Original Research

Barriers to Telemedicine: Survey of Current Users in Acute Care Units

Herbert J. Rogove, D.O., FCCM, FACP,[1] David McArthur, Ph.D.,[2] Bart M. Demaerschalk, M.D., M.Sc., FRCP(C),[3] and Paul M. Vespa, M.D., FCCM[2]

[1]C_3O Medical Group, Ojai, California.
[2]Department of Neurosurgery, Ronald Reagan UCLA Medical Center, Los Angeles, California.
[3]Department of Neurology, Mayo Clinic, Phoenix, Arizona.

Abstract

Context: *The present study of current telemedicine users is a unique attempt to understand the barriers and motivational factors related to the utilization of telemedicine.* ***Objective:*** *A survey of emergency and critical care remote presence telemedicine users was conducted to determine the factors that motivate and the barriers that impede the acceptance and maintenance of a robotic telemedicine (RTM) program.* ***Setting:*** *The majority of the survey users were in the Emergency Department or in the Intensive Care Unit.* ***Methods:*** *E-mail invitations were sent to 483 individuals representing 63 healthcare institutions and groups in North America and Europe. Respondents were directed to a Web-based survey. The survey consisted of 96 separate questions, addressing user familiarity and 5-point Likert scales, addressing issues spanning the conceptual and practical issues surrounding adoption of telemedicine.* ***Results:*** *A total of 106 surveys were completed, representing an individual response rate of 21.9% but an institutional response rate of 60.3%. More than two-thirds of the respondents were physicians who participated in active RTM programs. Across seven different topics related to barriers to implementing RTM, the majority of all respondents indicated that cultural issues did not constitute meaningful hurdles, technological matters were generally favorable, and that most personnel were agreeable to both achieving the buy-in to start an RTM program and to maintaining RTM once started. However, respondents proclaimed that RTM's success was still hampered by licensing, credentialing, and malpractice protection, as well as costs, billing, and reimbursement issues. Achieving immediate patient access, overcoming service gaps, improving quality, providing clinical support, maintaining patient satisfaction, and adhering to practice guidelines were viewed as significant motives for RTM implementation.* ***Conclusions:*** *The leading applications of RTM included emergency response and consultation. The patients, physicians, nurses, nor hospital executives served as barriers to implementation. However, licensing, costs for technology, and reimbursement for RTM continue to impede progress.*

Key words: *telemedicine, telehealth, technology*

Introduction

The practice of critical care and emergency medicine is swiftly evolving with a focus on rapid response supported by robotic telemedicine (RTM) technology. This evolution is based on an intersection of novel therapies and technologies that facilitate care, and is taking place against a backdrop of a worsening shortage of qualified medical providers. There is great potential with the use of RTM, but with any emerging new approach or technology, the healthcare community may be reluctant to adopt novel practices. Reasons for this resistance are manifold and may include concerns about feasibility, scientific evidence, competition, and excessive cost. Recent studies suggest that telemedicine applications for critical care are being underutilized due to some or all of these reasons. But, heretofore, a prospective study of the types of barriers to adoption has not been performed. Therefore, the purpose of this study was to describe and rank the potential barriers to adoption of a single modality of telemedicine that is used primarily for emergency and critical care.

Telemedicine is an established type of technology, which has been used in one form or another for over 40 years. With the advent of more powerful computer technology making real-time audiovisual communication feasible, the interest in telemedicine has grown rapidly in the last decade.[1] This is evidenced by the formalization of organizations such as the American Telemedicine Association and the growing number of publications on this topic. Application of telemedicine to emergency and critical care has been growing in popularity in the last 5–10 years, with much of the interest fueled by the clinical rationale of rapid and timely treatment for patients. During that time, there has been unplanned growth in telemedicine among academic and community medical centers, resulting in improved quality of care in selected clinical settings.[2–4]

The present study is a prospective study of the barriers to adoption of telemedicine, specifically RTM, in emergency and critical care settings. This survey was conducted among users of the most advanced technology (i.e., robot) in order to specifically highlight that humans rather than purely technical factors are currently limiting the application of telemedicine.

