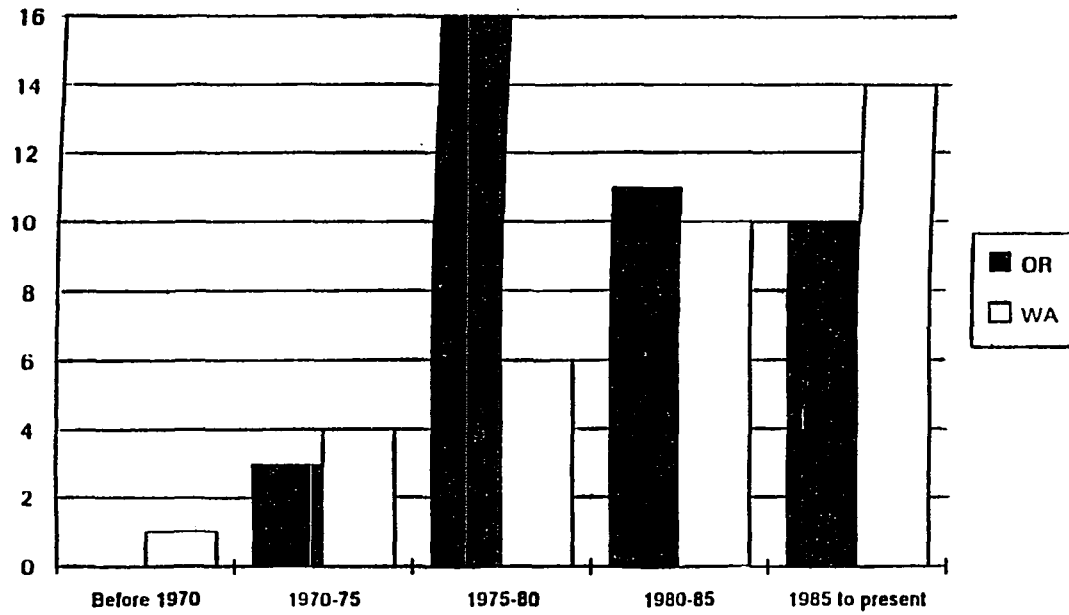
The gender of librarians performing MEDLINE searches was primarily female. Where once computers were expensive and provided to selected few at large academic centers or hospitals, now they became more accessible to all sizes of health sciences libraries. Librarians shared searching techniques and pitfalls. The director of a large institution had administrative duties as the first priority, such as budget and personnel. Often they did not keep up their expertise in online bibliographic database searching.

The shift from a predominantly hierarchical structure of information delivery had been altered to afford far more lateral access to the biomedical literature. Librarians were empowered. The National Library of Medicine continued to play its pivotal role in securing funding and implementing information projects in the field of biomedical communication, while becoming more attuned to the needs of the health sciences librarians as well as the health practitioners and researchers it serves.

The National Library of Medicine increasingly had the tendency to cater their services directly to the practicing physicians and

FIGURE XIX

NUMBER OF LIBRARIANS  
PARTICIPATING IN  
CONSORTIUM GRANTS, MEDLINE USE, UNION LISTS



researchers. At times, this federal powerhouse bypassed the health sciences libraries in its delivery of new programs. However, when these endeavors were library related or dependent, a vocal constituency effected the inclusion of libraries in the services provided.

The results of my inquiry support that interorganizational relations among health sciences libraries in the Pacific Northwest increased after the passage of the Medical Library Assistance Act of 1965. The interlibrary loan data collected provide an excellent indicator. The confluence of the establishment of the Regional Medical Library network with the development of a computerized database, MEDLINE, made this component of the Medical Library Assistance Act a resounding success. Without Joseph Raelin's model of a legal-political mandate, the changing character of health sciences libraries may not have been understood as well.

What could have occurred in the absence of the Medical Library Assistance Act of 1965 and its nationwide biomedical information network? Would the interorganizational relations among health sciences libraries in the Pacific Northwest have increased? Perhaps. However, this would most likely have occurred over a longer period of time rather than within the span of a few years as documented in this research. Libraries may have continued to rely on the Pacific Northwest Bibliographic Center at the University of Washington as a

switching station for interlibrary loan requests or would have made other, informal or formal, arrangements locally or elsewhere. An emergence of an effective and vast standardized information network would be unlikely without the power and influence of a federal agency such as the National Library of Medicine. These hypothetical situations would fit the exchange and power/dependency models of interorganizational relations.

Another possibility, depending greatly on the evolution of computer technology, would be that the bibliographic utilities such as the Online Computer Library Center (OCLC), and online database vendors would fill the need for comprehensive, easy, and timely access to information resources. Libraries would have to pay for these services, or users would access these directly and be charged a fee.

