

*Building on Success
Charting the Future of*

**Knowledge Management
Within the Academic
Health Center**




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AAHSL Charting the Future Task Force

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*"We must sail sometimes
with the wind and sometimes
against it, but we must sail and
not drift, nor lie anchor."*

Oliver Wendell Holmes, M.D.



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CONTENTS

Forward	1
Introduction	3
Knowledge Management in Clinic Practice	6
Knowledge Management in Education	8
Knowledge Management in Research	10
Knowledge Management for Community Service	12
Conclusion	14
Appendix 1: Library Partnerships within the AHC	15
Appendix 2: Professional Core Values	16
Appendix 3: References and Bibliography	18
Appendix 4: Challenge to Action Executive Summary	20

FORWARD

Consistent with its mission to provide leadership and guidance to the nation's academic health sciences libraries, the Association of Academic Health Sciences Libraries (AAHSL), part of the Association of American Medical Colleges and its Council of Academic Societies, sponsored a project to develop a vision of the future for libraries in academic health centers (AHC). AAHSL charged a task force with creating a vision of the future to assist member libraries in achieving leadership in a dramatically changing environment. This report is a successor to a 1987 report entitled Challenge to Action: Planning and Evaluation Guidelines for Academic Health Sciences Libraries. The 1987 report was focused on the environment and needs of member libraries and was intended as a practical guide and checklist at a time of intense change in technology and the health care environment. The sea changes in technology, most notably the proliferation of the Web, and the ongoing changes in the health care environment that have occurred since the 1987 report prompted this new report and its accompanying Web site highlighting important AHC library successes and suggesting additional roles and strategic collaboration for the 21st century. The title of this report, "Building on Success...", underscores the belief of the AHC library community that past success predicts future success.

Intended Audience

The intended audience for this report includes AHC leadership and key decision-makers. Leaders of the nation's premier health institutions need to be aware of the significant accomplishments and potential that their libraries possess and take advantage of the breadth of expertise available in knowledge management, information services, and collaboration.

A Value Based Approach to Envisioning the Future

Librarians are committed to being user-centric, service oriented, and highly collaborative, and they believe in the centrality of knowledge to all academic missions. The world is viewed through these filters and in the context of enduring professional core values, which are included in this report as Appendix 2.

How Should This Report be Used?

This report and its accompanying Web site are intended to sensitize decision-makers to the unique strategic and operational roles that the AHC library currently plays and could play in the future of ensuring the success of the institution. It is focused on the areas that can make a significant difference to the bottom line, to faculty and student recruitment and retention, to excellent patient care, to research competitiveness, and to community initiatives. The examples of success or suggestions for future collaborations are not comprehensive, but aimed at suggesting to AHC leadership the critical areas in which libraries and librarians provide the most value to the organization.

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INTRODUCTION

Academic health centers (AHC) committed to thriving in the 21st century must address powerful forces now shaping higher education, including demographic trends, the ongoing technological revolution, and economic developments. The Association of Academic Health Sciences Libraries (AAHSL) commissioned this report and its accompanying Web site to explicate the pivotal roles of the library and of knowledge management in ensuring the continued viability and excellence of the nation's premier health institutions.

The following four mission-oriented sections outline challenges, successful practices, and opportunities for partnership and collaboration to support the AHCs primary missions of clinical practice, education, research, and community service. Four appendices support the main body of the report.

The concept of knowledge management used in this report refers to the systems and processes used by libraries to acquire, organize, store, access, retrieve, teach, and disseminate knowledge and information in all formats – traditional and digital. The degree to which these processes and systems overlap and integrate with other disciplines, including information technology, instructional technology, and informatics, forms a nexus for collaboration for sustained quality improvement and excellence.

This report is intended for key decision-makers within the nation's AHCs. The accompanying Web site is designed for a community of collaborators, including librarians, information technology staff, informaticians, and other professionals, who conceive, build, and maintain the academic infrastructure supporting the education, clinical, research, and community service enterprise collectively referred to as an AHC.

BRINGING VALUE TO THE AHC LEADERSHIP TABLE

Knowledge transforms disciplines, processes, and entire institutions and is the key to successful AHCs. Academic libraries have sometimes been called the "heart of the university" because of the centrality of knowledge to the academic mission. The AHC library assumes the critical role of portal, through which scholarship in all formats is discovered and used, where collaboration and education take place, and where students, faculty, and staff can find the expert assistance of highly trained librarians.

THE LIBRARY AS AN "INSTITUTIONAL KNOWLEDGE COACH"

Making the best use of AHCs resources is an imperative in the knowledge age. This means focusing on the areas that can make a significant difference to the bottom line, to faculty and student recruitment and retention, to quality-ensured patient care, to research competitiveness, and to the never-ending quest for excellence throughout the AHC. The sections that follow describe what AHC libraries do best currently or could do in the future to support the four basic missions of the AHC. The examples are flexible and extensible to allow variations in AHC institutions and the libraries that support them.

