

University Outreach through Telemedicine

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Research, teaching, and public service and outreach are the three missions of the academy. While the focus of most large research institutions is on the first two missions, medical schools typically have been involved in the third mission through the provision of care to patients, and in particular to those patients who are not insured or who have limited access to care. In fact, government funding of medical schools typically includes funds that are specifically designated for care of the indigent. While funded research and the educational mission will continue to "drive" activity at schools of medicine throughout the coming decade, public service and outreach, especially to the disenfranchised, will receive greater attention with changes in funding patterns. At universities across the nation, this decade is "an era of unprecedented interest, change, challenge, and opportunity in the area of public service and outreach" (Younts 1996).

Major changes are also taking place within the telecommunication infrastructure across the nation. Every major university is involved in some way with providing education that makes use of advanced telecommunications technology. In the field of medicine, advances in technology have allowed for the creation of "telemedicine." Telemedicine makes use of two-way audiovisual communication integrated with medical telemetry, making the delivery of medical care to isolated or rural sites possible. The Medical College of Georgia has been the leader in the development of telemedicine through the creation of GSAMS, the Georgia Statewide Academic and Medical System, which is the largest and most comprehensive distance-learning and telemedicine network in the world. Through the Georgia Statewide Telemedicine Program (GSTP), the Medical College of Georgia offers public service and outreach to citizens throughout the state.

What is Telemedicine?

Most broadly defined, telemedicine is "the use of telecommunications technologies to provide medical information and

services" (Perednia and Allen 1995). In the state of Georgia, the telemedicine system is designed to provide remote and isolated health-care providers with access to medical specialists (Sanders and Tedesco 1993). This is done through a system that utilizes two-way audiovisual communication that is integrated with medical telemetry. The goal of the system is to "assure that everyone in our state, whether living in the heart of Atlanta or on a south Georgia farm, has immediate access to quality medical care" (Sanders and Tedesco 1993). Public health clinics, hospitals, correctional facilities, and tertiary medical care centers are linked through a fiber-optic communication network that also provides the linkage for the state's distance-learning network. The system began with a pilot program in 1991 and is nearing its final stage of implementation. When fully implemented, the Georgia Statewide Telemedicine Program will offer a consultation and referral system serving the entire state of Georgia through a "hub-and-spoke" network (Adams and Grigsby 1995). As of May 31, 1997, more than 1,300 medical consultations across a broad array of medical disciplines had been provided to rural or isolated patients through the use of the system. Typically, greater than eighty-five percent of the patients seen via telemedicine are able to remain in their own communities and do not have to be transferred to a tertiary care center for evaluation (Grigsby, Adams, and Sanders 1995).

Telemedicine as Outreach and Public Service to Rural and Isolated Individuals

In "The Scholarship of Engagement," Ernest Boyer argues that "higher learning and the larger purposes of American society have become inextricably interlocked" (Boyer 1996). He contends that universities have a historic commitment to the "scholarship of engagement" and are partners in the search for solutions to problems confronting society. One of the problems faced by the state of Georgia is a "maldistribution" of health-care resources. While the Atlanta Metropolitan area has a wide range of medical practitioners across medical disciplines, eleven Georgia counties have no physicians and less than fifty percent of Georgia's 159 counties have pediatricians (Randolph 1993). In the area of medical subspecialties, child psychiatry is not available in eighty-eight percent of Georgia's counties (Georgia Psychiatric Physicians Association 1991). Forty-three (59%) of the child psychiatrists in Georgia practice in Atlanta, leaving thirty psychiatrists to cover the rest of the state, which is the largest state east of the Mississippi River. In too many cases, patients and their families travel great distances in order to receive needed health-care services. The implementation of the Georgia Statewide Telemedicine Program allows patients to receive the care they need without having to travel great distances.