Without the introduction of computers to information processes such as indexing of the journal literature as well as library operations, large libraries or those in metropolitan areas with a variety of types of libraries would likely make use of each other's collections. Smaller ones in rural areas would probably not have fared as well.

Did the impact of the Medical Library Assistance Act have unintended results? Raelin's characteristic of mandate/network distributional balance, as expressed by change in resource sharing

patterns, shows a significant shift during the period under study. Certain stipulations of the original mandate appear to be a great variance from how resources were actually allocated. Initially, it was a highly centralized network, effectively administered by the National Library of Medicine. The Regional Medical Library was the primary beneficiary of allocated resources and also determined most of the distribution of these resources in Region X.

Then, something quite different occurred. A marked change took place when health sciences libraries in the third tier of the biomedical information network organized themselves into special interest groups. The number of health sciences libraries and/or librarians organizations which sprung up from 1976 on, arose in part as a response to the unequitable existing distribution and allocation of resources made available through the renewals of the Medical Library Assistance Act. The cumbersome protocols for interlibrary loan requests and restrictive access to MEDLINE appeared to hinder hospital libraries far more than the large academic health sciences libraries. However, the liberating and equalizing effects of computer technology applications on even the smaller health sciences libraries stimulated the shift in the mandate/network distributional balance from a hierarchical to a more lateral network. Thus, Raelin's model



of interorganizational relations may be considered here a descriptive as well as a predictive one.

For future research, it will be quite interesting to use Raelin's legal-political network model for the Information Super Highway. The copyright law of 1976 and the impact of the Internet on access to information resources have raised tremendously complex issues which greatly merit further exploration. A related area for study is electronic publishing, which is a perceived or real threat to the viability of the traditional library. Concomitantly, roles and responsibilities of librarians will be modified. "Delibraryzation," as manifested by individuals doing their own online searching, places the profession of librarianship at the crossroads. Will they become obsolete or change with the times?

Still, many libraries will continue to exist into the next century as a physical place for educational pursuits, research, and leisure. Others will become entirely virtual. All of them will take further advantage of new developments in information technology. Querying the respondees of the survey for this research should provide elucidating insights.

This study makes a significant contribution to the field because interorganizational relations theory in the context of libraries has not been much explored. The choice of the Medical Library Assistance

Act and its impact is important as it provides insights into the changing character of health sciences libraries. This research should be of assistance in the organizational decision-making processes for all those concerned with the role and responsibilities of libraries in information resources access and delivery, especially health administrators and librarians.

## ENDNOTES

### CHAPTER V

1. Pacific Northwest Regional Health Sciences Library letter dated March 31, 1981.

2. Bowker Annual of Library and Book Trade Information, 1984, p. 135.

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APPENDIX A

SURVEY OF IMPACT OF  
MEDICAL LIBRARY ASSISTANCE ACT OF 1965

**SURVEY OF IMPACT OF MEDICAL LIBRARY ASSISTANCE ACT OF 1965**

This survey is conducted to study the impact of a federally mandated information program on the interorganizational relations between health sciences libraries within the Pacific Northwest.

Name \_\_\_\_\_  
Position Title \_\_\_\_\_ since \_\_\_\_\_  
# of years with this library: \_\_\_\_\_  
Institution \_\_\_\_\_ Public\_ Private\_  
Office Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zipcode \_\_\_\_\_  
Phone# \_\_\_\_\_ FAX# \_\_\_\_\_ E-Mail \_\_\_\_\_

**Highest level of education:**

-High school diploma or GED \_\_\_\_\_ -Some college \_\_\_\_\_  
-Bachelor's degree \_\_\_\_\_ -Some graduate school \_\_\_\_\_  
-Masters in Library Science \_\_\_\_\_ -Year \_\_\_\_\_  
-Masters in \_\_\_\_\_  
-Doctoral degree \_\_\_\_\_ -Other \_\_\_\_\_  
Certificate(s) \_\_\_\_\_

**Dates of employment in health sciences libraries in the Pacific Northwest:**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Membership(s): (check all that apply)**

- Medical Library Association: years \_\_\_\_\_  
- Oregon Health Sciences Libraries Association: years \_\_\_\_\_  
- Oregon Health Information Network: years \_\_\_\_\_  
- Pacific Northwest Chapter/Medical Library Association: years \_\_\_\_\_  
- Seattle Area Hospital Consortium: years \_\_\_\_\_  
- Washington Health Sciences Librarians Organizations: years \_\_\_\_\_  
- Other organizations, consortia, networks: years \_\_\_\_\_  
- None \_\_\_\_\_

**When did you first use a computer and/or terminal in your work?**

Purpose: -cataloging \_\_\_\_\_ -wordprocessing \_\_\_\_\_ -database searching \_\_\_\_\_ -other \_\_\_\_\_  
- Before 1970 \_\_\_\_\_  
- 1970-75 \_\_\_\_\_  
- 1975-80 \_\_\_\_\_  
- 1980-85 \_\_\_\_\_  
- 1985 to present \_\_\_\_\_  
- Not applicable \_\_\_\_\_