THE CHALLENGES

Each of the four primary AHC missions has a set of challenges outlined in the sections that follow for which the AHC library can provide solutions. Two overarching challenges – competition and conserving scarce human attention – are singled out below because they affect all AHC primary missions. These challenges may not prompt AHC leadership automatically to look to the AHC library for solutions, but the AHC library provides a strategic advantage in addressing them through its focus on knowledge management and as an institutional knowledge coach committed to the success of the institution.

Competition

Staying competitive is demanding and expensive. Striving to remain or become a great academic institution is even more demanding and expensive. Competition for the best faculty and the best students is fierce. Funding a clinical environment that is high-tech, highly successful, and intensely human is extraordinarily expensive. Start-up costs to become a major player in the genomics/proteomics race are staggering. In a sense, AHCs are not only expected to be competitive, which they must be in a consumer-driven and inadequately funded world, but also are challenged to be the best, to lead the way in 21st-century academic medicine. The Institute of Medicine's recent reports, "To Err is Human" and "Crossing the Quality Chasm," are especially urgent reminders to AHCs to provide leadership and set knowledge and practice standards.

A recent publication from the Blue Ridge Academic Health Group speculates that the AHC is losing or has lost its hegemony in the creation of new knowledge and asks the following key question:

"When current medical knowledge is ubiquitous and medical technology widely diffused, what added value can AHCs bring to the patient and student experience?" (Blue Ridge Academic Health Group. Into the 21st Century: Academic Health Centers as Knowledge Leaders, 2000)

This question was posed in the context of intense and growing competition from industry in the creation of new knowledge, new technology, and new medical treatments.

The AHC library and effective knowledge management are crucial competitive assets to health care institutions undergoing massive change in the knowledge age. The sections that follow chronicle the knowledge management practices that are currently contributing or will in the future contribute the most to AHC competitiveness in the knowledge age.

Conserving Scarce Human Attention

The exponential growth in knowledge has resulted in increased specialization of traditional medical and scientific domains and created entirely new disciplines peculiar to the knowledge age, such as informatics and bioinformatics. The growth of knowledge has spawned the continuous "twigging" of the scholarly journals that now memorialize the advances of science into smaller and smaller domains. Physicians and scientists have responded to the flood of new knowledge by dividing themselves into progressively narrower specialty segments.

Technology has been a particularly effective tool for promotion of excellence through research and scholarship by libraries. Libraries have utilized technology to index and catalog the world's recorded knowledge in both traditional and online containers. The National Center for Biotechnology Information within the National Library of Medicine captures and stores the massive sequence and protein data output of countless laboratories around the world involved in genomic and proteomic research. AHC electronic medical record systems capture millions of images, clinical notes, and laboratory test data each year. Technology has proven to be an enabling and transformational tool for storage and retrieval of massive amounts of information and knowledge.

As important as technology is to storage and retrieval, the fact remains that the human attention span is finite and relatively short. The following remark summarizes the problem:

“Today, the improvement of organizations and the information systems in them is not a matter of making more information available, but of conserving scarce human attention so that it can focus on the information that is most important and most relevant to the decisions that have to be made...Information isn't the scarce resource; human time and attention is the scarce resource.” (Simon, 1997)

This report includes examples of current and planned projects that will extend and magnify the limited human attention span through the provision of library services and effective knowledge management by a collaboration of AHC campus colleagues.

FOCUSING ON WHAT LIBRARIES DO BEST

Making the best use of AHC's resources is an imperative in the knowledge age. This imperative includes focus on the areas that can make a significant difference to the bottom line, to faculty and student recruitment and retention, to quality-ensured patient care, to research competitiveness, and the never-ending quest for excellence throughout. The sections that follow document what AHC libraries do best currently or could do in the future. The examples are flexible and extensible to allow variations in AHC institutions and the libraries that support them.

KNOWLEDGE MANAGEMENT IN CLINICAL PRACTICE

CHALLENGES

The Institute of Medicine's reports, "To Err is Human: Building a Safer Health System" (1999) and "Crossing the Quality Chasm: A New Health System for the 21st Century" (2001), refocused the attention of academic medicine on improvements in the systems supporting clinical practice. AHC library services, systems, and collections have always been an essential ingredient in the provision of the best possible patient care through support for knowledge- and evidence-based decision-making. Evidence has always been collected, organized, retrieved, and disseminated by the AHC library, but not always used most effectively in the hospital and clinic services that determine the performance and competitiveness of the institution.

With vast amounts of information and knowledge widely available for clinical decision-making, how can the best evidence be efficiently identified and promoted for patient care excellence and safety? The answer lies in various institutional collaborations, especially those involving the library and knowledge management systems and services. Knowledge management tools, expert search assistance, expert end-user instruction, and the availability of significant online content at the desktop or examining room have the potential of moving the evidence from the network or library to where it can have the biggest impact on patient care outcomes.

KNOWLEDGE MANAGEMENT SUCCESSFUL PRACTICES

AHC libraries build their institutions' primary academic knowledge repositories in the form of access to licensed Internet-based collections, institutional digital repositories, and traditional resources. The focus is now on digital collections and curricula. AHC libraries are also helping to build the technological infrastructure that supports access and delivery of digital information, including proprietary bibliographic retrieval systems, electronic course reserve systems, image management systems, and instructional management systems for e-curricula. Services provided by highly trained library staff -- expert literature research, document delivery and interlibrary loan, end-user online training, outreach and consulting services, and evidence-based medicine training -- distinguish most AHC libraries as superb contributors and collaborators supporting the mission of the AHC amidst astonishing and rapid modern medicine advances. Their commitment contributes to the efficient and effective transformation of knowledge into the best medical care available.