Methods

A 96-question survey was designed to evaluate the major barriers of acceptance and maintenance of an RTM program. An electronic mail invitation to participate in the survey was sent to 483 individuals representing 63 institutions in the United States, Canada, and Ireland known to have utilized the RP-7 RTM robot (InTouch Health, Santa Barbara, CA) or similar devices. At the majority of institutions, there was often more than one identifiable member of the

Table 1. Robotic Telemedicine Utilization by Institution Type and Location

	ADMIN/ TEACHING	ER	ICU	MEDICAL/ SURGICAL	OR	OUTPATIENT
Academic medical center	0	19	12	2	0	5
Teaching hospital	1	12	9	2	0	3
Community Nonteaching Hospital	2	10	5	3	1	1
Rural hospital	2	0	2	3	0	3
Other	0	5	1	3	0	0

ER, emergency room; ICU, intensive care unit; OR, odds ratio.

administrative, physician, or nursing staff who was involved in the implementation of a remote presence RTM program.

The survey, placed on an Internet Web site (www.SurveyMonkey.com), contained questions related to demographics, utilization location, years of use, and, using 5-point Likert scales, questions about barriers and motivations for implementing an RTM program. Barriers were categorized as cultural, administrative, patient-related, exposure, technology, and regulatory issues. Motivations were categorized as issues of implementation. Within each category, between two and seven questions were to be completed by the respondent. The survey, open for 4 weeks from mid-February through mid-March, 2010, was not delimited in any way by the specific RTM technology in use.

Results of the Web-based survey were analyzed using R version 2.11.0 (R Core Development Team).[5] Statistical tests included chi-square and Fisher's exact test for count data, and Kendall's coefficient of concordance W. Statistical significance is set at a stringent $p < 0.001$ to control for multiple comparisons.

Results

Of the 483 individuals known to participate in RTM, 106 responded, representing an individual response rate of 21.9%. The response rate based on institution was 38 out of 63 (60.3%). Of the 106 respondents, 88 (83.0%) voluntarily provided their name and/or title. Physicians constituted 68.3% of those who did identify themselves, nurses and nurse practitioners 17.0%, and administrators 8.0%. Six others were represented by academic titles, by clinical services, or by research specialty. The remainder elected to remain anonymous. Of the nonresponders, 33 had e-mail addresses that were undeliverable.

Respondents indicated the operational nature of their institutions as follows: academic medical center 35.8%, teaching hospital 25.5%, community nonteaching hospital 20.7%, rural hospital 9.4%, community teaching hospital 1.9%, RTM specialists 1.9%, and other 4.7%. The primary locations of utilization occurred as follows: Emergency Department 43.2%, Intensive Care Unit (ICU) 27%, Medical/Surgical floors 12%, odds ratio 0.9%, outpatient 11.3%, and administrative and/or teaching activities 4.7% (*Table 1*). Among these respondents, a plurality of RTM utilization occurred in the emergency room (ER) of academic medical centers.

The primary uses of remote presence were emergency response and consultation 47.2%, critical care patient follow-up and evening rounds 13.7%, critical care routine rounds 10.4%, critical care educational 7.5%, critical care nonurgent consults 9.4%, critical care family and patient communication 0.9%, and other 11.3% (*Table 2*). Sixty-two percent of the respondents indicated that they elected to use RTM for more than one task; second choices are indicated in *Table 2* in parentheses. The most popular combination of primary and secondary tasks was emergency response/consults along with patient follow-up/evening rounds.

Slightly over one-third of respondents have utilized RTM for 1 year or less although about 1 in 10 have utilized RTM for more than 5 years. Patients seen using RTM were primarily stroke (49.1%) and ICU (35.8%) patients; trauma, surgical consults, and medical consults were the other principal groups routinely seen using remote presence.

Human barriers include cultural, administrative, and regulatory issues while a second major category of barriers relates to technology (*Table 3*). For simplicity the wording of each original question has been condensed

Table 2. Robotic Telemedicine Utilization by Institution Type and Primary Task (Secondary Task)

	EDUCATIONAL	EMERGENCY	FAMILY COMMUNICATION	NONURGENT CONSULTS	OTHER
Academic medical center	1 (0)	20 (8)	0 (3)	3 (5)	3 (8)
Teaching hospital	1 (0)	12 (7)	0 (4)	4 (6)	4 (6)
Community nonteaching hospital	5 (0)	8 (3)	1 (2)	1 (3)	3 (6)
Rural hospital	1 (0)	3 (3)	1 (1)	2 (1)	1 (4)
Other	0 (0)	7 (0)	0 (1)	0 (1)	1 (4)

and restated, neutral responses are omitted, and the remaining categories were combined into agree or strongly agree, and disagree or strongly disagree. Complete data were available for all but one of the respondents, who demurred due to unfamiliarity with RTM. Concordance within each subset across respondents is modest, which is a direct indication that the questions within subsets were not answered uniformly but were considered individually and uniquely; for example, respondents generally did not merely express a single unwavering viewpoint across each subset of questions. A clear majority of questions in these subsets elicited statistically significant differences in the number of respondents selecting agree or strongly agree compared with the number of respondents selecting disagree or strongly disagree.

