

“We Got Mail”: Electronic Communication Between Physicians and Patients

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Abstract

E-mail has the potential to improve both the quality and efficiency of healthcare service delivery. Despite the substantial growth of this form of communication over the past decade, its promise to patients, providers, and their health plans remains largely untapped. In this article we (1) review the literature on e-mail use between patients and providers; (2) identify challenges and opportunities facing managed care organizations that wish to maximize the potential of this form of communication; (3) describe the components of 2 systems aimed at enhancing e-mail use in clinical settings; and (4) discuss the implications of increased e-mail use for managed care.

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For editorial comment, please see page 1569.

E-mail and the internet are being used increasingly to perform everyday tasks. An estimated 12 to 20 million Americans had e-mail “boxes” in 1993, with the e-mail market projected to double by 1996.¹ Major commercial e-mail providers

(America Online, Compuserve, MindSpring, AT&T, Geocities) currently support at least 20 million active e-mail accounts in the United States²⁻⁵; this number increases considerably after adding in employer or educational e-mail accounts and accounts with smaller commercial vendors. According to one estimate, the number of e-mail users is projected to increase from 50 million in 1997 to more than 100 million by the year 2000 (Figure).⁶ Approximately 150 million personal computers in the marketplace are wired for internet access, although it is not clear how many are used for electronic communication.⁷

Interest in using e-mail and the internet to obtain health information is increasing. A 1997 survey indicated that of the estimated 40.6 million US adults who accessed the internet within the past year, 43% used it for medical information.⁸ A 1996 survey showed that “information from my own doctor’s office” ranked highest in what patients wanted to access on-line.⁹ In 2 studies conducted in 1993 and 1994, about half of the patients surveyed in a university clinic said that they used e-mail frequently and that they would like to use it to communicate with clinic providers.¹⁰

In parallel with this consumer trend, increasing numbers of physicians are incorporating e-mail into their clinical practices. The 1998 Physician Resource Questionnaire from the Canadian Medical Association indicated that 46% of physicians who used computers did so for e-mail, although the survey did not explore the purpose or the recipients of physicians’ e-mail.¹¹ In the clinical setting, physicians use e-mail for a variety of tasks, including consulting with colleagues, obtaining hospital laboratory information, following up on patient outcomes, reviewing and disseminating new research findings, and, increasingly, communicating with patients.^{10,12-16} The

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number of physicians who routinely use e-mail with their patients is not known, but according to a 1997 estimate, between 1% and 2% of physicians offer patients the option of e-mail communication.¹⁷ Anecdotal reports suggest the number of physicians participating in active e-mail dialogue with their patients has increased.

With the expansion of e-mail as a means of doctor-patient communication, there emerges a unique set of issues, stemming from interactions among clinicians, patients, and their health plans. In this article we review the use of e-mail and evaluate the challenges, opportunities, and implications of e-mail use in the clinical setting.

... LITERATURE EVALUATING THE USE OF E-MAIL ...

Research on e-mail use among both patients and physicians is still in its infancy, despite rapid growth. A systematic literature search of indexed English-language journals in Ovid MEDLINE (National Library of Medicine, 1966 to 1999) and other electronic databases was performed using major MeSH headings and the text words "electronic mail," "electronic communication," "e-mail," "computer networks," "physician-patient relations," and "telemedicine." In addition, selected references cited in articles were evaluated for pertinence and applicability. Opinion pieces and studies focused on electronic image transfers for clinical purposes,

web-based consumer health information (as opposed to e-mail communication), and electronic communication for the purposes of medical education were excluded. Only 12 articles qualified as original research on straight-text e-mail communication in the medical setting; of these, 8 focused on patient-provider communication,^{10,14-16,18-21} and 4 focused on the impact of e-mail communication on healthcare institutions or communication among medical colleagues.^{1,12,13,22}