OPPORTUNITIES AND PARTNERSHIPS IN THE CLINICAL SETTING

In the clinical setting, knowledge- and evidence-based decision-making is most critical in a number of high-impact areas. These are the areas where library solutions to the challenges of competition, conserving scarce human attention, and using the expertise and knowledge systems of AHC library as an institutional knowledge coach can pay real dividends. These are the areas where the expertise of the library staff and utilization of the knowledge systems they create can make both a competitive difference and influence performance outcomes such as the financial bottom line, error-free practice, and faculty and student recruitment, satisfaction, and retention.

The high-impact areas include complex and unusual clinical cases, institutional patient safety including IRB support, support of legal depositions, key business decisions, literature research for grants and scholarship, practice guideline development, and evidence-based interfaces to the electronic medical record.

For example:

- **Complex and Unusual Clinical Cases:** The increasing necessity to expedite medical decisions in the complex cases seen in AHCs requires appropriate evidence to be available immediately. AHC libraries have historically provided "clinical librarian" services, where a librarian is assigned to a health care team to select and deliver the most appropriate literature pertaining to the case. An extension of such programs is the development of a new specialty -- the "informationist," a

specialist capable of directly participating on a clinical or research team as the literature and retrieval expert. These specialists not only are located with the care team to provide appropriate literature for decision-making but also participate in teaching, filtering, and evaluating the literature, as well as creating specialty knowledge databases for the care team.

- **Practice Guideline Development:** Collaboration between the library and the practice guideline team can improve the efficiency of discovery and delivery of relevant documents pertinent to the guideline under development. Library expertise in literature research and evidence-based medicine come into play here. Collaboration may involve placement of a librarian on the team or using the expert literature search services of the library to discover and filter relevant knowledge for the team. The library staff may be asked to build a database for quick retrieval and easy reference of the relevant knowledge pertinent to the guideline, including links to licensed e-resources. If the team prefers a self-service approach, the library can provide expert assistance and training as needed.
- **Evidence-Based Interfaces to the Electronic Medical Record (EMR):** Developing a unique practice brand or managing the quality-ensured delivery of service in a practice area may involve development of electronic links and interfaces between the medical literature and the institutional EMR systems. The interfaces need to be evidence-based and supported by the best knowledge available. This opportunity for collaboration among library services, knowledge management systems, and consultation can create a viable system that effectively uses the resources already provided by the institution.

Other examples are listed in the Appendix I of this report.

OUTCOMES

Many recent federal and foundation reports have echoed the Institute of Medicine's call for safe, effective, patient-centered, timely, efficient, and equitable care. If AHCs are to bring this vision into reality within the confines of an environment of competition, fiscal restraints, and scarce human attention, the full participation of the library as an "institutional knowledge coach" will ensure that the institution's investment in knowledge resources and expertise will be applied to the goals of the clinical mission. The library, as a partner, will help to ensure that the AHC's clinical care is timely, safe, and effective with the addition of literature expertise to the health care team, and with the creative use of information technologies to provide links to best evidence from the electronic medical record. Every AHC library is a cost center, rather than a revenue center. Its positive effects on the bottom line are always recorded as indirect in financial reports, but they can be significant on case outcomes when a culture of lifelong learning and the use of knowledge is part of the fabric of the AHC.

KNOWLEDGE MANAGEMENT IN EDUCATION

CHALLENGES

The Health Professions Education Summit held in June of 2002 was in direct response to a recommendation in the Institute of Medicine's "Crossing the Quality Chasm" report. At this meeting, a cross-section of health educators from a large variety of disciplines gathered to propose strategies and actions that could be used to guarantee that their students and professionals would attain competency in five recommended areas. By guaranteeing competency in these areas, the Institute of Medicine committee felt that the future workforce would be able to change the entire health care system to reflect the quality objectives of the report: safety, effectiveness, patient-centeredness, timeliness, efficiency, and quality. The five areas discussed by the summit participants were synthesized into a vision that proposes

"All health professionals should be educated to deliver patient-centered care as members of an interdisciplinary team, emphasizing evidence-based practice, quality improvement approaches and informatics." (Institute of Medicine, Health Professions Education Summit, 2002)

Two areas of concern pertain to teaching the competencies for effective retrieval and critical use of health sciences literature: evidence-based practice and use of informatics. To use evidence-based practice, health professionals must be lifelong learners. The report found that, although many medical schools are making an effort to teach skills related to evidence-based medicine, more than a quarter of their graduates feel unprepared to interpret clinical data, research, and literature reviews. In addition, faculties are not trained in these skills. While the report acknowledged that medical students feel competent searching the Internet and that the Association of American Medical Colleges has identified a set of core competencies for informatics, it also stated a concern that other health professions have even less experience in teaching these skills directly. In either case, the fundamental issue of assessing competencies remains to be addressed.