Since its inception in 1991, more than 1,300 telemedicine consultations have been completed at the Medical College of Georgia. This figure does not include all of the telemedicine consultations that

have been completed statewide. It represents the number of consults that originated in one of the remote sites as a request from a Medical College of Georgia faculty member. The largest number of requests have been in the areas of pulmonary medicine, neurology, infectious disease, dermatology, and cardiology. The average length of time spent in the consultation is twenty-five minutes. As of May 31, 1997, more than ninety-two percent of the persons who were seen via telemedicine were able to stay in their own communities and did not have to travel to the tertiary-care center (Medical College of Georgia Hospital and Clinics) in Augusta, Georgia (Medical College of Georgia 1997). Patients and family members did not have to bear the expenses of traveling or the hardships of being away from family and community support. Advanced telecommunication technology has effectively overcome the barrier of geographic isolation and distance for many of the state's rural residents in need of specialty health care.

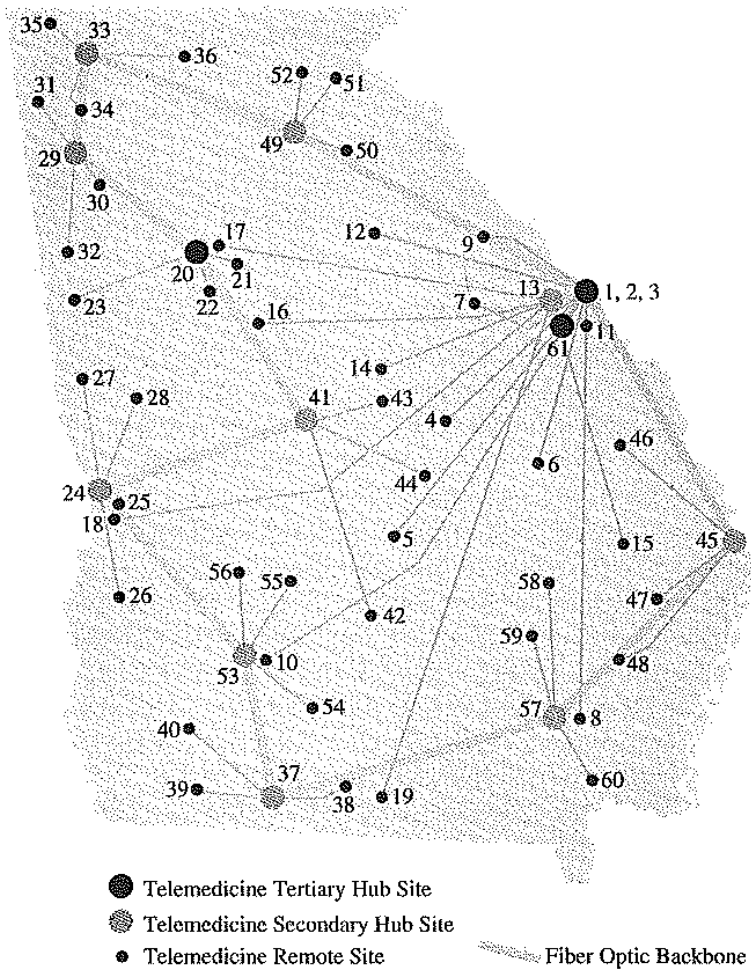
Votruba (1996) argues that the university's alignment with society will be improved through outreach activities that are integrated with the other dimensions of the university's mission: teaching and research. The Georgia Statewide Telemedicine Program embodies this as teaching and research are fully integrated with service activities.

Teaching and Learning through Telemedicine

The Georgia Statewide Academic and Medical System (GSAMS) provides an extensive network of distance-learning sites that are utilized by units of the State University System of Georgia and numerous others to provide for thousands of high-quality distance education links every year. Additionally, the Georgia Statewide Telemedicine Program (GSTP) provides ongoing, Category I Continuing Medical Education (CME) credit to the referring physicians who participate in the patient consultation sessions with the consulting faculty physicians at the Medical College of Georgia. Both the conventional distance-learning sites and the telemedicine sites make use of interactive audio and video. The distance-learning sites make use of one-half of a T-1 communications line, while the telemedicine system uses a full T-1 line enabling the transmission of higher-resolution images and medically relevant information. This technology allows the referring physicians to participate in a "tutorial" with the consultant in real time and with a real patient. All consultations are recorded on videotape and are reviewed by a panel of medical faculty to make certain that requirements for awarding CME credit have been met. Bibliographic resources are made available to the referring physicians through CD-ROM (Grigsby 1996). This allows remote medical practitioners to access up-to-date medical education without having to endure the difficulties of finding another physician to "cover" their patients while traveling to a traditional continuing medical education seminar.