Doctor-Patient Communication via E-Mail

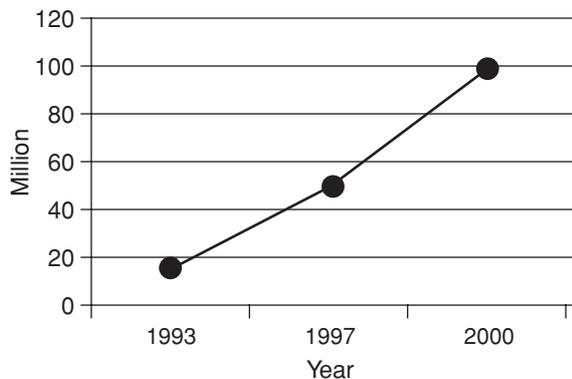
The utility of electronic mail as a medium for patient-physician communication was examined in a 1993 study of a university-based family practice clinic by Neill et al.¹⁸ This exploratory survey in a small sample of patients (N = 87; response rate = 74%) suggested that patients perceived e-mail communication could increase speed, convenience, and access to medical care for simple and nonurgent problems, such as refilling prescriptions, communicating laboratory results, and making appointments. However, only 15% of respondents used e-mail to communicate with their physician.

In a 1994 study of patients' access to and attitudes toward e-mail, Fridsma et al.¹⁰ surveyed 444 consecutive internal medicine clinic patients, of whom 70% were enrolled in managed care plans. Nearly half of the respondents reported they used e-mail on a regular basis. Patients between the ages of 20 and 50 comprised more than 83% of e-mail users (although patients as old as 80 reported using e-mail). However, for communicating with the clinic, e-mail was used less frequently than the telephone, US mail, or fax: 91% of patients used the telephone, whereas only 25% of respondents used e-mail to communicate with the clinic. When patients, regardless of access to or use of e-mail, were asked if they would use e-mail to communicate with the clinic if they could, 51% of current e-mail users said they would use it all or most of the time, whereas only 24% of those without e-mail said they would use it to communicate with the clinic if they had access.

Another study of patient-physician communication via e-mail queried consecutive patients of 23 family physicians in Oklahoma regarding their use of computers and access to e-mail.¹⁹ Of patients with current e-mail access or with plans to obtain access within 6 months, a substantial majority indicated they would like to use this medium to interact with their family physician.

E-Mail Communication: Content and Motivation. The volume and content of e-mail communication

Figure. Estimated Growth of Active E-Mail Accounts Over Time



between patients and physicians have not been studied widely. In a 1997 study, Widman and Tong reviewed all unsolicited e-mail from patients visiting one physician's internet site focusing on cardiac arrhythmias.¹⁴ Over a 12-month period, a total of 70 unsolicited inquiries were received from 39 patients and 20 family members (the sources of 11 inquiries were unknown). The inquiries focused on therapy (68.6%), diagnosis (21.4%), patient education (8.6%), and prognosis (1.4%). Subsequent follow-up of 22 patients who could be contacted revealed that after visiting the website, 72.7% of the patients were reassured, 18.2% consulted a cardiac electrophysiologist, 4.5% consulted a general cardiologist, and 4.5% visited a tertiary care electrophysiology center.

Borowitz and Wyatt published a retrospective review of all e-mail requests sent to the Division of Pediatric Gastroenterology at the University of Virginia Children's Medical Center between November 1995 and June 1998.¹⁶ An average of 37.6 e-mail requests were received per month, of which 81% were initiated by parents, relatives, or guardians, 10% by physicians, and 9% by other healthcare providers. The purposes of the e-mails were the following: 69% questioned the cause of a particular child's symptoms, diagnostic tests, or therapeutic interventions; 22% requested general information about a disorder, treatment, or medication without reference to a particular child; and 9% sought a second opinion about a diagnosis or treatment for a particular child. The majority of requests (87%) were answered within 48 hours of the initial request, with the average response time being 30.1 hours. Reading and responding to each e-mail took slightly less than 4 minutes on average. The authors concluded that e-mail provides a timely mechanism for parents, guardians, and healthcare professionals to obtain patient- and disease-specific information from medical consultants.

In a third study, Eysenbach and Diepgen examined 209 unsolicited e-mails to a German university-based dermatology website²¹ and categorized the e-mails as follows: (1) wants general information about a given disease (34%); (2) contains specific question (75%); and (3) does not contain any particular question or request (5%). The authors listed 6 perceived reasons why people seek medical help from an unknown physician via e-mail rather than visiting their own physician: frustration and/or desperation for information; lack of trust in their own physician; desire for anonymity; inadequate or confusing information given by their doctor; seeking information for a friend or a relative; and an irrational hope that

a "cyberdoc" would relay something different. The authors noted that more than half of the patient e-mails (56%) indicated they had seen at least one physician in person about their question before sending the e-mail (for 33% of the patients, this was not known).

