
AHEC library services: from circuit rider to virtual librarian

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The North Carolina Area Health Education Centers Library and Information Services (NC AHEC LIS) Network provides library outreach services to rural health care providers in all nine AHEC regions of North Carolina. Over the last twenty-five years, the AHEC and university-based librarians have collaborated to create a model program for support of community-based clinical education and information access for rural health care providers. Through several collaborative projects, they have supported Internet access for rural health clinics. The NC AHEC Digital Library—under development by NC AHEC, University of North Carolina at Chapel Hill, Duke University, East Carolina University, and Wake Forest University—will further extend access to electronic biomedical information and resources to health professionals in a statewide digital library.

INTRODUCTION

Over the last ten years the North Carolina Area Health Education Center's (NC AHEC's) library outreach program has changed with the times. While ten years ago, the NC AHEC Library and Information Services (NC AHEC LIS) Network emphasized forming cooperative library networks with rural hospitals through consultation services and circuit rider library programs, today its emphasis has shifted toward creating virtual libraries delivering core resources and services to the health care provider's desktop.

The ability to make this change in emphasis can be credited to NC AHEC's commitment to library services, which dates back to the program's inception in 1972. The NC AHEC Program is administratively located in the School of Medicine, University of North Carolina at Chapel Hill (UNC-CH). The program's base budget is part of the state funding for the University of North Carolina. Continuous state funding for the library program, along with significant local funding, has contributed to building a dynamic library network that remains essential to NC AHEC's core mission, which is to improve the quality and distribution of health care in rural and underserved areas. In addition to state funding, NC AHEC librarians have been successful in acquiring foundation funds to develop new services, which have positioned the NC AHEC LIS Network to construct the AHEC Digital Library and Resource System.

The partnership between the NC AHEC Program and North Carolina's university health sciences schools has influenced the library's response to changes in health sciences education and the health care workforce. In the mid-1990s, with concerns rising nationally about the shortage of primary care providers, the NC AHEC Program received a mandate from the North Carolina General Assembly to institute measures to address these shortages. Working in collaboration with the state's four medical schools (UNC-CH, Duke University, East Carolina University, and Wake Forest University), NC AHEC established several programs to encourage more medical students to enter primary care fields of medicine.

In an attempt to make rural medical practice more appealing to students, the four medical schools revised their curricula to increase community-based education [1]. NC AHEC established the Office of Regional Primary Care Education (ORPCE) in each of the nine NC AHEC centers (Area L, Charlotte, Coastal, Eastern, Greensboro, Mountain, Northwest, Southern Regional, and Wake). Each ORPCE recruits preceptors and oversees the placement of students with preceptors in community sites. At present, more than 1,800 primary care practitioners across North Carolina serve as preceptors to train 2,295 primary care health sciences students per year. At UNC-CH, these community rotations provide 40% of the clinical education for medical students.

The NC AHEC's mission to provide continuing education for rural health care providers, and the aca-

demographic emphasis on education by community-based clinicians provide an ideal overlap of interest between the NC AHEC librarians and the university health sciences librarians. Access to current biomedical information and a good working relationship with university colleagues are key elements to providing quality education in a rural location. These same elements are important for NC AHEC to support life-long learning for health professionals. The collaboration of AHEC and universities has helped the librarians to identify common constituencies and strengthened the collaboration between NC AHEC and university librarians.

With the advent of the Web, which provides the ability to bring patient care information to the desktop of the health care provider even in a rural location, librarians are able to facilitate remote access to digital libraries. However, in North Carolina, Internet access from homes and communities is below the national average. According to a recent U.S. Department of Commerce report [2], the state ranks forty-sixth in number of households dialing the Internet from home. Only 19.9% of North Carolina households connect to the Internet versus 26.2% nationwide. Internet access is a more severe problem in rural areas where 52% of North Carolina's population lives. According to a report in the *Greensboro News and Record*, "Regardless of income level, Americans living in rural areas are falling behind in Internet access and home computer use People living in urban regions, such as the Charlotte area, the Triad, and the Research Triangle area, are twice as likely to have Internet access than those living in rural areas" [3].

NC AHEC began promoting Internet access to its statewide staff ten years ago when the University of North Carolina's Internet license was extended to include all faculty, staff, and clinicians employed by the NC AHEC Program. Network routers and terminal servers installed at all nine NC AHEC centers provided electronic mail accounts, access to electronic biomedical literature, and several other services. The Web has stimulated rural health professionals' interest in access from the desktop, however, significant barriers to their use of the Internet were recognized by NC AHEC. Those barriers included lack of reliable Internet service providers (ISPs) with local telephone numbers, cost of Internet service, uncertainty about the technical support required to connect to the Internet, and lack of training in how to use the Internet.

The last two five-year plans for the NC AHEC LIS Network responded to the changing environment of rural health care professionals and students. The theme of the 1990-95 plan was the "library without walls," to encourage making library resources and services accessible at the point of need. The 1995-2001 plan proposed a statewide electronic network to address the educational and informational needs of practicing health care professionals, preceptors for health

professions students, students in community-based rotations, and burgeoning numbers of distance-education students in an integrated fashion [4].