Motivations for implementing RTM and sources of possible importance and added value to the institution due to RTM are shown in *Table 4*. Concordance across respondents across questions is modest, indicating as before that the questions were being answered individually and selectively rather than as combinations. Each of the questions contained in these subsets demonstrated statistically significant difference between agree or strongly agree compared with disagree or strongly disagree.

Discussion

The results of this survey suggest that the principal human barriers to adoption of RTM in emergency and critical care medicine, expressed in rank order, are (1) regulatory barriers for physician privileges, (2) financial barriers due to the inability to bill for services while needing to pay for additional technology, and (3) cultural barriers resulting from a lack of desire or unwillingness to change clinical paradigms through the use of telemedicine.

Regulatory issues have been identified as a barrier to implementing telemedicine programs. The survey revealed an overall consensus that licensing out-of-state physicians, concern about malpractice liability, the credentialing for medical staff privileges at individual facilities, and the reimbursement limitations are significant impediments for implementing a telemedicine solution. Some

Table 3. Selected Barriers to Implementation of Robotic Telemedicine, Proportion of Agreement or Disagreement, and Coefficient of Concordance Within Subset

	AGREE OR STRONGLY AGREE	DISAGREE OR STRONGLY DISAGREE	KENDALL'S W
Cultural barriers			0.354
Patients do not like RTM	**5.7%**	**82.9%**	
Physicians do not like RTM	**13.3%**	**60.0%**	
Nurses do not like RTM	**5.7%**	**80.0%**	
RTM seen as local threat	**21.0%**	**51.4%**	
RTM seen as local loss of control	**20.0%**	**49.5%**	
Physicians lack incentives to use RTM	**56.2%**	**19.0%**	
Administrative barriers			0.606
Executive administration does not like RTM	34.3%	47.6%	
Nursing leadership does not like RTM	**18.1%**	**60.0%**	
CMO or VPMA does not like RTM	25.7%	43.8%	
Technological barriers			0.293
Usability	**18.1%**	**56.2%**	
Reliability	**23.8%**	**53.3%**	
Internet connectivity	**22.9%**	**46.7%**	
Remote data access	28.6%	40.0%	
Technical support	**16.2%**	**67.6%**	
Documentation and billing	45.7%	26.7%	
Regulatory barriers			0.350
Out-of-state licensing	**61.0%**	**12.4%**	
Malpractice liability	**61.0%**	**14.3%**	
Credentialing	**69.5%**	**9.5%**	
Government reimbursement	**73.3%**	**4.8%**	
Nongovernmental reimbursement	**67.6%**	**18.1%**	
DEA licensing	**43.8%**	**11.4%**	
RTM's success is hampered by …			0.189
Equipment cost	**59.0%**	**13.3%**	
Lack of understanding	**42.9%**	**15.2%**	
Lack of exposure	42.9%	21.0%	
Inability to bill for services rendered	**61.0%**	**18.1%**	
Medico-legal issues	33.3%	32.4%	
Patient quality of care issues	**13.3%**	**60.0%**	
Lack of effective RTM leadership	33.3%	41.0%	

continued →

Table 3. Selected Barriers to Implementation of Robotic Telemedicine, Proportion of Agreement or Disagreement, and Coefficient of Concordance Within Subset
continued

	AGREE OR STRONGLY AGREE	DISAGREE OR STRONGLY DISAGREE	KENDALL'S W
Difficulties in getting buy-in for RTM include			0.340
Executive administration	**24.8%**	**66.7%**	
Nursing leadership	**19.0%**	**77.1%**	
CMO or VPMA	**29.5%**	**59.0%**	
Medical staff	**29.5%**	**57.1%**	
Physicians	41.0%	41.9%	
Other providers	**16.2%**	**75.2%**	
Difficulties in maintaining RTM as an ongoing program include			0.378
Executive administration	**4.8%**	**74.1%**	
Nursing leadership	**4.8%**	**74.3%**	
CMO or VPMA	**4.8%**	**73.3%**	
Medical staff	**14.8%**	**65.7%**	
Other providers	41.0%	41.9%	
Patients	**1.0%**	**93.3%**	

Statistically significant differences ($p < 0.001$) are shown in bold.

