The South Dakota Med-Fax Network*‡

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Health sciences librarians established a statewide medical information network in South Dakota to provide rural physicians with database access and rapid document delivery. A private grant funded equipment for interactive simultaneous remote searching (ISRS) and telefacsimile transmission, as well as for a coordinator for training and follow-up support. In less than one year, telefacsimile technology has become an integral part of library information transfer among sixteen network sites, and ISRS is gaining acceptance among physicians who lack local access to online databases.

A 1984 survey measured South Dakota physicians' perceptions of library services in this rural state. Survey results indicated that much remains to be done to meet the information needs of physicians who are underserved or unserved by health sciences libraries [1]. Three librarians representing the state's medical school, Rapid City Regional Hospital, and McKennan Hospital in Sioux Falls saw the survey confirming that underserved or unserved physicians wanted to know more about library services. Physicians were not concerned about fees for information and were eager to embrace new telecommunications and computer technology as one answer to their lack of access to biomedical literature. In 1986 these librarians began discussing solutions to the lack of library information access for underserved or unserved physicians while improving resource sharing among existing health sciences libraries.

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PLANNING

The planning effort focused on two specific problems. First, health professionals in areas with inadequate library resources often lacked the knowledge of what was available in the biomedical literature to address specific patient care problems. Second, when a specific document was identified as containing an answer to a problem, no easy means existed for rapid acquisition of that document. Once the problems were identified, three objectives were drafted. These objectives called for 1) expanding library service, specifically database access, to underserved or unserved physicians, 2) rapid turnaround (twenty-four hours) for documents required for patient care decisions, and 3) enhanced statewide sharing of widely dispersed library resources. The three sites agreed that any proj-

ect aiming at better dissemination of biomedical information must be a network response rather than a centralized model of information sharing. No single institution in the state, including the medical school, had the level of staffing or library collection capable of sustaining an outreach effort that would potentially affect nearly one-third of the state's physicians and a still greater number of other medical personnel. It was also apparent that the objective calling for enhanced sharing of resources could best be met with the linkage provided by networking.

Telefacsimile technology became a focus for rapid document delivery because it fit the criteria for decentralized sharing, encouraged statewide networking, and provided a means of twenty-four-hour document delivery. A literature search revealed that academic and hospital groups were exploring telefacsimile sharing models [2–3]. Discussion with leaders of an online reference services network at Eastern Oregon State College revealed another promising technology that seemed applicable to the rural environment in South Dakota [4]. That technology allowed librarians to provide specific citations from the periodical literature to the requester through a process called interactive simultaneous remote searching (ISRS). ISRS training made it possible for physicians and other medical personnel to become active participants in the online search.

ISRS

Interactive simultaneous remote searching (ISRS) combines the advantages of searching online databases by a trained intermediary and direct end-user searching. A key feature is the ability of a remote end user to interact by keyboard with a librarian while the online database query occurs. At the end of the search, a bibliography is instantly available to the remote user as well as the librarian searcher.

Promoting end-user searching as an alternative was considered, but ISRS has advantages for individuals with an occasional need for online services. Not only does ISRS preserve the concept of instant database access, it also eliminates the paperwork, billing, and training requirements necessary for most direct end-user searching. ISRS also gives potential access to a wider array of databases with the librarian deciding on the appropriate database for a given search.

The potential for ISRS has been known for some time and has been discussed in the literature [5–6]. However, our interpretation of the literature suggests that a significant improvement in this technology occurred with the introduction of a trialogue switch [7].

Co-inventors Debra Graham, a hospital librarian at Sacred Heart Hospital in Eugene, Oregon, and Rodes Trautman, a retired scientist with a doctorate in biophysics and an additional degree in librarianship,

created a product that delivers what its name suggests for $250 (at the time of our purchase). The trialogue switch is a device cabled between a searcher's terminal and two modems, an originate modem and a second answer-type modem. The switch acts as an internal conferencing device directing signal flow. It allows the searcher and the remote user to access the host computer or "talk" to each other, depending on the position of the switch. The other components, a microcomputer, two modems, and communications software, are not limited to any particular type of equipment or software [8].

FUNDING

By late 1986, a plan was proposed that incorporated the data from a statewide survey of physicians, telephone interviews, and literature research on information networking systems used by other rural states. First, ISRS would be used to solve the problem of remote search access. Next, telefacsimile transmission would be used for document delivery. Both technologies eliminated the disadvantage of geographic distance, were cost effective, and appeared affordable for the local network site libraries. The goal of the program was to give most health professionals access to critical library support at a reasonable cost.