Summit attendees identified barriers for success in accomplishing the educational aims for informatics: lack of a clear understanding of informatics as a discipline, limited support for informatics education among administrators and faculty, the overcrowded curriculum, and lack of faculty time to develop skills. The barriers to teaching evidence-based medicine include the need for development of replicable teaching methods and their translation into practice and a misunderstanding of the concepts and definition of evidence-based medicine.

KNOWLEDGE MANAGEMENT SUCCESSFUL PRACTICES

Teaching the use of the health sciences literature and basic information retrieval skills has been an accepted part of the academic health sciences librarian's charge since the early 1980s. The first national benchmark report on teaching activities in medical libraries occurred in 1986/87 (Association of Academic Health Sciences Library Directors, 1986/87). The mean number of educational programs presented during that annual reporting time frame (exclusive of orientations that were counted separately) was 46, and the average attendance was 407. The 2001/02 mean values for educational programs and attendees increased dramatically, nearly fourfold, to 161 sessions and 1653 attendees. These courses represent basic instruction in searching the specialized literature of each of the health professions, as well as the use of the MEDLINE database. In addition, many librarians offer courses in using evidence-based medicine resources, converting a patient-problem to an appropriate information query or learning question, appropriate use and understanding of the drug literature, and, often, basic facility with computers and the Internet. There has been a recent upward trend toward more clinical librarian teaching experiences where librarians accompany the interdisciplinary health care team in conference or on rounds to demonstrate and suggest appropriate resources for case-based teaching.

OPPORTUNITIES FOR PARTNERSHIPS IN HEALTH PROFESSIONS EDUCATION

Although AHC libraries are committed to offering in-depth instructional programs, the library profession is struggling with the same issues featured in the “Bridging the Quality Chasm” report: difficulties in assessment of competency, lack of good role-modeling by faculty and practitioners who have not been trained in these skills, and problems in proving the efficacy of such knowledge in clinical practice. To move beyond the anecdotal reporting of isolated successes in dealing with the above problems, the library community recognizes the power of partnerships with other professions in designing and evaluating projects that would develop assessment of success and a set of best practices that could be implemented easily anywhere. AHC libraries are charged with serving each of the health professions schools, thus librarians think in terms of cross-disciplinary core competencies and working with students, residents, and faculty.

For example:

- **Student Instruction:** Many AHC libraries participate in problem-based learning curricula through the small group learning and knowledge discovery process. Librarians serve as tutors and provide instruction in the use of evidence-based and factual information for case-based problem solving and individual learning.
- **Curriculum Development and Support:** As more curricula become digitized and available online, librarians are working with faculty, using their knowledge management skills to develop a role in creation of efficient user interfaces and preserving the curriculum content for future use through development of indexing schemes, metatagging, and knowledge databases.
- **Competency-based Curriculum:** Librarians, in partnership with medical educators, are developing appropriate competency-based curricula for information skills that include informatics as well as evidence-based information use. These clear competency assessments can be used by residents, faculty, and other health professionals to determine self-proficiency for those skills they were never taught.

Other examples are listed in the Appendix I of this report.

OUTCOMES

There is a growing national concern, as presented in several of the reports on the future of AHCs, that the health care team of the future is not prepared to practice quality-based medicine as described in “Crossing the Quality Chasm.” Librarians have as their knowledge domain the literature of the health sciences from an organizational and applied view. They have been experts for years on how to rapidly find the best evidence for a particular clinical or research problem, and they teach basic informatics skills. Now that evidence-based medicine has been codified into a concept and model of practice, they are rapidly adopting these principles as a way of training future health care providers to practice medicine for a lifetime. Partnering with librarians to organize these skills for integration in the curriculum will place the AHC in a strong position for curriculum change. A happy by-product of this effort will be an earlier adoption of these skills within clinics and hospitals by faculty, residents, and other practicing health care professionals.

In addition, the library’s success in providing remote access to Internet-based knowledge resources easily supports the increasing trend toward off-campus instruction and ensures equitable educational environments. Libraries can partner with the teaching faculty in off-campus sites to ensure faculty is well trained in using these resources.

Even more importantly for the national health care system, achievement of the vision of a quality-based health care system will happen more naturally and sooner with librarians and medical educators working in research partnerships to determine the best practices for learning, teaching, and evaluating these skills.

KNOWLEDGE MANAGEMENT IN RESEARCH

CHALLENGES

“Universities are a collection of brilliant people but not examples of collective brilliance. Because there is little information flow, the university is not intelligent as a whole.” (Blue Ridge Academic Health Group. Into the 21st Century: Academic Health Centers as Knowledge Leaders, 2000)

Basic science departments in most academic health centers are in the midst of transformational understanding of the biology of living organisms. Molecular and cellular advances are changing the nature of “disciplines” as they have been constructed over time. Laboratories are increasingly dependent on computational tools and methods. Departmental boundaries are becoming less important as collaboration begins to bring research and knowledge into cross-disciplinary enterprises and laboratories.