CMO, Chief Medical Officer; VPMA, Vice President of Medical Affairs; RTM, robotic telemedicine.

respondents indicated that lack of case law and lack of clear safety and outcome data need to be addressed. The creation of a national telemedicine license would be a logical approach to solve this problem. However, with state bureaucracy and individualistic approaches to state medical licensure, there are a great many hurdles to overcome. States have differing policies on telemedicine licenses: Alabama, Montana, Minnesota, New Mexico, Ohio, Oklahoma, Oregon, Texas, and Tennessee have telemedicine licenses and Nevada has a special-purpose telemedicine license. California, Florida, and New York require full licensure to perform any function relating to patient care, with exceptions for consultation in some instances. Other states are exploring the issue of telemedicine and its regulation.[6,7]

Financial barriers, especially in the contemporary world of hospital finance, remain a major barrier because of both lack of reimbursement and the capital expenditure for telemedicine technology. While many professional societies are at the forefront of gaining support for physician reimbursement, the Center for Medicare and Medicaid has only recently established a telemedicine code for consultation, which became effective on January 2010. Unfortunately, the code is only applicable to hospitals that are not in metropolitan areas such as critical access hospitals. Each state has its own regulation for private payers and at this time the regulation exists for only the following: Louisiana, California, Oklahoma, Texas, Hawaii, Kentucky, Colorado, New Hampshire, Oregon, Virginia, and Maine.[8] The survey respondents indicated that reimbursement is a very large barrier for a successful telemedicine program and the limitations are applied to both government and nongovernment insurers. Medicaid pays for telemedicine encounters in 24 states; however, strict attention must be paid to the specifics such as need for the local physician to be present.[9]

Cultural barriers include primarily patient and physician acceptance. For the most part, patient and family acceptance has not been a major factor. Most patients either through their family or themselves have experienced technologies such as videoconferencing with at-home experiences on free Internet sites. Respondents to this survey confirmed that patients do not have a problem with RTM consultation. A review of the literature reveals that across multiple specialties, patients are very satisfied with their clinical encounter via telemedicine and particularly the access and travel time saved.[10] Most of the physicians strongly believed that quality of care would improve with RTM eliminating this as a major barrier to acceptance.

On the other hand, physicians have been slow adopters of technology for their practices. While the percent of physicians utilizing technology on a daily basis is increasing, this is in large part due to younger colleagues and national acceptance of electronic medical records. The latter will become a part of the everyday practice of medicine as it becomes an accepted standard of care. Physician concerns noted in this survey reveal that while physicians may be willing to accept the decision of implementing a telemedicine program at their respective hospitals, they are often slow to accepting the value of telemedicine in their own practice. This issue of buy-in often diminishes as personal experience and results of quality studies help these physicians shed some of their skepticism. Similar to physician's resistance to the use of telemedicine, Thomas and group found a similar response to physicians in the ICU who often did not involve the tele-ICU team and this subsequently might have contributed toward a barrier for improved outcomes.[11]

In responding to the survey, the physician respondents were most often the users of the technology; they reported that a major cultural barrier to adoption of telemedicine was that the threat local doctors would feel from remote presence expert consultations. Additionally, there was concern that the local physicians would feel loss of control over their patients. We note, however, that an inherent shortcoming

Table 4. Selected Motives for Implementation of Robotic Telemedicine, Proportion of Agreement or Disagreement, and Coefficient of Concordance Within Subset