Quality of Internet-Based Physician Resources for Patients. Eysenbach and Diepgen are the only researchers who have systematically evaluated the quality of advice given by physician websites on the internet,^{15,20} and to publish a study of responses to unsolicited patient e-mail requests for medical advice on the web.¹⁵ The authors sent e-mails from a fictitious patient describing an acute dermatologic problem to 57 medical websites. Of 29 sites (50%) that responded to the patient e-mail, 26 were physician sites. Of the 29 respondents, 27 urged the fictitious patient to see a physician and 2 refused to give any advice; 18 respondents mentioned a diagnosis, of which 13 were expressed with caution.

The authors also sent the website providers a 9-item survey (from a different e-mail address) that inquired about the number of unsolicited e-mails the site received per week, what the response policy was, and what the respondent's view on the topic was. Of the 53 physicians surveyed, 55% responded, including 17 who also replied to the fictitious patient e-mail. Respondents indicated that unsolicited patient e-mails ranged from 0 to 50 per week, with a median of 1 e-mail per week. For 15 of the 17 respondents who had answered the patient and filled out a survey, the authors reported no discrepancy between actual behavior and the respondent's policy on handling unsolicited e-mail. The authors' conclusion, however, was that there was a striking lack of consensus on how unsolicited patient e-mails should be handled. About one third of those who replied refused to answer patient requests individually, arguing that a diagnosis via e-mail without an examination was not possible and that they did not have the resources or mandate to reply to such queries. The remaining two thirds attempted to help individually, with 5 giving detailed treatment advice.

Eysenbach and Diepgen repeated their study in a smaller sample of 17 "cyberdocs" (10 free and 7 charging) identified on the web, allowing physicians to charge a consultation fee to the credit card of a fictitious patient with an acute dermatology complaint.²⁰ Ten physicians responded, of whom 3 refused to give advice because dermatology was not their area of expertise. The remaining 7 physicians provided advice (2 at no charge, 5 for a fee), usually within 8 hours. Of these 7 physicians, 2 (1 free, 1

charging) provided questionable advice, including such ambiguous instructions as "make sure you get at least 2 good bowel movements a day, and if you don't, have 2 apples and a warm glass of water immediately." The authors proposed the development of an independent international regulatory committee that would issue cyberlicenses for cyberdocs offering advice over the internet. They also suggested that patients should be warned that the credibility and qualification of physicians on the internet remains undetermined.

Impact of E-Mail on Communication Among Healthcare Providers

The research on the impact of e-mail on communication among healthcare providers falls loosely into 2 categories: institutional surveys of e-mail users and studies of e-mail communication between physicians.

Institutional Surveys of E-Mail Users. Singarella et al undertook one of the first studies of the perceived impact of e-mail in health sciences institutions in 1991 and 1992.¹ E-mail subscribers (N = 2919) in the medical centers at the University of Tennessee and University of Texas were sent surveys, of which 823 were returned (28% response rate). Because of the likelihood of a response bias with such a low response rate, it was not surprising that the authors noted a significant positive impact of e-mail relative to other forms of communication (eg, paper or phone). E-mail was found superior with regard to response rates, value, formality, perceptions, reducing errors in communication, cost effectiveness, communication style, and other factors. More than half of respondents felt that their response was quicker with e-mail compared with paper mail (63%), whereas 27% felt they responded at the same rate. A high percentage (94%) of respondents indicated that use of e-mail in the medical center was valuable: 24% said it was highly valuable; 42%, very valuable; and 28%, somewhat valuable. Overwhelmingly, respondents agreed that e-mail had not significantly changed their workload and that it was "less formal, less official, easier to respond to, and easier to retrieve or to access after a month had elapsed." In addition, technology, maintenance, and confidentiality issues did not appear to be a significant concern for respondents.