The National Research Council notes, “Biomedical researchers require increasingly sophisticated capabilities (i.e. access to expertise in biomedical computer applications) to analyze complex molecular structures and link them to relevant clinical information. Current laws and policies aimed at protecting intellectual property are outmoded...”. (National Research Council. Networking Health: Prescriptions for the Internet. National Academy Press, 2000)

The independent nature of research and the disparate need for specific computational tools have led to uneven access to bioinformatics tools in most academic medical centers. Data generated through the research process is independently “managed” through publication including postings on Web sites, additions to national databases, or storage on department computers or central file servers. There is rarely a framework for the overall management, archiving, and shared use of data derived from independent experiments.

The “Next Generation IAIMS” report commissioned by the Association of American Medical Colleges and the National Library of Medicine highlights parallel problems. “Organizations wishing to maximize the competitiveness and effectiveness of these biomedical researchers will need to confront a variety of issues including:

- The lack of infrastructure for archiving lab notebooks and data appendices
- Underdeveloped methods for integrating local data resources with those outside the institution
- The need for automating methods of linking genomic and other modular data to be de-identified as protected health information
- The lack of educational infrastructure for faculty and staff to rapidly adopt new research methods.”

Clinical research raises parallel problems with integration of knowledge-based resources, basic science research, and clinical data sets.

KNOWLEDGE MANAGEMENT SUCCESSFUL PRACTICES

Addressing the panoply of knowledge-based issues that the new science has generated is a relatively new undertaking of the AHC library. The literature is just beginning to reflect a growing interest in this area, driven in part by the National Library of Medicine’s efforts to link genomic information directly to the published record of scholarship. As knowledge-based research tools increasingly intertwine with bench tools, and as methods of authenticating users for appropriate use becomes increasingly commonplace, AHC libraries are using their expertise in purchasing large information sets to license bench tools for the broad community of basic scientists within the university. These efforts provide cost-effective means of providing common access to tools across the collaborative, a clear advantage, particularly for researchers who may have occasional need but who would not have licensed expensive resources independently.

A growing number of libraries are starting to look at their role in facilitating the management of data sets from bench research. D-Space, a new initiative at MIT, attempts to create a digital repository for information across the academy. Others look at managing specific types of data (such as confocal microscopy images), making those images retrievable to the “owner” and to others in the community who would benefit from access and creating standards for organization, retention, and access to such data for the benefit of the global scholarly community.

OPPORTUNITIES FOR PARTNERSHIPS IN RESEARCH

The service mission, penchant for collaboration, and passion for knowledge of AHC libraries can bring a different focus to the research knowledge management tasks ahead. Librarians are the natural collaborators in issues involving information and knowledge management. Their participation in decision making forums dealing with building institutional frameworks and delivering services around the information problems of the new era of scientific research will reap benefits for the entire organization.

For example:

- **Licensing Research Databases:** AHC libraries have a very long successful record of providing shared access to information resources in electronic formats through effective contract negotiations, licensing, and intranet access. Parallel models should be explored for licensing and training for computer-based research tools such as GCG, LaserGene, and BLAST. Providing unified Web portals to both knowledge-based resources and bench tools maximizes the investment for the entire institution.
- **Research Data Repositories:** Similarly, the library’s long involvement in managing knowledge-based resources through the development of scholarly databases of online indexes and catalogs translates easily into providing pivotal collaboration and developing new thinking regarding the management of data sets both locally and globally.
- **Intellectual Property Management:** The AHC library’s extensive experience with licensing, copyright, and related laws provides a strong base for collaboration with the scientific community on new standards and methods for securing appropriate local or cooperative publishing rights for data associated with university sponsored research.

Other examples are listed in the Appendix I of this report.

OUTCOMES

The examples cited above are new frontiers for many institutions. With libraries as participants in managing the online research databases as a shared resource available to all, the institution’s ability to attract and retain the best faculty and students increases. Maximizing these investments contributes to the financial health of the institutions. Applying knowledge-based and computational solutions to the management of data is a rich opportunity for federal funding as science grapples with the enormous amount of data and analysis of that data required for new discovery. Bringing existing library expertise to the table to help solve the information problems of scientific discovery will strengthen the institution’s competitive edge.

KNOWLEDGE MANAGEMENT FOR COMMUNITY SERVICE

CHALLENGES

“The overriding purpose of academic health centers is to improve the health and health care of their communities and of the larger society in which they reside.”
(The Commonwealth Fund. Task Force on Academic Health Centers. Envisioning the Future of Academic Health Centers, February 2003)

Community service goals for academic health centers intend to create patient-centered “continuous healing relationships” with affiliated health care professionals and consumers/patients. A challenge in the transformation to a more patient-centered medicine and promotion of community service goals is maintenance of the economic viability of the AHC, often through consolidation of independent practitioners and smaller hospitals and clinics into integrated networks.

The explosive growth of health information and its increasing accessibility on the Internet create a dilemma for health care professionals and patients/consumers. Most health care consumers now find their health information primarily on the Internet, yet expect their physician to interpret it and help judge its value and thus allow them to knowledgeably participate in their personal health care decisions. The ability to rapidly find quality patient/consumer information tailored to a wide range of cultural, education, and language needs challenges both patients and their time-constrained physicians.