Have you received on-line database training?  Yes  No

If yes, check all years that apply with names of city & sponsor

- Before 1970 \_\_\_\_\_
- 1970-75 \_\_\_\_\_
- 1975-80 \_\_\_\_\_
- 1980-85 \_\_\_\_\_
- 1985 to present \_\_\_\_\_
- Not applicable \_\_\_\_\_

Have you performed on-line database searching?  Yes  No

If yes, check all years that apply with name of library

- Before 1970 \_\_\_\_\_
- 1970-75 \_\_\_\_\_
- 1975-80 \_\_\_\_\_
- 1980-85 \_\_\_\_\_
- 1985 to present \_\_\_\_\_
- Not applicable \_\_\_\_\_

Which of the following databases have you used?

MEDLINE  Yes  No \_\_\_\_\_ First year of use

DIALOG  Yes  No \_\_\_\_\_ First year of use

BRS  Yes  No \_\_\_\_\_ First year of use

Other(s) \_\_\_\_\_

Have you participated in a union list of serials?  Yes  No

Name and date of first participation \_\_\_\_\_

Have you received or been an participant in any consortium grant(s) and/or subcontract(s)? (check all that apply & specify)

Purpose: \_\_\_\_\_ Funding source: \_\_\_\_\_

- Before 1970 \_\_\_\_\_
- 1970-75 \_\_\_\_\_
- 1975-80 \_\_\_\_\_
- 1980-85 \_\_\_\_\_
- 1985 to present \_\_\_\_\_
- Not applicable \_\_\_\_\_

Are you familiar with the Medical Library Assistance Act of 1965?

Yes  No

If yes, please list in order of importance three impacts of the Act you have observed

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

Has the Regional Medical Library Program had an impact on your work?

Yes  No

If yes, please list the three most important ways

1. \_\_\_\_\_
2. \_\_\_\_\_

3. \_\_\_\_\_

Would you be willing to participate in a follow-up interview?

- Yes                      - No

Any comments? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Date of birth \_\_\_\_\_ Gender \_\_\_\_\_

**Thank you for your participation!**

**Please return to:**

**Leonora Ingraham-Swats**

**Lewis D. Cannell Library**

**1800 E. McLoughlin Blvd.**

**Vancouver WA 98663**

**(206) 699-0472 FAX (206) 696-6333**

**E-mail: [ingrie@clark.edu](mailto:ingrie@clark.edu)**

**APPENDIX B**

**SURVEY OF RESPONDENTS BY  
TITLE, YEARS OF EXPERIENCE, AND PLACE**

SURVEY OF RESPONDENTS BY  
TITLE, YEARS OF EXPERIENCE, AND PLACE

ID	TITLE	SINCE	YEARS	LIB	CERTIF	CITY	STATE
1	Chief Librarian	80				Seattle	WA
2	Planning Coordinator	89			AMRT	Portland	OR
3	Medical Library Director	84		11		Portland	OR
4	Librarian	89		3		Tacoma	WA
5	Audiovisual Librarian	90		3		Portland	OR
6	Outreach Services Coordinat	92		1		Seattle	WA
7	Manager, Health Information	89		3		Spokane	WA
8	Reference Librarian	68		25	MLA-Disting	Portland	OR
9	Medical Librarian	92		.		Coos Bay	OR
10	Medical Reference Librarian	91		2		Seattle	WA
11	Supervisor, Health Sciences	91		1		Billings	MT
12	Head, Veterinary Medical/Ph	76		17	AMYP-Disting	Pullman	WA
13	Librarian	.		15		Bremerton	WA
14	Medical Librarian	80		13		Portland	OR
15	Director of Medical Librari	88		.		Seattle	WA
16	Medical Librarian	82		3		Everett	WA
17	Director of Libraries	92		7	Library Mgt	Portland	OR
18	Director of Health Sciences	79		14	MLA	Clackamas	OR
19	Medical Librarian	76		14		Hamilton	MT
20	Director of Library Service	85		7		Coeur D'Alene	ID
21	Head Librarian	79		14		Portland	OR
22	Medical Librarian	75		5	WA Teaching	Kirkland	WA
23	Library Director	85		7		Salem	OR
24	Director Planetree Health R	91		1		The Dalles	OR
25	Medical Librarian	91		2		Portland	OR
26	Science & Medical Referenc	68		19		Salem	OR
27	Chief, Library Science	75		17		Tacoma	WA
28	Health Information Analyst	92		2	Archival Adm	Spokane	WA
29	Librarian (Retired)	61		29		Beaverton	OR
30	Director Physician Developm	92		.		Vancouver	WA
31	Medical Librarian	89		4		Oregon City	OR
32	Head, Information Services	91		.	Acad. Health	Chapel Hill	NC
33	Medical Librarian	76		9		Medford	OR
34	Librarian	91		2		Seattle	WA
35	Regional Development Coordi	81		.	Elem Educat	Seattle	WA
36	Director of Libraries	76		16		Portland	OR
37	Health Information Speciali	91		2		Vancouver	WA
38	Medical Librarian	85		7		Hillsboro	OR
39	Collection Development Coor	86		8		Portland	OR
40	Librarian	92		1		Portland	OR
41	Resourct Sharing Coordinato	89		10		Seattle	WA
42	Head Librarian	80		12		Spokane	WA
43	Library Coordinator	91		2		Klamath Falls	OR
44	Librarian	83		9		Seattle	WA
45	Library Director	90		3		Salisbury	NC
46	Medical Librarian	89		3		Seattle	WA
47	Medical Librarian	91		1	Technical Wr	Edmonds	WA
48	Library Director	91		.		Anchorage	AL
49	Reference Coordinator	88		13		Edmonton	AB
50	Business Owner	86		7		Seattle	WA
51	Library Director	84		14		Seattle	WA