In a 1992 observational study of e-mail usage patterns during a 1-week period at Boston's Beth Israel Hospital, Sands et al¹³ found that more than 1200 people sent approximately 7500 e-mails to 1300 different recipients. Each category of user (attending physician, house officer, nurse) sent the most e-mail

to others in the same category. One hundred fifty-three attending physicians sent 16% of the e-mail, 373 nurses sent 17%, and 208 house officers another 17%. These 734 clinical faculty and staff accounted for 50% of the e-mail sent during the 1-week observation period; the remaining e-mails were sent by other clinical staff and authorized users of the hospital information system. Half of the nearly 4000 hospital faculty and staff with access to e-mail and authorization to retrieve clinical information responded to a subsequent e-mail questionnaire. Two thirds (66%) of respondents reported using e-mail daily or weekly, 93% found it useful for communicating about patient care issues, 90% felt e-mail made their lives easier, and 61% felt it had a humanizing effect on their lives.

To determine the reasons for using e-mail and the time spent, as well as the impact of e-mail on user productivity, Nelson and Stewart collected data from users of e-mail in 12 Department of Defense hospitals in 1993.¹² The authors surveyed more than 4100 physicians, nurses, other healthcare providers, and technical and administrative staff (no response rate was given). One third of respondents indicated they used e-mail for patient consultation and referrals, communication of test results, patient follow-up, staff education and training, and patient care assignments. Patient follow-up was the primary patient care reason reported for using e-mail. Interestingly, physicians used e-mail most often—more than 25% of physicians used e-mail at least 10 to 15 times a day—but for shorter periods at a time. Respondents providing direct patient care (eg, physicians and nurses.) frequently cited time savings, especially for patient consultations and referrals, as a benefit of using e-mail.

E-Mail Communication Among Physicians. A study of electronic communication between primary and secondary care providers in the Netherlands by Branger et al²² showed that electronic communication vastly improved the efficiency of information exchange. Via paper mail, admission-discharge reports from hospitals took a median of 2 to 4 days to reach general practitioners; laboratory reports took 2 days. With e-mail and electronic data exchange, almost all admission-discharge reports were available to general practitioners within 1 hour of generation. When laboratory samples were analyzed on the day of collection, the laboratory reports were available to the general practitioner the same day via electronic data interchange. Fifteen of the 24 general practitioners who returned a questionnaire reported that the use of electronic admission-discharge reports provided more accurate and com-

plete information about the care delivered to their patients, and several general practitioners reported that electronic laboratory reports reduced data processing. The majority of physicians (20) ranked electronic communication high (either 4 or 5) on a usefulness scale (0 = useless, 5 = very useful).

Summary

The literature survey underscores the need for more rigorous evaluation of the clinical appropriateness of e-mail and its effects on resource utilization. Because none of the published studies used a random sample of patients or providers, the literature may be inherently biased toward responses of people who like using e-mail and are motivated to respond to usage surveys. Nonetheless, research findings to date suggest the following:

- Most patients still use the phone as the primary means of communicating with their physician's office; however, patients perceive e-mail communication to increase speed, convenience, and access to medical care.
- The majority of patients who use e-mail to communicate with their doctors are satisfied with this method of communication.
- Patients between the ages of 20 and 50 (the majority of subscribers to managed care organizations [MCOs]) are more likely to use e-mail to communicate with their doctors than are older patients.
- Medical center staff perceive e-mail to rival other forms of communication with regard to response rates, value, formality, cost effectiveness, communication style, and other factors.
- Reading and responding to patient e-mails does not appear to be overly time-consuming.
- E-mail is ideal for nonurgent problems such as refilling prescriptions, communicating laboratory results and making appointments; it is also well suited to patient follow-up, staff education and training, and patient care assignments.
- Consensus on how to handle unsolicited patient e-mails is lacking.

... OPPORTUNITIES ...

E-mail has enormous potential to improve the quality and efficiency of medical care delivery and enhance patient satisfaction. In this section we examine the opportunities across 3 domains: improving communication between patients and their healthcare providers, enhancing communication between healthcare providers, and increasing patients' access to health information.