INCREASING HEALTH PROFESSIONALS' INTERNET ACCESS

Several grant proposals were funded that furthered the goals and objectives expressed in the planning documents. In the 1990s, the Duke Endowment funded over \$1 million in grants through the NC AHEC LIS Network to community hospital libraries for purchase of computers, fax machines, and subscriptions to databases. A follow-up grant from the Duke Endowment funded the creation of a statewide health sciences union list on CD-ROM, including holdings of almost every health sciences library in North Carolina.

Between 1992 and 1997, two National Library of Medicine grants advanced NC AHEC efforts to take Internet service beyond hospitals. The first, "Information Connection Service: Information Services to Off-Campus Ambulatory Care Training Sites," a sub-contract with the National Network of Libraries of Medicine, Southeastern/Atlantic Regional Library, was funded from April 1992 through December 1994. The goal of this project was to establish and test a prototype for fast, easy, and affordable access to information resources from community health centers. Eight rural community health clinics that served as training sites for UNC-CH students were selected for participation in the project. The grant provided for the placement of computers in the rural health clinics and for a librarian to visit those clinics in order to train the health care providers in access to MEDLINE and other electronic resources.

The evaluation data from the project revealed several key findings that have guided subsequent planning [5]. Because this project was completed before Web use gained prominence, several training and technical problems noted in this evaluation might be less problematic today. However, the 1994 findings are:

- *Interest is high.* There is a high level of interest in community health sites for using online information access if it can meet the criteria of quick, easy, and affordable.
- *A six-month time frame is needed to make a site operational.* The first three months of the project were absorbed with the administrative effort of ordering the equipment and getting it delivered. The second three months were taken up with installing software, configuring the equipment, obtaining passwords, and scheduling training.
- *Training options should be flexible.* The training plan should be flexible and based on the individual clinic's needs. Both individual and group training opportunities should be offered. Providing training to health professionals in the use of computer workstations for

accessing information resources is critical to the successful adoption of the technology. Using professional librarians to teach information management with follow-up training from medical students on rotation can work very well.

- *Staff should attempt to minimize technical difficulties.* Despite the importance of the needed information, these busy clinicians will use the service only if the computer connections and interfaces are convenient and uncomplicated. A single interface for multiple resources is highly desirable, along with simplified login procedures.

- *NC AHEC librarians should offer regular outreach visits.* The onsite training and computer technical support needs of the sites were greater than had been anticipated at the beginning of the project; therefore, regular outreach visits from AHEC librarians were essential.

- *Staff should tailor onsite services and resources based on the needs of each site, but offer MEDLINE and quick document delivery at a minimum.* The usefulness of new and existing information resources should be evaluated periodically, particularly as more full-text electronic resources become available.

- *Staff should be sensitive to varying motivation levels among health professionals at different clinics.* The motivational level of the clinic staff to use the workstation varies at different sites depending on the pace of the clinic, the work style of the health professionals, and the presence of a champion among the clinicians who will lead by example.

In 1997, the NC AHEC LIS Network received a second National Library of Medicine grant, "The Community Clinics Internet Connection Project," an Internet Access Grant directed toward extending Internet services to rural health clinics through purchase of ISP accounts. The objectives of the grant were to buy as much Internet access as possible and to use the NC AHEC LIS Network to provide technical support and training to rural health clinics. "The Community Clinics Internet Connection Project" used \$50,000 to purchase Internet service provider accounts for 128 sites including ninety-three community health clinics, two pharmacies, eight hospitals, three health departments, eighteen student housing units, and four student laptop computers. In addition, grant funds were used to upgrade the speed of the existing Internet connection at Area L AHEC in Rocky Mount.

The ISP accounts purchased with the grant helped to fill in the Internet access gaps for the preceptors affiliated with AHEC. Supplying 128 sites with grant-funded Internet accounts built upon the access already supported by NC AHEC through routers and terminal servers located in each AHEC. While this level of Internet access had been adequate in previous years, the AHEC equipment could not keep up with the demand for Internet access by the increased number of students and community-based preceptors. As the number and

distribution of private sector ISP companies increased, NC AHEC shifted its focus from supplying Internet access to getting clinics signed up with cost-effective ISPs. NC AHEC librarians chose the most reliable and cost-efficient ISP for each site, based on the location of the clinic. In order to minimize long-distance charges, thirty different ISP companies were used to cover the 128 sites.

The clinics chosen for the project, geographically dispersed across the state, train health students from UNC-CH, Duke University, Wake Forest University, East Carolina University, and other colleges and universities. Health professionals who serve as preceptors in the clinics have been chosen for the project. Because studies show that precepting students adds time to the health professional's already busy schedule, many incentives are used to encourage and compensate health professionals for agreeing to become preceptors. Surveys show that access to biomedical literature, library services, and computers ranks high on lists of incentives valued by preceptors [6]. Therefore the tangible rewards from participation in this project (i.e., ISP account, training, technical support) are viewed as contributing to NC AHEC's efforts to recruit and retain preceptors for community-based education.