ID	TITLE	SINCE	YEARS	LIB	CERTIF	CITY	STATE
52	Coordinator Outreach Servic	89	13			Portland	OR
53	Director, Educational Servi	90	3			Kennewick	WA
54	Chief, Library Service (ret	.	.			Portland	OR
55	Librarian	89	4			Renton	WA
56	Library Director	89	4			Portland	OR
57	Director, Idaho Health Scie	92	1			Pocatello	ID
58	Assistant Director for Libr	90	14			Portland	OR
59	Associate Director for Admi	86	7			Seattle	WA
60	Reference/Cataloging Librar	90	3			Spokane	WA
61	Assistant Director, Health	80	22			Seattle	WA
62	Librarian	.	4			Seattle	WA
63	Librarian	87	13			Spokane	WA
64	Medical Librarian	88	5			Yakima	WA
65	Library Coordinator	88	5	Library Mgt		Mount Vernon	WA
66	Director, Library Services	81	12			Olympia	WA
67	Director	.	8			Eugene	OR
68	Reference Librarian	83	3			Eugene	OR
69	Medical Reference Librarian	81	15			Eugene	OR
70	Director of Libraries	73	20			Portland	OR
71	Librarian	78	2			Corvallis	OR
72	Chief, Library Service	85	15			White City	OR
73	Health Services Librarian	80	13	MLA		Mobile	AL