The next challenge was to attract external funding to develop a network that demanded large initial expenditures for equipment and training. Three grant proposals were written in late 1986 and early 1987. Two were submitted to private foundations, while the third was directed to the National Library of Medicine. In June 1987, after an earlier site visit to South Dakota, the Bush Foundation of St. Paul, Minnesota approved funding of the full amount requested (just under $132,000) for development of a South Dakota medical information network (later renamed the South Dakota Med-Fax Network). The grant paid for all telefacsimile and ISRS equipment, a coordinator's salary for eighteen months, travel expenses, a consultant from the Oregon network, and supplies.

Equipment funds were sufficient to establish sixteen telefacsimile locations in the state. Eleven of these sites were chosen primarily because they had resources that they were willing to share. Of these eleven sites, four were chosen to serve as primary ISRS search sites. ISRS selection was based on the library's experience with online searching and its existing service patterns to geographic areas in the state. Five ISRS remote receiving sites were placed in areas providing significant regional health care, but lacking equipment or personnel for local library service. Each of these sites received a telefacsimile machine, in addition to the microcomputer workstation, for ISRS searching. Beyond this, the network was designed to serve individual health professionals who

access the network through personally owned micro-computers and institutional telefacsimile equipment or faxphones.

ESTABLISHING THE NETWORK

A network advisory committee was established in the planning stage. Initially composed of librarians from the primary provider institutions, its membership has expanded to allow participation by users of network services. This committee confirmed sites scheduled to receive equipment, determined service areas for the primary search sites, and became directly involved in onsite telefacsimile equipment evaluation. The committee decided on a supportable level of data collection for project evaluation. Finally, the committee urged adoption of standard borrowing procedures and minimum service charges.

When grant funds were provided, it was necessary to write a memo of understanding between the grant administrators and each network site. The responsibilities of network membership, along with a complete listing of equipment and services provided, were submitted to the participating institution to sign.

The performance standards for telefacsimile transmission in a library are different from those in a business office. This means that machines must be tested onsite to verify claims of clarity, memory capacity, speed, and ease of use. Factors of primary importance for the South Dakota Med-Fax Network were 1) image resolution and speed at the standard transmission setting, 2) clarity of nonprint images and text when both appeared on the same page, and 3) sufficient memory for document storage.

In South Dakota, the quality of telephone transmission is a major factor affecting the operation of telefacsimile machines. Only a complete field test could determine if a local telephone hook-up or line "noise" has the capacity to interfere with proper transmission. Nine machine models represented by five different manufacturers were tested onsite. Ultimately two different models of Canon telefacsimile machines were selected to meet the essential needs of the South Dakota Med-Fax Network. The lower-end model represented a compromise in memory capacity for potential delayed transmission. However, this has not affected network operation, since all transmissions are conducted during regular office hours.

INITIAL OPERATION

Interlibrary loan activity among Med-Fax network libraries was recorded for a five-day period in April 1988. This was less than three months after the initial installation of equipment. The data showed that 107 of 271 (or 39.5 percent) of interlibrary loans were

assisted by telefacsimile. Document requests were its most popular use. Twenty-eight, or 10.3 percent, of loans were filled by telefacsimile. The average time to complete a loan that was both requested and filled by fax was 1.09 days. The data showed that traditional methods of delivery cannot compete with telefacsimile when fast document delivery is necessary. By comparison, requesting and receiving documents by mail averaged 12.2 days and requesting electronically and receiving by mail averaged 10.1 days.

The results for ISRS searching are much less conclusive after five months of offering the service. The five remote search sites requested only forty-one ISRS searches. However, this represents 60 percent of the total searches done for these sites. Scheduling a time when both physician and searcher can participate creates a problem. Some physicians have shown a preference for faxing search requests and results. One site requested information on Grateful Med access, and others delegated the interactive participation, presumably because of time constraints on physicians. No independent user sites have yet been established for ISRS searching, but this is due in part to a lack of awareness about network services. Much of the work required to make ISRS a sustaining component of network service involves publicity and marketing. Work in both areas is proceeding, and it appears that at least some health professionals are adopting, what is for them, an unfamiliar technology.

Through a combination of cooperation and standardization made possible by formal networking and new technology, South Dakota is determined to conquer some of the most persistent problems facing libraries charged with meeting the information needs of rural and geographically dispersed health care professionals. Many other areas of the country face similar problems. Perhaps by looking at a distributed, shared network with reasonable expectations about the ability of the network members to maintain the system, others will be able to develop further and improve on the beginning made in South Dakota.

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