Students in community-based educational sites need an Internet connection to complete their assignments. Many students, whose schools may even require purchase of a computer, bring their own computer to a community rotation. Because a student may be assigned to several locations across the state within a year, and because there is no single ISP that has local calling from every town in the state, it has become necessary for the regional AHEC to have an ISP account that can be used temporarily by the students. Two NC AHECs have decided to use grant funds to place ISP connections in student housing.

This grant has had significant impact on increasing Internet access for health professionals and students. The highest impact has been evident in four of the Area L, NC AHEC, counties, where the grant has provided Internet access for 54% of the primary care providers. A total of 1,789 students had 1,968 rotations in clinical sites participating in the grant. More than 400 students stayed in student-housing sites with an ISP connection during the grant [7]. In 1999, when the grant funds supporting the Internet access ended, all ISP accounts were continued using local funding.

VIRTUAL CLINICAL CAMPUS

Establishing Internet access for rural health care providers, preceptors, and students was a necessary process for building infrastructure; however, project experience and needs assessments have demonstrated that the clinicians still need technical support and training to make effective use of the Internet. The NC

AHEC librarians outlined a plan for providing this support based on the virtual clinical campus concept described by Charles P. Friedman, Ph.D. As Dr. Friedman suggested, "use information technology to create a 'virtual clinical campus' to allow students to enjoy the best of both worlds: the immersion in primary care offered by the community-based setting and the knowledge-rich resources of the academic medical center, including the all-important library" [8]. Dr. Friedman listed four necessary elements to build the virtual clinical campus: access to biomedical knowledge, access to colleagues, access to feedback, and access to faculty.

Using Dr. Friedman's outline as a model, the NC AHEC librarians formed a team to plan training for effective access to their "Virtual Clinical Campus." The team planned a core curriculum for teaching database searching, Internet use, email systems, and evidence-based medicine (EBM). Because librarians long ago learned the reality of never knowing how much actual time they might have with a clinical health care provider, they designed several teaching outlines for situations when there was only ten minutes, thirty minutes, or occasionally sixty minutes of teaching time.

Teaching an EBM approach was an exciting framework in which librarians and health care providers could work together to promote the use of biomedical literature for effective patient care. The AHEC LIS Network focused its efforts on using EBM with rural physicians and residents. Several librarians were already team-teaching evidence-based medicine to residents and students. So that all NC AHEC librarians would be qualified to use EBM principles, NC AHEC LIS Network sponsored basic and advanced courses offered by the Medical Library Association. AHEC librarians were encouraged to look for opportunities to work with health professionals using EBM. After these sessions, two librarians, with advanced experience in teaching EBM to medical students and residents, developed a Web-based tutorial on evidence-based medicine for health professionals [9].

Formal and informal instructional sessions and outreach visits from NC AHEC librarians are important to creating the "Virtual Clinical Campus." NC AHEC librarians contributed significant time to this activity. From 1997-99, NC AHEC librarians conducted:

- 48 group training sessions and 62 individual training sessions
- 508 librarian outreach visits to clinics precepting students
- 1,187 technical assistance and consultations requests, filled from rural health clinics

FUTURE PLANS

The AHEC LIS Network, having passed its twenty-fifth anniversary, is a well-known and respected pres-

ence in rural North Carolina communities. Through outreach visits to rural health clinics, the NC AHEC librarians provide access to full-text, electronic resources, and assistance through effective use of the Internet. With the university affiliation of NC AHEC, many of the resources typical of academic medical center libraries are available to NC AHEC staff and the community-based preceptors. The commitment of the partners to ensure that all affiliated users are covered by license agreements for a core set of resources facilitates cost-effective licensing for all parties.

In the last three years, the use of the Internet has increased exponentially, and today health professionals' use of the Internet to access information resources and services is the norm. In clinics where students are trained, access to the Internet is critical for quality education. The NC AHEC support of rural health care providers' connections to the Internet has enabled access to full-text electronic textbooks and journals from homes, offices, or community hospitals. The critical service that the outreach librarians offer is information-management education for effective use and evaluation of the health information available on the Web.

The future direction for the NC AHEC LIS Network is to develop the AHEC Digital Library. The ultimate goal of the AHEC Digital Library is to become the digital health library for all North Carolina health professionals. In 1999, a prototype of the NC AHEC Digital Library became available for use by NC AHEC staff and community-based preceptors. The digital library provides a common Web-based point of entry for access to core health information resources and services that support health professionals' clinical education. Panels of librarians and health care professionals select core resources. Further development of the prototype is underway to provide a customized environment that delivers preselected and user-selected resources that are of highest value to individual health care providers and to link users to services of their affiliated NC AHEC and university. Future collaboration with statewide library projects may lead to a digital health library for all North Carolina citizens.

The AHEC Digital Library is a collaboration of the University of North Carolina at Chapel Hill, Duke University, East Carolina University, Wake Forest University, and the North Carolina AHEC Program. The collaboration of these organizations provides the opportunity to create a statewide digital library focused on health care that is connected to the larger educational context of the universities while maintaining the NC AHEC library outreach service to rural communities. As outreach librarians combine the "high touch" with the "high tech" approach, they construct an information network that builds on the past but looks to the future.

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