Number of cases read = 73      Number of cases listed = 73

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APPENDIX C

PACIFIC NORTHWEST REGIONAL HEALTH SCIENCES LIBRARY

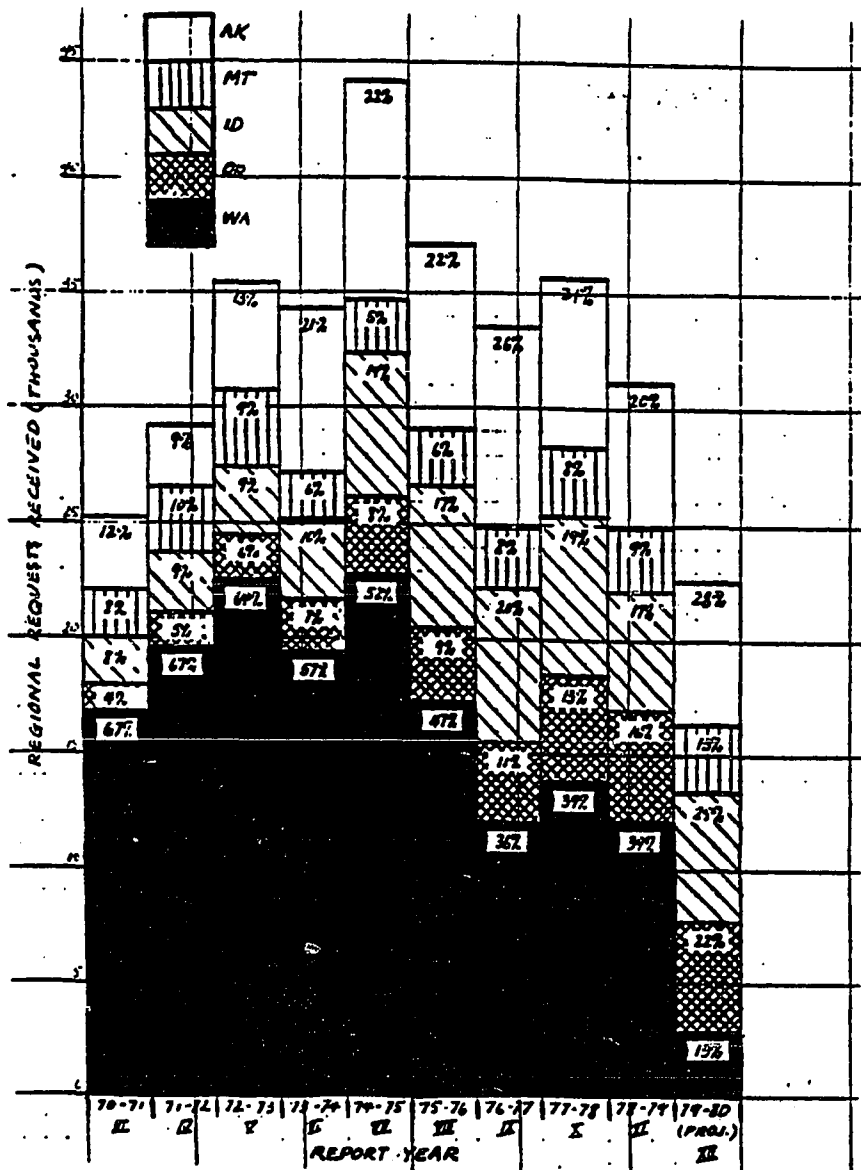
QUARTERLY REPORT--APRIL 1980

INTERLIBRARY LOAN REQUESTS

1970 THROUGH 1979

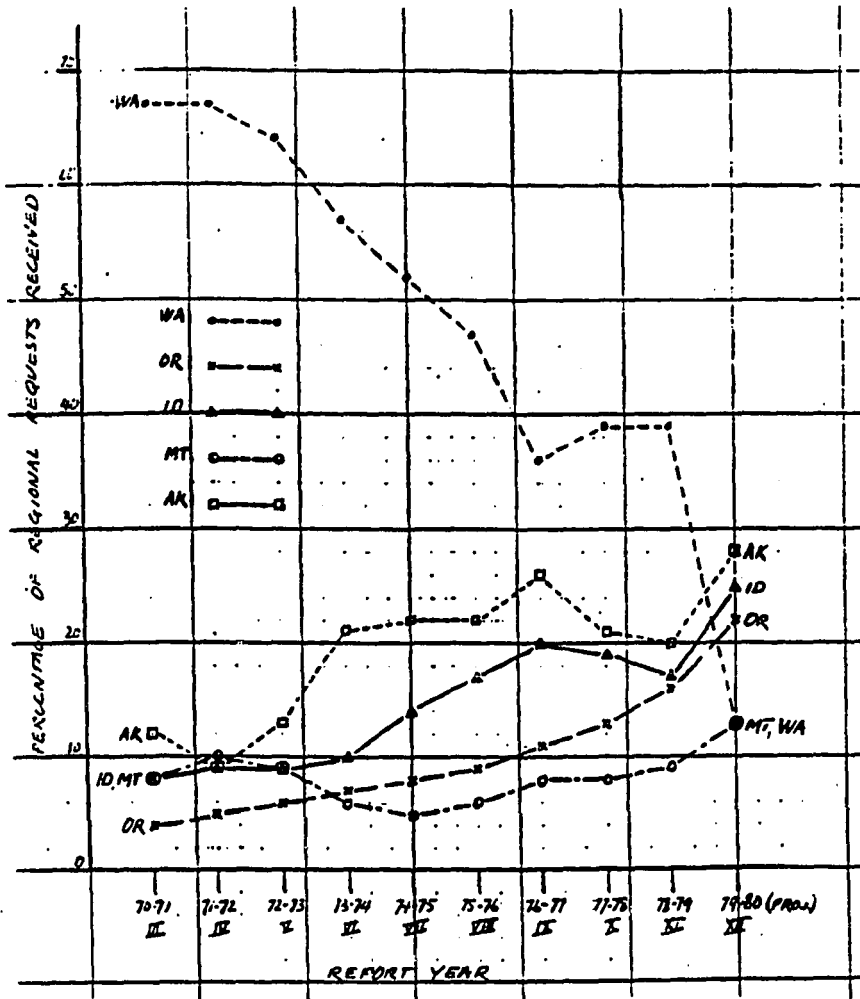
FIGURE IA

REQUESTS RECEIVED, BY STATE



Source: Pacific Northwest Regional Health Sciences Library Quarterly Report--April, 1980; Interlibrary Loan Requests, 1970-79.