The AHC library can contribute to AHC community service goals and the reality of Internet medicine through the creation of information portals and library services that serve to positively bind constituencies of the larger health community together and underscore the commitment of the AHC to the health care of their community.

KNOWLEDGE MANAGEMENT SUCCESSFUL PRACTICES

AHC libraries have long maintained a wide range of digital library services available to the community. The skills used to organize the complex sets of library resources and services for health care professionals also can be applied to the development of unique patient-centered health information sites. An example is the National Library of Medicine’s MedlinePlus consumer health Web site, the nation’s premier source for discovering authoritative consumer health information.

AHC libraries have created extensive information portals offering remote access through skillful use of authentication technologies. Demand for use of library resources from off-campus users is second only to e-mail in most institutions. These successes lay the groundwork for even more creative uses of information to enhance AHC community service goals.

OPPORTUNITIES FOR PARTNERSHIP IN COMMUNITY SERVICE

More than thirty years of experience with regional networks sponsored by federal, state, and local agencies and extensive involvement in cooperative interlibrary programs have given librarians valuable experience in the development and sustenance of inter-institutional cooperative programs and networks.

For example:

- **AHC Web Site for Consumers:** Many health libraries develop consumer health and patient library services and collections (traditional and digital) that are integrated into the services of the institution. AHC libraries can link to local information resources and connect users of the AHC public portal to specialty services, local clinical trials, and physician referral information available at the

AHC. Resource selection skills and knowledge of the ways that patients request health information can greatly assist AHC agencies responsible for an AHC-sponsored consumer health Web site.

- **Community Outreach Projects:** The National Library of Medicine and state and local agencies encourage librarians to develop outreach services for cooperative training of staff in public libraries. These community libraries provide consumer and health information through their local library systems and to refer questions to AHC libraries for backup expertise when necessary. Sponsorship of such programs by the AHC is an important branded public service that exhibits the institution's concern for its community mission.
- **Affiliated Health Professional Information Services:** With the availability of electronic full-text resources and search services, valuable health information can now be made available instantly to a practitioner located outside the AHC physical campus. Institutions can provide a high-quality information portal to its affiliated providers will help to ensure a continuing relationship for patient referrals. AHC librarians are knowledgeable about the networking technologies and the business contractual requirements and arrangements that can provide these services. Indeed, some state-funded AHC libraries have developed statewide health information networks for physicians and nurses in practice.

Other examples are listed in Appendix I of this report.

OUTCOMES

The library has always been valued as a neutral, service-oriented organization that exists for the common welfare of the community. As such, the library is an ideal partner in developing community-based programs and networks. Working in partnership with the AHC executives responsible for community and patient services, the library, in its role as institutional knowledge coach, can create a series of services and programs that enhance institutional goals and objectives. Health information is an attractive commodity for both off-campus health practitioners, current patients, and prospective patients. Since these programs offer needed services, they are seen as positive contributions to the community rather than marketing ploys, yet they will provide a solid underpinning for that integrated network approach to more viable health care delivery systems.

CONCLUSION

The AHC library strives for sustainable quality improvement for health by enhancing the interaction of information and people to create knowledge. This knowledge is the organization's intellectual capital, an asset that enhances the AHC's capabilities, strengthens relationships with health care players, and adds value to the health care world. AHC libraries cooperate and collaborate with individuals and departments throughout the AHC and with individuals and organizations outside the institution to identify, capture, gather, manage, present, and organize information and data. These functions are critical to the well-being of an AHC operating within the dynamic health care environment.

The health sciences library profession is based on a set of fundamental shared values that, in total, drive AHC librarians to a mission-oriented management philosophy. On the basis of these values and using traditional knowledge resource selection skills, responsible fiscal management, client-centered service, and design of networks and management systems for ease of use, librarians can become valued partners of the management, teaching, patient care, and research teams that make up the AHC. Librarians fully recognize the economic pressures inherent in competition and the extreme scarcity of human time and effort. Yet, if our institutions are to remain the nation's premier health care institutions and provide leadership in creating a new health care system for the 21st century as uniformly defined in recent federal and foundation reports, they must wisely use every resource at their disposal. This report demonstrates how libraries, as the institutional knowledge coach, can help:

- maximize use of information management expenditures;
- attract and retain the best faculty and students;
- increase the competitive edge in research;
- train and equip future and current practitioners in the use of best-practice, evidence-based knowledge; and,
- ensure knowledge availability through technology for use whenever and wherever patient care is required.

The appendices briefly present more examples of creative library partnership experiences and possibilities, the list of core values that inspire our profession, a bibliography of the reports and works that informed this report, and the executive summary of Challenge to Action, a set of AHC library guidelines published in 1987.

A Web site at <http://www/aaahsl.org> interactively elaborates on the concepts presented here and is intended to be the basis for continuing discussion among the community of collaborators envisioned in this report.

APPENDIX 1: LIBRARY PARTNERSHIPS WITHIN THE AHC

This appendix contains additional examples of effective partnerships and contributions of the AHC library to the success of the institution.

