Taking Telemedicine Into the Mainstream

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This paper addresses efforts that are under way to incorporate World Wide Web (WWW)-based telemedicine techniques into the mainstream of Internet, Intranet, and local area network applications to accomplish many of the same objectives.

The University of Missouri proposed and was awarded funds for a project that included use of the WWW to foster telemedicine interaction among those involved in rural community health care and between those communities and the University of Missouri Health Sciences Center (UMHSC). This special focus was part of a larger telemedicine program that included an extensive video-implementation of telemedicine.

The Rural Telemedicine Evaluation Program (RTEP) worked with three communities in central Missouri that could benefit from sharing information and communicating via the WWW. Each community was encouraged to develop local information resources of interest to that community and of value to health care providers and patients in each community. These resources included general local information, information about community hospitals and other medical facilities, and specific information about medical topics of interest to the local community.

The RTEP workstation was developed as a software application available through a Web browser such as Internet Explorer or Netscape Navigator. In addition to the community information noted above, this workstation permitted identification of Web sites of interest to the community, gave each user the ability to save links to other sites of individual interest, and provided an electronic mail service.

Because three of the communities were rural, the RTEP workstation also included the ability to identify a practice area consultant on the UMHSC faculty or staff who was available to assist with specific medical questions or issues.

The ability of these communities to sustain the RTEP experience after conclusion of the grant has been mixed, in large measure because of the availability of local technical resources to support local user groups.

Although reliance on the Web for application software has eliminated the largest portions of the support need, some rural communities lack either the ability or the commitment or both to establish even the most basic desktop computer support within their user community.

Despite this limitation, the RTEP workstation is providing an important and useful technical foundation for a variety of other applications that fall within the broad definition of telemedicine.

University of Missouri Health Care (UMHC) is an extensive enterprise of hospitals, clinics, health care education facilities, and related activities. Most health care professionals perform health care roles in more than one facility, many in more than one city. A physician may be in the University Hospital in Columbia one day, a local clinic the next, and a second clinic many miles away on another day.

Increasingly, the need for Web access to information is becoming an essential element of basic services. Some necessary resources are readily available from any point on the globe with no specialized

equipment or software (a PC, a browser, and a phone line). These resources, however, are generic medical reference materials, such as MEDLINE, Ovid, and UMHC Web sites.

Specialized clinical and business applications and—in particular—access to patient records require a more sophisticated approach to ensure the confidentiality of medical records. As we prepare to meet expected guidelines issued under the Health Insurance Portability and Accountability Act, the demand for secured and protected access will become a dominant concern.

Traditionally, remote access to such applications has been engineered application by application, with specific instructions for connecting, specific remote services in this context is not affordable in the current health care financing environment. Remembering how to use the plethora of connections becomes unmanageable for most potential users.

The RTEP platform offers great potential for a robust and easily implemented solution. The RTEP environment is based on a server implementation that includes the Secure Sockets Layer. This permits both secured and unsecured communications sessions. General information screens can be displayed in unsecured mode; patient or other confidential information can be displayed in secure mode.

Because the RTEP workstation created varying views and controlled access to resources based on the user's identity, it already includes a sign-on process and a database to control access within the environment based on the sign-on.

We have adapted the environment to support the Division of General Internal Medicine within UMHC and are in active discussion with a number of other groups about using this Web-based telemedicine

hardware and software requirements for establishing a useful connection, and specific user name and password validation steps. When a relatively small number of such remote users had to be satisfied, the technical staff could meet the needs with manageably sized modem pools, dial-back modems, and related methods of providing access—without compromising system integrity. In addition, individual users tended to need only one or two such applications, so users' ability to manage their connectivity issues was reasonable.

As more and more aspects of the health care process move from paper to computer, the number of users requiring access expands significantly. In addition, each user needs access to a growing number of applications. Providing

technique to support a wide range of remote access requirements.

Once secured entry into the system is established, access to appropriate applications and databases can be as simple as insertion of a Web link to another system. In some instances, we have designed Web applications using Active Server Page technology to provide access to legacy systems that would not otherwise be accessible through the Web.

We also are incorporating streaming video, networked whiteboarding, and Internet Protocol links to the Missouri Telemedicine Network into the capabilities accessible through the RTEP workstation environment.

With the shift in user group focus from rural communities to intra-UMHC "communities," the RTEP designation is inapt, even though rural communities are indeed the beneficiaries of many of the traveling service providers who are the new focus. To broaden the applicability of the technology to this different service group, we are transforming RTEP into the Community of Users Secure

Telecomputing Online Medical System (CUSTOMS).

This serendipitous marriage of RTEP technology with emerging need will allow us to go forward with our customers more aggressively than would otherwise be possible with the limited resources available for new application development.

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