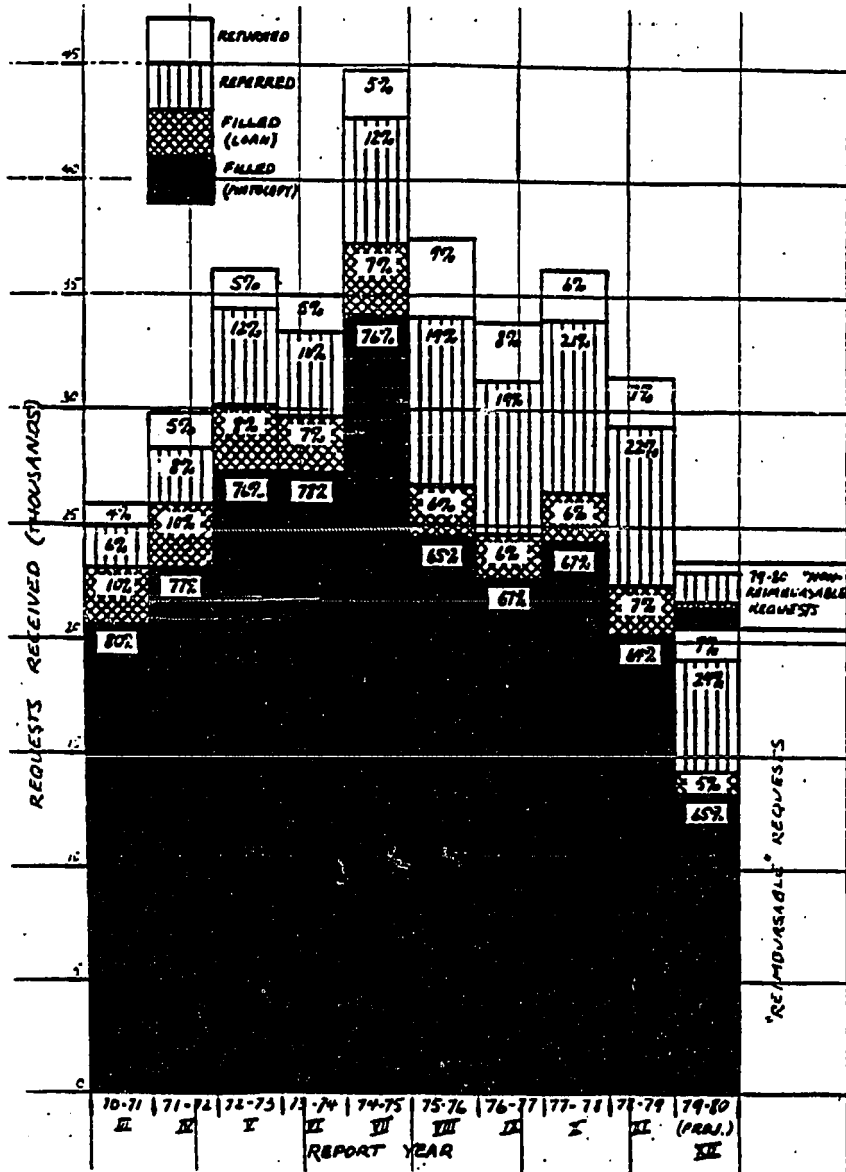
FIGURE 1B  
 REQUESTS BY STATE, AS PERCENTAGE OF TOTAL FROM REGION



Source: Pacific Northwest Regional Health Sciences Library  
 Quarterly Report--April, 1980; Interlibrary Loan Requests, 1970-79.