A. Clinical Practice

- **Clinical Information Toolkits:** Working with residents and training program directors, librarians have developed quality filtered Web-based clinical practice toolkits to encourage immediate and efficient use of the most appropriate evidence-based and quality filtered information resource tools for patient care in the hospital.
- **PDA's:** Mobile personal digital assistants (PDAs) have been adapted readily for use in the hospital by residents and students as well as attending physicians. AHC libraries have created PDA Web sites to facilitate use of the best sites for quality care, rather than those that are free or marketed heavily by for profit organizations. AHC libraries have begun providing "syncing stations" where clients temporarily in the hospital or otherwise away from their desktop support can download and upload current resource information, e-mail, and other timely information on the fly.
- **Legal Depositions:** Depositions are a fact of life at every AHC and should be supported with expert literature research from the AHC library. Firms supporting plaintiffs against the AHC will undoubtedly have had the benefit of such a service.
- **Key Business Decisions:** Knowledge management brings use of the peer reviewed literature and results of government and foundation studies to bear on strategic planning initiatives; health care economics and financial projections and trends; program development, and evaluation. Strategic administrative decisions will benefit from librarian research assistance to quickly find and provide the key reports that will facilitate informed decision making in financial, personnel, and business areas.

B. Education

- **Computer-Based Education Support:** Many AHC libraries are responsible for purchasing and providing technical support for faculty using commercially available interactive course support systems, such as CBT or Blackboard, over the Internet. This includes faculty and student training as well as administration of accounts. AHC libraries are also supporting digital multimedia repositories for teaching and learning.
- **Digital Instruction Centers:** Building on the tradition of providing and developing curriculum support software in audiovisual laboratories, libraries are developing digital instruction centers where new technologies for education can be seen and tried by faculty interested developing more interactive, visual, and engaging course experiences.
- **Digital Curriculum Libraries:** Librarians working with faculty and professional educators have received significant grant funding to apply tools developed for digital library projects to index curriculum support images and curricular modules and to develop techniques for sharing these items with other medical schools nationally and beyond.

C. Research

- **Institutional Review Board Support:** The death of a health volunteer at a major AHC was a wake-up call to IRB directors to become more familiar with the processes of expert literature research and to consider involving the AHC library through collaboration. Adding an extra measure of insurance in the form of library expertise or routine use of knowledge-based systems to the work of the IRB may reduce the institutional risk and exposure of conducting clinical research.

- **Molecular Biology Informatics:** AHC libraries are now adding staff positions for Ph.D. trained molecular biologists who provide reference support and training to biomedical researchers using the plethora of new databases and related tools for genomic and proteomic research.
- **Ethics and Publishing:** Librarians participate in required responsible conduct of research courses to inform the scholarly community about intellectual property issues and institutional copyright compliance; publication requirements of both journals and granting agencies; ethical authorship, and emerging issues in the realm of scholarly communication.
- **Animal Research Compliance:** Librarians have teamed with the local institutional animal care and use committees to help ensure institutional and investigator compliance through comprehensive information retrieval for animal based funding requests, and creation of Web sites on library portals to educate investigators about animal alternatives. The University of California Center for Animal Alternatives is an excellent example of this type of collaboration.
- **Interdisciplinary Initiatives:** AHC libraries are neutral ground that are eminently suitable for creating new collaborative learning and research environments that are highly multidisciplinary like bioinformatics. Space for sharing access to expensive research tools, training and consultation, as well as access to the expertise of highly skilled library information specialists can help forge new collaborations among scientists in varied disciplines.

D. Community Service

- **Consumer Health Portals:** Expanding access to health information for the patient/consumer as patients and their families become better informed about their health has become a mandate for many AHC libraries. Bringing quality health information to consumers matched to their language, literacy level, etc. through information portals and community and institutional marketing efforts is becoming a health sciences librarianship specialty. NetWellness, an award winning Ohio-wide consumer health information portal and training program, was developed by the medical library at the University of Cincinnati is an example of a consumer health portal. It is an outstanding example of many local and regional community-based web projects that AHC librarians have established.
- **Minority Community Health Programs:** AHC libraries at Tufts, Houston Academy of Medicine/Texas Medical Center, and New York University have created Web sites in Asian languages for both disease prevention programs and patient instruction use that can facilitate communication between English speaking health care providers and their Asian patients. AHC librarians are involved in a variety of local community-based health and wellness programs aimed at target groups.
- **Minority and High Risk Programs:** Health awareness among K-12 students has been encouraged by library partnerships with AHC and university minority education and recruitment programs. Libraries provide information searching and library-use training and also work with students on development of research papers and web sites.

APPENDIX 2: PROFESSIONAL CORE VALUES

All professions have values that inform and provide the guideposts for present as well as future activities. The enduring values that guide AHC libraries are also a reminder that the future is an extension of the past. While the profession will use new technologies in the future and world views and practices may change, enduring values will continue to inform and guide our actions.

The core values found below were informed by the Medical Library Association "Code of Ethics" (Medical Library Association, 1993) and were adapted and augmented for this publication from "Our Enduring Values: Librarianship in the 21st Century" (Gorman, American Library Association, 2000).