Improving Communication Among Patients, Providers, and Health Plans

Fridsma et al's study indicated that more than 40% of patients' telephone calls to the clinic involved simple or nonurgent problems that could easily be handled via e-mail.¹⁰ E-mail, being an asynchronous form of communication, allows clinic staff to respond when they have time. Nelson and Stewart¹² found that for nonurgent matters, clinic staff perceived asynchronous communication such as e-mail to be more efficient than interruptive phone calls that required taking a message, calling the patient back later, or postponing current activities. Because many patient needs are often addressed best by nonphysician providers within the medical center, e-mail allows for more rapid response by routing the request to the right person through a triage system modeled after existing phone triage protocols. Other benefits of asynchronous communication are that patients can make detailed requests at any hour, they don't have to wait by the phone for a response, and they can check for the clinic's response when they have time, rather than being interrupted by an inopportune phone call.

Disease-specific e-mails from patients, as opposed to e-mails that can be handled by clinic staff, allow physicians to track a patient's health status, symptoms, and response to treatment, and furthermore, give physicians the opportunity to maintain and enhance the doctor-patient relationship through these between-visit communications. E-mail can be used to improve the content and quality of communication with patients, for example, to send patients attachments containing detailed but consumer-friendly health information tailored to their needs. Such patient-specific information has the potential not only to increase patients' knowledge of preventive screening and disease management tools, but also to encourage positive healthcare decisions that lead to better health outcomes.

Enhancing Interactions Among Clinicians

Within medical centers, e-mail appears to be well utilized by clinical personnel for consultations, staff education, meeting scheduling, and patient care assignments. Nelson and Stewart reported time-savings with e-mail ranging from 15 minutes to more than 3 hours per day, with an average of 37 minutes per day per respondent.¹² Patient consultations and referrals occurred more rapidly with e-mail use. Furthermore, electronic communication vastly improves the efficiency of information exchange.²² These testimonials to the efficacy and efficiency of

e-mail advocate for its increased use for administrative and patient care transactions in medical centers.

The use of e-mail among clinicians can be enhanced by creation of electronic support systems such as online resources for providers (eg, forms for referrals, test results, and other health documentation) and construction of computer interfaces that allow rapid entry of electronic communication into patient records.

Widening Access to Health Information

E-mail offers laypersons a timely mechanism for obtaining patient- and disease-specific information from medical consultants they might never otherwise interact with¹⁶ and thus provides access to second opinions, up-to-date clinical recommendations, and different strategies for disease management. One classic example is described in a 1995 editorial in the *New England Journal of Medicine*: "The author of a popular book on computer-based communication tells the story of finding a blood-filled tick on the skin of his 2-year-old daughter at 11 o'clock at night. While his wife called the pediatrician, he logged onto an electronic conferencing system based in San Francisco that involves people around the world. Within minutes he learned from a physician on-line how to remove the tick safely and had done so before the pediatrician called back."²³ E-mail can thus provide an invaluable service if used appropriately, and several large managed care organizations currently offer such e-mail-based health information sites to their enrollees. Moreover, the attention and initial commercial success that web-based health information companies have received suggest that internet-based health information services are likely to become an integral part of health-care delivery.

... CHALLENGES TO EFFECTIVE USE OF E-MAIL ...

Despite the many opportunities for use of e-mail in healthcare, widespread implementation and appropriate utilization of this emerging technology face significant challenges. These issues can be divided into the following categories: defining appropriate uses of e-mail, technical issues, access to and comfort level with e-mail, privacy and confidentiality, workload and reimbursement, and medicolegal issues. Some of these issues have been addressed in guidelines for clinical use of e-mail with patients developed by the American Medical Informatics Association (AMIA), an interdisciplinary organiza-

tion focused on the development and application of medical informatics technology in healthcare (Table).²⁴

Defining "Appropriate" Uses of E-mail

The use of e-mail, despite its great potential, may not be appropriate under certain circumstances. Physicians are advised not to use e-mail to communicate abnormal or confusing test results or to relay bad news.²⁵ Similarly, the diagnosis of a new problem requiring a complex and dynamic dialogue is best handled face-to-face.²⁵ E-mail is not recommended for conveying information about sensitive diagnoses, such as human immunodeficiency virus infection, sexually transmitted diseases, disability, and mental illness. Preference for the use of e-mail in these situations will likely depend on the context as well as on the individual physician and patient. Similarly, e-mail should be used to augment, not replace, the crucial interpersonal contacts that are the basis of the patient-physician relationship.²⁵ The interactions and relationships that develop as a result of direct human communication cannot be replaced by e-mail.²⁶