FIGURE IIA

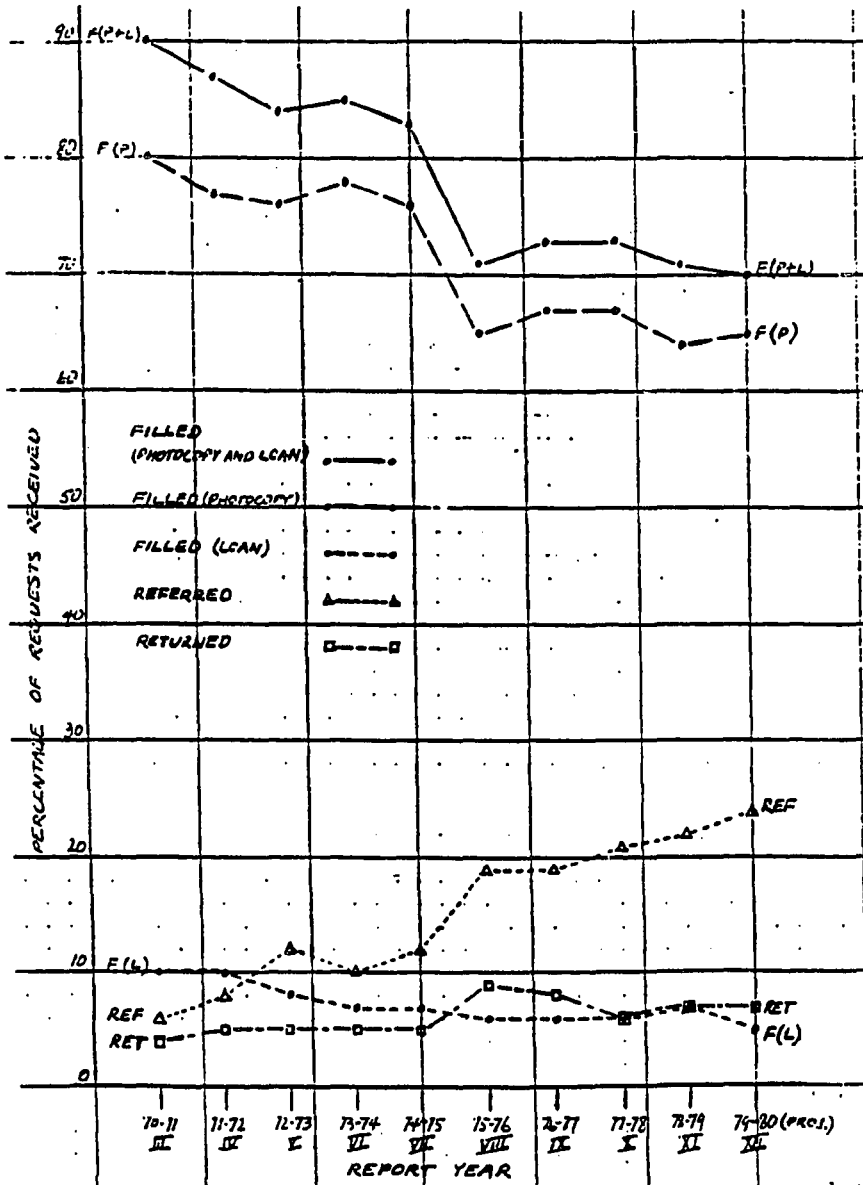
REQUESTS RECEIVED, BY DISPOSITION



Source: Pacific Northwest Regional Health Sciences Library Quarterly Report--April, 1980; Interlibrary Loan Requests, 1970-79.

FIGURE IIB

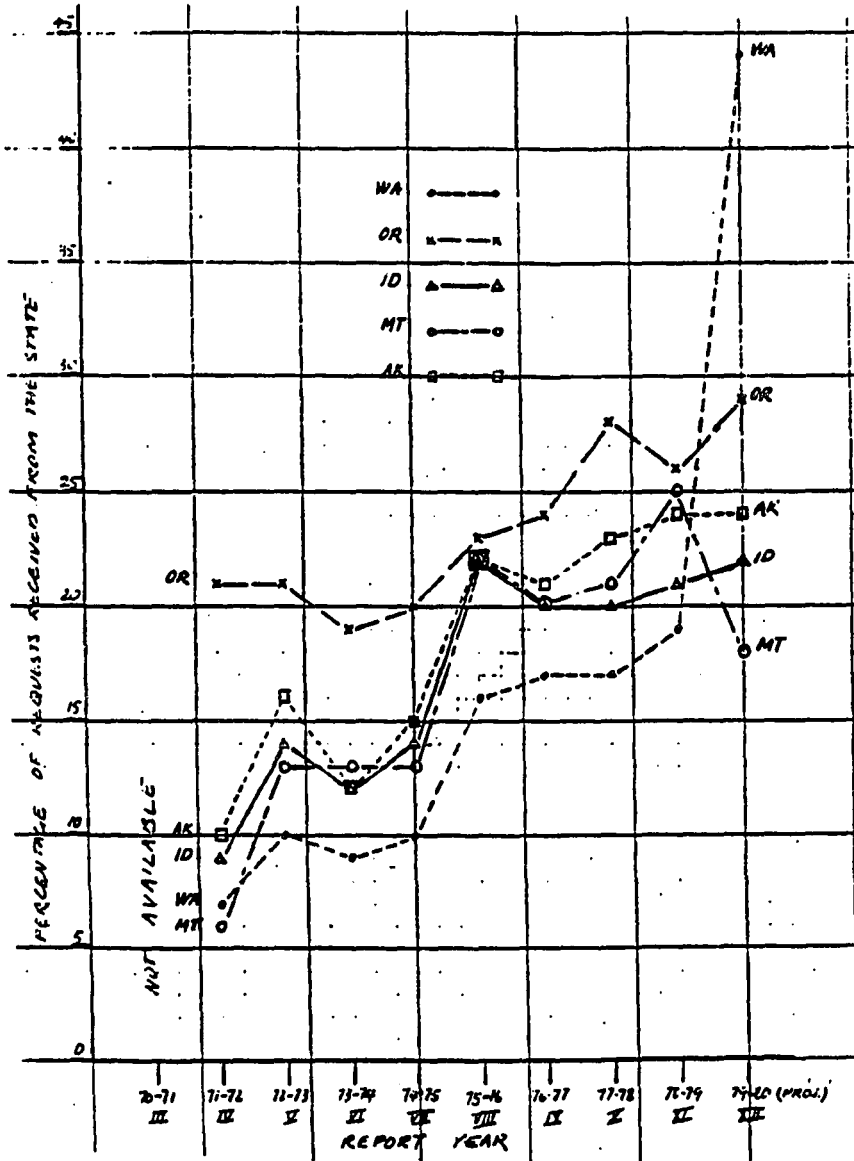
DISPOSITION OF REQUESTS, AS PERCENTAGE OF TOTAL



Source: Pacific Northwest Regional Health Sciences Library Quarterly Report--April, 1980; Interlibrary Loan Requests, 1970-79.