	AGREE OR STRONGLY AGREE	DISAGREE OR STRONGLY DISAGREE	KENDALL'S W
Motives for implementing RTM include …			0.284
Quality improvement	**59.0%**	**14.3%**	
Filling gaps in service	**60.0%**	**17.1%**	
Immediacy of patient access	**69.5%**	**7.6%**	
Driving institutional growth	**50.5%**	**24.8%**	
Assisting with staff retention	**15.2%**	**67.6%**	
Assisting with staff recruitment	**14.3%**	**67.6%**	
Improving institutional metrics	**20.0%**	**55.2%**	
Satisfying institutional leadership	**23.8%**	**56.2%**	
Importance and value of RTM to the institution is through …			0.440
Addressing national guidelines	**61.9%**	**10.5%**	
Addressing patient satisfaction	**80.0%**	**3.8%**	
Providing clinical support	**83.8%**	**2.9%**	
Addressing marketing	**72.4%**	**4.8%**	
Providing quality care	**87.6%**	**1.9%**	
Reducing costs	**50.5%**	**14.3%**	

Statistically significant differences ($p < 0.001$) are shown in bold.

of this survey is that nonusers, medical staff leadership, and local physicians did not participate and thus the possibility of such a threat from their perspective cannot be validated from the present study.

Respondents confirmed that technological problems, such as dropped or slow connections, are not significant barriers. This maybe biased because we surveyed only users of robotic systems. However, this bias permitted a more direct focus on strictly human factors that may affect adoption.

Results of this survey indicate strongly that current RTM users do not see that cultural, administrative, or technological barriers continue to pose substantive roadblocks to implementation of RTM in healthcare institutions. There are, however, other concerns that appear to be more difficult to solve in the process of implementing and maintaining active RTM programs. These include ongoing issues related to licensing, malpractice liability and credentialing, and concerns about equipment costs and reimbursement including both government and nongovernmental reimbursement, as well as how to implement satisfactory methods of billing for services rendered. Licensing for out-of-state telemedicine practice, medical staff privileging by proxy, and reimbursement issues are being addressed by the American Telemedicine Association as well as state and regional organizations. Costs are steadily being reduced both by the availability of increasingly compact operational RTM devices and the steady growth of high bandwidth, high-speed Internet connectivity, at the same time that computer prices have fallen drastically while computer power has risen exponentially from the earlier decades in which RTM was attempted.

Silva et al.[12] conducted an environmental scan of telemedicine-based stroke programs (telestroke) in the United States. The investigators performed Google and Pubmed searches to identify potential telestroke programs. An analyst interviewed respondents and collected online survey data. One hundred possible telestroke programs were identified in 43 states, and 38 agreed to participate. The institutional program response rate was only 38% compared with 60% in the RTM program survey. The programs that did not participate in the telestroke survey were similar to the ones that did in terms of structural and functional programmatic and service elements. Silva et al. reported that the three most important factors driving creation of telestroke programs were to provide a community benefit, improve clinical outcomes, and improve clinical process effectiveness. In the Silva survey, participating telestroke programs rated inability to obtain physician licensure, lack of funds for technology, and lack of reimbursement as the most important barriers to program growth and development. Despite the low response rate, these were identical to the top three impediments identified in the RTM program survey.

Our observation of a low response rate to online surveys directed toward clinical and administrative health professionals and health professional organizations is consistent with the previous research. Reviews of survey design and methodology have identified modest to no significant differences between early and late respondents and suggested that response bias may not seriously affect findings when a threshold response rate (of approximately 50%) is achieved.[13–15] The survey literature indicates that when resources are limited and prevent aggressive follow-up, healthcare professional organization and program surveys with a lower response rate may still yield representative results.[13,16]

Conclusions

While there have been multiple telemedicine surveys, this survey focused on users of robotic remote presence.[17] Based on the results of this survey, we have identified three top tier barriers to adoption of telemedicine in emergency and critical care medicine. These are (1)

regulatory barriers, (2) financial barriers, and (3) cultural barriers. Action items necessary to resolve these barriers appear to be the following: (1) regulatory models need developing that permit physicians to obtain credentialing and interstate licensing for telemedicine. Current practice likely needs to be streamlined to facilitate easier credentialing at multiple facilities while at the same time creating standards off acceptable practice for telemedicine. Credentialing by Proxy may be the answer as this recently supported endeavor by both the Joint Commission and the Center for Medicare and Medicaid Services is encouraging. Similar changes need to be considered for the creation of a national telemedicine medical license. (2) Payment mechanisms for telemedicine need to be developed that go beyond currently restrictive practices. At present, billing for the delivery of critical care via telemedicine is not permissible, yet our survey shows that more than half of the respondents use RTM for this purpose, and other studies have shown the feasibility and safety of this practice. (3) Ongoing educational programs need to be developed to introduce the concepts of telemedicine to all physicians, including discussion of pertinent literature that outlines safety, efficacy, and outcome benefits of telemedicine.