Unsolicited e-mails from a patient to an unknown physician or health information internet site may be inherently different from e-mails sent in the context of an ongoing patient-physician relationship. First, expectations differ for communications with a physician with whom a history has been established, compared with communication with an unfamiliar physician. For instance, a patient who sends an e-mail to a regular physician is likely to expect a personalized response that took into account individual patient characteristics (eg, previous illnesses, personality traits, or past experiences), whereas a patient e-mailing an unfamiliar source can expect a response based only on the information in the e-mail. Second, patients who e-mail an unknown physician or health information internet site are more likely to seek information without an expectation for services than patients who e-mail their physician in an ongoing patient-provider relationship. Finally, there may be inherent differences in patients' expectations for the duration, tone, and detail of the e-mail dialogue. Patients e-mailing an unknown physician usually expect this to be a one-time encounter for a second opinion or advice for a referral to an expert in a given field, whereas patients who e-mail their regular physician are more likely to expect an ongoing dialogue and responses that demonstrate knowledge of both the case history and certain personality attributes. This

difference may subtly influence the content and quality of the interaction. If a physician knows the patient and understands that a personal response is expected, he or she may be more likely to approach the e-mail message differently compared with an information site.

Technical Issues

Many healthcare institutions are ill equipped to deal with technology implementation, maintenance, and system wide integration of electronic communication. Implementing and maintaining a system wide network is a major endeavor that requires organizations to devote sufficient resources to system support and information technology efforts. Technical issues can directly impact the perceived usefulness of e-mail: if server difficulties delay or prevent e-mails from being delivered, e-mail will not be viewed as a reliable means of communication. In addition, compatibility issues within the system or among users (eg, attachments, header files, address cards) must be addressed to maintain the usefulness of electronic transfer of information.

Comfort with E-mail

Access to and comfort level with e-mail affect both patients and healthcare providers. Although patients appear interested in using this form of communication with physicians, it is unclear whether they would substitute e-mail for phone calls or direct visits if given the opportunity. Whether physicians feel comfortable enough with the technology to use it regularly with patients is also an uncertainty.

A study by Sproull and Kiesler found that the lack of external stimuli (eg, voice, body language) with e-mail supported greater openness in communication between workers in an organization; this openness may influence informality when e-mail communication is used.²⁷ On the other hand, because e-mail features only text, senders have more difficulty evaluating how their message

is received, and recipients have more difficulty determining the intended underlying tone. This poses problems in a medical setting, for example, when physicians want to be sure that patients have understood what they were told. In general, many patients do not comprehend health information well, even after a face-to-face explanation. This leads some physicians to question the wisdom of trying to communicate health information in a noninteractive, text-only medium such as e-mail. Similarly, from a patient perspective, patients cannot determine whether their degree of concern was successfully conveyed via e-mail, or if

Table. Recommendations of the American Medical Informatics Association

<p>Communication guidelines</p> <ul style="list-style-type: none"> • Establish turnaround time for messages • Do not use e-mail for urgent messages • Inform patients of privacy issues (who will see messages, will message be made part of the patient's medical record, etc) • Establish types of transactions (prescription renewal, appointment scheduling) and sensitivity of subject matter (HIV, mental health) permitted over e-mail • Instruct patients to put category of transaction in subject line of message for filtering: prescription, appointment, medical advice, billing question • Request patients put name and patient ID number in the body of the message • Configure auto reply to acknowledge receipt of messages • Print all messages with replies and place in patient's chart • Avoid anger, sarcasm, harsh criticism, and libelous references to third parties in messages <p>Medicolegal and administrative guidelines</p> <ul style="list-style-type: none"> • Consider obtaining patient's informed consent for use of e-mail. Written forms should provide communication guidelines, give instructions for when and how to escalate to phone calls and office visits, describe security mechanisms in place, and indemnify the healthcare institution for information loss due to technical failures • Use password-protected screen savers for all desktop workstations in the office, hospital, and at home • Never forward patient-identifiable information to a third party without the patient's expressed permission • Never use patients' e-mail addresses in marketing schemes • Use encryption for all messages when encryption technology becomes widely available, user-friendly, and practical • Do not use unencrypted wireless communication with patient-identifiable information • Commit policy decisions to writing and electronic form

Adapted from reference 24.

they included the relevant information for their physician.