Georgia Statewide Academic and Medical System (GSAMS)

Georgia Statewide Telemedicine Program (GSTP)



In addition to continuing medical education that is provided on a tutorial basis, a "Telemedicine Standardized Patient Program" is being developed in coordination with the Medical College of Georgia Robert Wood Johnson Medical Generalist Initiative Standardized Patient Program. In this program, individuals are hired to portray or "model" actual patients in a standardized fashion. Physicians and other health care providers are then able to see these patients via the telemedicine system (or "live" in the Robert Wood Johnson Initiative) and are presented with scenarios where neurologic, dermatologic, cardiac, psychiatric, rheumatologic, infectious disease, or surgical conditions are presented in a standardized manner allowing the clinician to learn about treating patients with the condition. Initially, this will be limited to six of the telemedicine sites, but will be expanded throughout over time.

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Research through Telemedicine

From the inception of the Georgia Statewide Telemedicine Program, the academic community has seen the program as an area for completing advanced research studies. Approximately \$4.5 million in external funding has been secured from government agencies and foundations.

Currently, research efforts related to the efficacy of telemedicine and to the development of home-based telemedicine services are underway. A service contract has also been obtained from the state Department of Human Resources for the delivery of children's medical services through telemedicine. Evaluation of this program presents an opportunity for research on both the technical and health services delivery aspects of providing health care to children with multiple handicaps. The Board of Regents of the University System of Georgia has funded a project to integrate the state mental-health system with the Georgia Statewide Telemedicine Program. Again, university-based research and evaluation efforts are fully integrated with the outreach and public service components of the Telemedicine Center. To date, research efforts have resulted in the publication of numerous journal articles, book chapters, and reports.

The convergence of teaching, research, and service demonstrates the viability of telemedicine as an effective outreach effort, as knowledge is being generated, transmitted, applied, and preserved "for the direct benefit of external audiences in ways that are consistent with the university and unit missions" (Michigan State University 1993). Educating medical and allied health students, enhancing the skills of practitioners through continuing education,

providing clinical care to patients, and generating and communicating knowledge are seamlessly integrated within the telemedicine efforts at the Medical College of Georgia.

What Lies Ahead?

The telecommunications revolution surrounds us and offers the potential for greater involvement of the academy in the daily lives of individuals, families, and communities. Various projects utilizing advanced telecommunications technology have become commonplace in the university environment. It is likely that continued research and development will allow for an even greater expansion of public service and outreach activities. In a sense, universities may need to begin to look at the "exporting" of knowledge generation to other parts of the world. This may be through distance-learning technologies, but is unlikely to be limited to provide audiovisual transmission of a lecturer to a remote site. It is much more likely that advances in telecommunications technology will allow for a plethora of opportunities in the areas of teaching, research, and public service and outreach. In fact, public service and outreach may become the centerpiece for concomitant teaching and research efforts.

Summary and Conclusion

As public service and outreach activities move towards the forefront of university activities, it is important that they not be seen as "just one more job." Votruba (1996) maintains that "a solid intellectual foundation that provides the basis of both the fundamental mission of the university and the relations of outreach to it" must be established if public service is to be seen on par with the other missions of the university, teaching and research. Appropriate public service and outreach will also help to maintain critical public support for the university overall. While "do-more-with-less" is a common expression on university campuses, it is becoming clear that it is also a reality of today's academic marketplace.

Advanced telecommunications technologies, such as telemedicine, have the potential of expanding the market for university outreach and public service activities that are clearly integrated with the teaching and research missions. The Georgia Statewide Telemedicine Program at the Medical College of Georgia is only one example of how a creative, innovative outreach program can enhance the overall mission of the university.

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About the Author

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