1. Timeliness

- Working to ensure that information is received in the most timely manner possible

2. Accuracy

- Developing standards and procedures that emphasize the accuracy of resources made available for patient care and biomedical research
- Highlighting peer reviewed knowledge

3. Creation of New Knowledge

- Unleashing the creativity of our users for the creation of new knowledge
- Supporting the purpose of the academy in teaching and discovery

4. Commitment to Improving the Quality of Health and Health Care

5. Library as Place

- Valuing the library as a cultural center within the academic health science community
- Preserving the serendipity of discovery among the library's resources through browsing and people-to-people interaction

6. Collaboration

- Providing access to the world's biomedical information via formal and informal collaboration between and among health science libraries and librarians
- Maintaining close esprit with colleagues in the profession for optimum growth and development of individual librarians and academic health science librarianship

7. Stewardship and Preserving the Human Record

- Caring for and nurturing the profession of librarianship
- Being good stewards to earn the respect of our communities

8. Service

- Ensuring that our policies and procedures are animated by the ethic of service to individuals, communities, and posterity
- Evaluating all policies and procedures using service as a criterion

9. Intellectual Freedom

- Commitment to the idea that all people in a free society should be able to read and see whatever they want to see
- Defending the intellectual freedom of all members of our community
- Defending the free expression of minority opinion
- Making the library's facilities and programs accessible to all

10. Rationalism

- Organizing and managing library services in a rational manner
- Applying rationalism and the scientific method to all library programs

11. Literacy and Learning

- Encouraging literacy and the love of learning
- Encouraging lifelong sustained reading
- Making the library a focus of literacy teaching

12. Equality of Access to Recorded Knowledge and Information

- Ensuring that all library resources and programs are accessible to all
- Overcoming technology and monetary barriers to access

13. Privacy

- Ensuring the confidentiality of records of library use
- Overcoming the technological invasions of library use

14. Democracy

- Playing our part in maintaining the values of a democratic society
- Participating in the educational process to ensure the educated citizenry that is vital to democracy
- Employing democracy in library management
- Respecting all users equally

APPENDIX 3: REFERENCES AND BIBLIOGRAPHY

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APPENDIX 4: CHALLENGE TO ACTION EXECUTIVE SUMMARY

The project to develop guidelines, sponsored by two national professional organizations (Medical Library Association and Association of Academic Health Sciences Library Directors), was funded by the National Library of Medicine and the Council on Library Resources. This publication, offering a framework for strategic planning and self-evaluation, is expected to become a standard work in academic health sciences library management in academic institutions as well as national accreditation bodies and other agencies.

The report emphasizes the importance of coordinating institutional planning and development efforts in the area of information management for effective and economical operation, and demonstrates the library's unique position for playing a vital role in this effort within the academic health sciences center. The report, therefore, calls for full library participation in these endeavors.

The document discusses new partnership roles for the library with other units in the institution, projects the development of institutional resources, and describes how the library's information management resources and skills can contribute to the institution's mission in research, education, patient care, and community service. Specific topics on "Management," "Information," "Technological Advances," "Educational Changes," and "Financial Constraints" address the issues involved, state implications for the institution, and actions to be taken by the library. Guidelines toward strategic planning relating to each of these topics address new roles and responsibilities of the library, and make recommendations for achieving these. Major points can be summarized as follows:

- The institution's strategic planning activities for the management of academic information resources and activities must include senior library management, as a full partner with other units in the institution.
- The library and the computer center should participate in management and planning efforts toward coordinating the acquisition and use of the institution's computer and communications resources for academic information management.
- The institution needs to recognize the growing necessity for technological support to strengthen the library's capabilities as an academic information services center.
- The library should be instrumental in the institution's plan to integrate computing and non-print learning resources into the curriculum; it also must assume a broader role in assisting students, faculty, and practitioners to master basic skills in information handling.
- The library can offer substantial support to researchers by using new technologies to organize, synthesize, and filter scholarly information.
- The library can contribute to patient care cost containment efforts by providing rapid access to information at such critical points of need as the laboratory, office, or patient's bedside.
- The library, with a tradition of outreach and community service, is a ready-made partner to strengthen community ties of the academic health sciences center through its information support services to community agencies and consumers.

The report examines cost implications to the institution in the proliferation of uncoordinated equipment and the purchase or creation of duplicate databases. The cost of information needed for access to patient care, education, research or community service must be charged to the user, the general institutional budget, tuition, or indirect revenue. The library is in a unique position to help the academic health sciences center determine its information costs, and establish allocation policies.

Awareness of new types of information services, combined with cost-reduction methods such as networking, resource sharing, and fee-for-service, will enable each institution to improve its financial management and accountability for information services. The question of who is to pay for information and services needs to be addressed as does the potential emergence of two societies within the same institution—those who can afford the fees for information use and those who cannot. Policy statements reflecting the institution's position on information, and on its duty to provide for access to information fundamental to its mission must become a priority for the academic enterprise.

A final list of needed actions highlights those factors most critical to fulfilling the vision of the guidelines. Some of these actions can be accomplished by the academic health sciences centers and its library. Others relating to research, education, and accreditation issues need to be carried out by outside organizations and agencies both at the state and national level.

(Challenge to action: planning and evaluation guidelines for academic health sciences libraries. Chicago, IL: Association of Academic Health Sciences Library Directors and Medical Library Association, 1987.)