Issues of Equity: E-Mail Access

Access to e-mail is determined in large part by socioeconomic status. Although internet availability is currently skewed toward wealthier, more educated users, market forces may shape a substantially more equitable distribution.²⁵ Financial barriers may be reduced in the future as hardware costs and internet access fees continue to fall. Web-browsing technology will soon be built into standard televisions, and the diffusion of this technology will likely parallel that of personal electronic items such as video cassette recorders and personal computers.²⁵ In addition, some internet providers have begun giving away free personal computers in exchange for internet service contracts. In combination, such factors may lead to much greater access to e-mail and the internet.

For individuals without computers, many public libraries offer internet access at no cost. Several internet vendors (Yahoo, Geocities, Hotmail) supply free e-mail accounts to anyone with access to the internet, so all people can access e-mail. However, patients may be less inclined to use e-mail to communicate with their physicians if their only e-mail service is at the library or workplace or if they feel their e-mail is not secure.

Privacy and Confidentiality

Ensuring privacy and confidentiality may be one of the most formidable challenges to the widespread implementation of electronic communication in medical settings. Encryption appears to be the one way to maximize the security of information passing through cyberspace (encrypting e-mail makes it inaccessible to users who do not have the appropriate deciphering software or system configurations), but currently there are no universally accepted encryption protocols. The AMIA recommends that encryption protocols be adopted as soon as encryption technology becomes widely available, user-friendly, and practical.²⁴

Privacy is not guaranteed, even with encryption protocols. Patients who use e-mail in the workplace for medical dialogue are not assured of confidentiality and may inadvertently expose sensitive details of illness or social circumstances to an employer.²⁵ Similarly, computer terminals left exposed in a medical setting may allow unauthorized staff to view patients' e-mails. The AMIA recommends password-protected screen savers for all computer terminals that may be used to access patient-specific informa-

tion.²⁴ Furthermore, patients who use family e-mail accounts at home may lack privacy from other family members.²⁵ Although the extent of the privacy concerns is not clear, the study by Fridsma et al reported that of patients who used e-mail primarily at work, more than a third would not use it for health-related communications for reasons of privacy; however, of the patients who used e-mail at home, only 10% listed privacy as a barrier to the use of e-mail to communicate with their physician.¹⁰

Workload and Reimbursement

E-mail has the potential to reduce the workload of providers by reducing the time dedicated to coordinating care through phone calls and visits. However, many providers are concerned that e-mail may simply add more work to already busy schedules and not substitute for other activities. The lack of financial reimbursement for e-mail communication may also inhibit its use. If e-mail communication were reimbursable, or if research showed that e-mail reduced the number of patient visits in a capitated system, physicians might be more inclined to use it. Furthermore, methods for intelligent sorting, authenticating, and triaging of incoming e-mails could be developed to avoid overwhelming physicians with patient e-mails.

Medicolegal Issues

Controversial medicolegal issues are emerging with widespread implementation and utilization of e-mail in the clinical setting. (1) Can a physician or a hospital be held liable if a breach in security allows an unauthorized third party access to confidential medical information transmitted via e-mail? (2) What is the liability associated with answering unsolicited e-mails from an individual a physician has never met? Some physicians refuse to respond to e-mails from unknown persons, whereas others do so but with long disclaimers aimed at minimizing legal liability. (3) How can physicians authenticate the identity of patients via e-mail, and what is their liability if they communicate private information to someone posing as a patient? E-mail is an almost anonymous form of communication, and there is no consensus on how to handle imposters.

E-mail has a certain degree of permanence. Even though messages can be erased from the screen, a durable record remains within the computer system; this record is easier to find and retrieve than many paper files, and e-mails can thus be traced for legal proceedings, including malpractice suits. Sensitive material should be prepared and sent

with care via e-mail or should be relegated to other means of communication.²⁶ Similarly, casual remarks made to colleagues may prove embarrassing if they are subsequently introduced in a courtroom.²⁸

... POSSIBLE SOLUTIONS ...