FIGURE III

PERCENTAGE REFERRED, OF REQUESTS FROM EACH STATE



Source: Pacific Northwest Regional Health Sciences Library Quarterly Report--April, 1980; Interlibrary Loan Requests, 1970-79.

## GLOSSARY

- AAHSLD** Association of Academic Health Sciences Libraries Directors, founded in 1977 to meet their special interests
- ALA** American Library Association, founded in 1985; oldest and largest library association
- CLR** Council of Library Resources, Inc., founded in 1956; private foundation awarding grants to individuals and libraries in academic institutions for research and problem solving
- IAMS** Integrated Academic Management System, concept developed by Nina Matheson and Bill Cooper in 1981 for a technologically integrated biomedical information network and subsequently implemented by many large health sciences libraries
- IM** Index Medicus, founded in 1879 by John Shaw Billings under the direction of the Surgeon General, U.S. Army. This monthly print index of more than 250,000 articles in over 2,600 medical journals is the oldest and most widely used medical bibliography  
Number of citations:  
          1879      FY1968      FY1976      FY1984  
          18,000   193,000   255,000   305,000  
(Miles, 1983, p. 383) (Bowker Annual, 1985, p. 160)
- ILL** Interlibrary Loan, longstanding arrangement between libraries to share their resources by loaning the physical materials or sending photocopies, especially of journal articles
- MEDLARS** Medical Literature Analysis and Retrieval System developed by the National Library of Medicine,



was in 1964 issued as a computerized (batch) database of Index Medicus to provide quicker and easier access to the biomedical literature

MEDLINE	<p>MEDLARS ON-LINE was made available by the National Library of Medicine in 1971 as an on-line version of <u>Index Medicus</u></p> <p>Number of citations:</p> <table> <tr> <td>FY1972</td> <td>FY1973</td> <td>FY1974</td> </tr> <tr> <td>22,000</td> <td>165,000</td> <td>270,000</td> </tr> <tr> <td>FY1975</td> <td>FY1976</td> <td>FY1977</td> </tr> <tr> <td>402,000</td> <td>579,000</td> <td>1,000,000</td> </tr> </table> <p>(Miles, p. 388)</p>	FY1972	FY1973	FY1974	22,000	165,000	270,000	FY1975	FY1976	FY1977	402,000	579,000	1,000,000
FY1972	FY1973	FY1974											
22,000	165,000	270,000											
FY1975	FY1976	FY1977											
402,000	579,000	1,000,000											
MLA	<p>Medical Library Association, founded in 1898; incorporated in 1934; for health sciences libraries and allied scientific libraries</p>												
MLAA	<p>Medical Library Assistance Act, U.S. Public Law 89-291, 89th Congress, October 22, 1965. Extensions: Medical Library Assistance Act Extension in 1970; Health Program Extension Act in 1973; Health Services Research, Health Statistics and Medical Libraries Act of 1974; Health Research Extension Act of 1985</p>												
NLM	<p>National Library of Medicine, named in 1956 as an independent federal agency, successor of the Surgeon General's Library of the Army's Library</p>												
PNW/MLA	<p>Pacific Northwest Chapter, Medical Library Association</p>												
OCLC	<p>formerly Online Computer Library Center, established in 1977; a bibliographic utility</p>												
OHIN	<p>Oregon Health Information Network, established in 1978</p>												
ORION	<p>Oregon Resources Information Network, established in 1985</p>												

OHSLA	Oregon Health Sciences Libraries Association, founded in 1977
PAHSL	Portland Area Health Sciences Librarians, founded about 1976
PNBC	Pacific Northwest Bibliographic Center, 1940-1982
PNRHSL	Pacific Northwest Regional Health Sciences Library, also referred to as the Regional Medical Library for Region X and the Pacific Northwest Regional Health Sciences Library Service, based at the University of Washington in Seattle
RML	Regional Medical Library, begun in 1965; 11 regional medical libraries established for the biomedical information network
SAHLC	Seattle Area Hospital Libraries Consortium, established in 1976
union list	combined list of journal titles held by a group of cooperating libraries to facilitate resource sharing
WAMI	Washington, Alaska, Montana, Idaho
WMLA	Washington Medical Librarians Association, established in 1980
WLN	formerly Washington Library Network, established in 1975; a bibliographic utility