Transfer of new research findings into forms useful for and used by health practitioners is a major concern and is addressed by many different approaches within the biomedical and information science communities. Conventional bibliographic data bases and document dissemination services meet most information needs of the research scientist, but are generally inefficient transfer mechanisms for the busy practitioner who frequently lacks the time necessary to access the formal literature and the expertise necessary to adequately process the massive amount of information likely to be available on any given patient management problem.

Increasingly, computer based information systems of varying kinds are being brought to bear as potential extenders of the practitioner's ability to analyze, synthesize, and translate available biomedical information; and as decision making tools to aid the practitioner in the day-to-day diagnosis, prognosis, and treatment of illness.

In order to better serve the information needs of health practitioners, the Lister Hill National Center for Biomedical Communications, the R&D arm of the National Library of Medicine (NLM), has developed a prototype computerized information system in the form of a comprehensive bank of information. The general concept of an information bank for practitioners was first proposed by Bird, Schoolman, and Stengle and has come to be implemented through the combined efforts of an interdisciplinary research team headed by Lionel M. Bernstein, M.D., and comprised of physicians, information scientists, computer scientists, and communications engineers. As conceived, the system is intended to:

a) contain substantive answers to questions posed by practitioners;
b) provide answers that are current and are the consensus of a group of experts;
c) be immediately responsive to inquiries (reliable, ready access); and
d) provide data supporting the answers as well as bibliographic citations to primary publications for more detailed study if desired. The diseases viral hepatitis have been selected to serve as the initial test model and a data base (300 pages in length and containing 1.0 million characters) suitable for automated search and retrieval techniques has been constructed.

The purpose of this presentation is to describe progress in the development of this prototype information system, and to discuss the role of the intellectual organization of subject matter content relative to the computer support mechanisms for storage, retrieval and dissemination.

Literature Analysis and Synthesis

Knowledge pertaining to aspects of viral hepatitis important to the practitioner and/or academician has been synthesized using the information contained in approximately forty syntheses on the subject (review articles) previously published by hepatitis experts (source documents). The magnitude of the underlying literature reservoir is indicated by a MEDLINE search that yielded more than 16,000 postings during the past decade.

Data Base Organization

Information judged relevant for inclusion in the information bank has been selected, placed in a highly organized hierarchical arrangement to permit easy retrieval, and encoded into a mini-computer. The data base is arranged by topic headings. For each heading there is an accompanying heading statement which synthesizes the state of knowledge about the subject. Each heading and heading statement is supported by "data elements"--detailed paragraphs containing clinical and experimental research findings taken from previously published source documents. Citations included within the data element paragraphs are to the primary publications cited by the experts in their source document articles to back up their conclusions or general statements.

Hardware Configurations

Data base delivery is currently supported by the Data General Eclipse C/330 minicomputer, using the MUMPS/MIIS operating system and the Hewlett-Packard 2648A videographics display terminal. Data base maintenance includes the capabilities to update text, table, figure, and bibliographic data sets. A stand-alone microprocessor/floppy disc version of the delivery system is under development. This will permit local display and retrieval of information without the need for costly communications facilities or large centralized data center supporting activities. This approach is consistent with current industry movement toward distributed information systems.
Consensus by Experts

The contents of the hepatitis data base reflect a consensus of ten nationally recognized experts on the state of knowledge of the subject. "Consensus" means general agreement on the state of knowledge; there may be substantive agreement, support for two or more mutually exclusive positions, or indication that information in a given area is simply lacking. The same group of experts will maintain currency of the data base by monitoring selected newly published material; revisions of the text will be entered monthly.

Computer Conferencing Network

The Electronic Information Exchange System (EIES), an experimental computer conferencing network especially designed for use by scientific communities, serves as the principal medium of communication linking the geographically dispersed hepatitis experts with one another and with the staff of the NLM. It will facilitate consensus development on elements of the data base, and will permit modifications in an efficient and timely manner at the personal convenience of the experts. Developed and operated by the New Jersey Institute of Technology, EIES is supported by the National Science Foundation's Division of Information Science and Technology.

Modes of User Access

A variety of access modes and retrieval mechanisms are keyed to the differing information needs and work settings of individual health practitioners. Access to material contained in the information bank may be direct via personal computer terminal or through a trained intermediary using a toll-free, dial-access telephone number. Users also will have telephone access to frequently asked programmed questions and answers, or receive computer-generated printed material in hard copy or on microfiche, either in response to specific queries or as a complete authoritative document on current knowledge pertaining to a disease.

Testing and Evaluation

Following completion of the initial updating process, the information bank will be made available on an experimental basis to a variety of practitioners in primary, secondary, and tertiary health care settings. At such time, its utility for medical decision making and medical education can begin to be assessed under actual field conditions.

Efforts are now underway to expand this prototype information transfer system to include multiple disease entities, for the purpose of assessing the transferability of the methodologies developed thus far and to provide a critical mass sufficient for a meaningful summative evaluation of the system. Disease candidates judged most appropriate for inclusion are those in which research results are yielding a rapidly changing state of knowledge and in which there are associated high levels of morbidity, mortality, dollar costs, and frequency of patient contact.


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