TEMPEST – Stanford University

An attempt to implement e-mail communication in a clinical setting was undertaken at Stanford University in 1994. Fridsma and colleagues developed TEMPEST, an electronic mail triage system for patients' prescription refill requests (D.B. Fridsma, MD, oral communication, March 1999). TEMPEST is an expert system interface that augments existing e-mail systems and sorts an incoming message, recommends an appropriate course of action based on the patient's electronic medical record, and forwards the message to the physician for approval. The system formulates recommendations based on background "rules" entered into the system, and a summary of information in the electronic medical record is provided to assist the physician in final approval of the prescription. TEMPEST was developed to assist in cases of potentially addictive medications, patients who required monitoring of drug levels, or patients who were prescribed drugs episodically, requiring doctors to review patients' charts before renewing prescriptions. Preliminary evaluation of TEMPEST suggests that physicians can successfully use a combination of clinical rules and patient medical records to assist with e-mail triage. To date, however, no formal, large-scale evaluation of the system has been conducted.

EMAIL – University of Michigan

At the University of Michigan and Ann Arbor Veterans Affairs Hospital, we (CAM, DTS, SJK) are evaluating one approach to electronic communication between physicians and their patients: the Electronic Messaging, Advice, and Information Link (EMAIL) study. This 3-year, randomized controlled trial funded by the Intel Corporation, features the development of the University of Michigan EMAIL system. This system is designed to maximize patients' access to their healthcare providers, while minimizing the potential for "e-mail overload" of busy physicians. Patients of participating physicians are encouraged to communicate with their doctors by e-mail, with a specially designed e-mail triage and tracking system operating behind the scenes. Patients' e-mails are received by a trained triage

nurse who acts similarly to the nurses who triage phone requests. All correspondence is also copied to the physician. The triage nurses assist with appointment scheduling, referrals, health-related forms, prescription renewals, test results, and basic health questions, whereas the patient's physician handles health concerns. The system also tracks messages and responses to provide a database for evaluation. The EMAIL study compares various outcome measures for patients and physicians using the triage system with those communicating through normal channels. Outcome measures are e-mail volume, response times, types of transactions occurring via e-mail between patients and physicians, impact of e-mail on phone calls and repeat visit volume, patient satisfaction, and physician satisfaction with communicating via e-mail.

... IMPLICATIONS FOR MANAGED CARE ...

E-mail and its easy link to the internet have enormous implications for managed care. As services become increasingly available, e-mail has the potential to improve patients' perceptions of the "accessibility" to their managed care organization and healthcare providers. It may also improve health outcomes and patient satisfaction without dramatically increasing healthcare expenditures.

Managed care organizations (MCOs) could use standard e-mail as an avenue to distribute health education materials and resources to all or some of their members, based on demographics or patient characteristics. Currently, e-mail is used by some MCOs for reminding patients to refill prescriptions. Existing efforts could be expanded to include sending health education resources, such as smoking cessation literature, weight loss tips, or stress management information. Interested patients could also be sent lists of health education web sites that are "endorsed" by their physician and/or managed care organization as being accurate and reliable.

E-mail communication could be intensified as part of a disease management strategy for patients with specific medical conditions, such as coronary artery disease, hypertension, or diabetes. At a basic level, patients could be sent information aimed at risk factor modification, compliance enhancement, and symptom management. In a more interactive approach, patients could be paired with a managed care-sponsored health educator or disease management specialist who would serve as a "virtual case manager." Case managers could answer questions

and monitor clinical markers (such as blood pressure or glucose levels) via e-mail.

As the technology improves, direct provision of care via the internet is a possibility. The results of an increasing number of disease-specific clinical markers that can be measured at home (eg, blood pressure, finger stick glucose, peak flow) could be automatically transmitted from the testing equipment via internet connections. Opportunities abound, but diffusion of internet-based health-related activities needs to be tempered by concerns over equitable access, confidentiality, and medicolegal issues. In addition, patients may have very different attitudes toward e-mails from their physicians versus e-mails from their managed care organizations. MCOs must work closely with enrollees and providers early in the diffusion process to identify, if not overcome, these hurdles in order to realize the enormous potential of this form of communication.

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