Acknowledgments

Funding/Support: InTouch Health provided financial support for the use of the Internet-based survey tool and the statistical analysis of the results.

Role of the sponsor: InTouch Health has played no part in the design and conduct of the study; the collection, management, or analysis; and the interpretation of the data; or the preparation, review, or approval of the manuscript.

Previous presentations: There have been no parts of this study that have been presented in any form elsewhere.

Disclosure Statement

Dr. Vespa has received stock from InTouch Health and serves on their advisory board. Dr. McArthur has received financial remuneration from InTouch Health for providing his expertise in the statistical analysis of this survey. Both Drs. Rogove and Demaerschalk had accommodations for travel to investigators meeting paid by InTouch Health.

REFERENCES

1. Vespa, PM, Miller, Hu C, X, Nenov V, Buxey F, Martin NA. Intensive care unit robotic telepresence facilitates rapid physician response to unstable patients and decreased cost in neurointensive care. *Surg Neurol* **2007;**67:331–337.
2. Zawada ET Jr., Herr P, Larson D, Fromm R, Kapaska D, Erickson D. Impact of an intensive care unit telemedicine program on a rural health care system. *Postgrad Med* **2009;**121:160–170.
3. Demaerschalk BM, Bobrow BJ, Raman R, et al. Stroke team remote evaluation using a digital observation camera in Arizona: The initial Mayo Clinic experience trial. *Stroke* **2010;**41:1251–1258.
4. Rogove H, Kramer J, Vespa P, et al. Improved availability and guideline compliance with a remote presence neurointensivist program. *Telemed e-Health* **2010;**16(Suppl 1) S98–99.
5. R Development Core Team. **2010**. R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. ISBN 3–900051-07-0. Available at www.R-project.org (last accessed on June 29, 2010).
6. State Licensure Requirements for Telemedicine. Available at www.medicallicensedirect.com/telemed.html (last accessed on October 26, 2010).
7. American College of Radiology. Available at www.acr.org (last accessed on October 26, 2010).
8. Private Payer Reimbursement. Center for Telehealth and E-Health Law. Available at www.telehealthlawcenter.org/?c=129 (last accessed on October 26, 2010).
9. Telemedicine for CSHCN: A State-by-State Comparison of Medicaid Reimbursement Policies and Title V Activities by TeleHealth Connections for Children, 2005. Available at www.ichp.ufl.edu/documents/Telemedicine in Medicaid and Title V Report.pdf (last accessed on October 26, 2010).
10. Witten P, Love B. Patient and provider satisfaction with the use of telemedicine: Overview and rationale for cautious optimism. *J Postgrad Med* **2005;**51:294–300.
11. Thomas EJ, Lucke JF, Wueste L, Weavind L, Patel B. Association of telemedicine for remote monitoring of intensive care patients with mortality, complications, and length of stay. *JAMA* **2009;**302:2671–2678.
12. Silva GS, Viswanathan A, Shandra E, Schwamm LH. Telestroke 2010: A survey of currently active stroke telemedicine programs in the US. *Stroke* **2010;**42:e292.
13. Dillman DA. *Mail and Internet surveys: The tailored design method*, 2nd ed. New York: Wiley, **2000**.
14. Kellerman SE, Herold J. Physician response to surveys: A review of the literature. *Am J Prev Med* **2001;**20:61–67.
15. Field TS, Cadoret CA, Brown ML, Ford M, Greene SM, Hill D, et al. Surveying physicians. Do components of the "total design approach" to optimizing survey response rates apply to physicians? *Med Care* **2002;**40:596–605.
16. Tran N, Dilley JA. Achieving a high response rate with a healthcare provider survey, Washington State, 2006. *Prev Chronic Dis* **2010;**7:1–8.
17. Moskowitz A, Chan YF, Bruns J, Levine SR. Emergency physician and stroke specialist beliefs and expectations regarding telestroke. *Stroke* **2010;**41:805–809.

Address correspondence to:
Herbert J. Rogove, D.O., FCCM, FACP
C_3O Medical Group
P.O. Box 626
Ojai, CA 94024

E-mail: hrogove@c3omedicalgroup.com

Received: April 13, 2011
Revised: June 10, 2011
Accepted: June 13, 2011