

## Bridging the Electronic Divide: Patient and Provider Perspectives on E-mail Communication in Primary Care

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**Objective:** To determine e-mail utilization patterns and attitudes toward e-mail use among primary care physicians and their ambulatory outpatient clinic patients.

**Study Design:** Cross-sectional baseline survey.

**Participants and Methods:** Participants included 476 consecutive outpatient clinic patients, 126 general medical and family practice physicians, and 16 clinical and office staff from 2 large primary care centers within an academic teaching system. They completed a survey about e-mail usage patterns and their attitudes toward using e-mail for patient-provider communication.

**Results:** More than half of patients (52.1%) were self-defined e-mail users, yet only 10.5% of those users had ever used e-mail to communicate with their doctors. Seventy percent of all patients said they would be willing to use e-mail to communicate with their doctors. Overall, patients were concerned about logistics, such as whether the message would get to the right person and how long it would take to get a response. Physicians and staff were more optimistic than patients about the potential for e-mail to improve the doctor-patient relationship. Patient e-mail users, patient e-mail nonusers, physicians, and staff reported low levels of concern about the security and privacy of e-mail.

**Conclusions:** Patient-provider e-mail may diffuse slowly into the primary care clinical practice setting because of patient concerns about efficiency and effectiveness and whether e-mail use will improve their relationship with providers. Managed care organizations that plan to build e-mail and Web-based patient portals will need to promote these technologies in a way that educates both patient and providers about their appropriate use.

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Electronic mail, or e-mail, has the potential to improve both the quality and efficiency of healthcare service delivery in managed care settings. The rapid diffusion of e-mail has resulted in an enormous increase in the number of people with

access to this electronic means of communication. In 1993, it was estimated that between 12 and 20 million people had access to e-mail.<sup>1</sup> By 1999, that number had exceeded 100 million.<sup>2</sup>

At the same time, physicians have incorporated e-mail into their clinical practices in growing numbers. The Canadian Medical Association's 1998 Physician Resource Questionnaire indicated that 46% of the physicians who use computers used them for e-mail, although the survey did not explore the purpose for that e-mail use.<sup>3</sup> In the clinical setting, physicians have begun to use e-mail to consult with colleagues, obtain hospital laboratory information, follow up with staff about patient care issues, and review and disseminate new research findings.<sup>4-9</sup>

Prior studies suggest that e-mail communication between physicians and patients is increasing, but that growth rates lag substantially behind growth in availability and general use of e-mail.<sup>4,10-14</sup> Published literature suggests that although access to e-mail is expanding, few patients have ever used e-mail to communicate with their healthcare providers (15%

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to 25%), even those who are regular e-mail users<sup>11</sup> or technologically savvy patient populations such as those found in San Francisco and the Silicon Valley.<sup>4</sup> Results from a survey of more than 9000 e-mail users in 2000 found that despite 85% reporting daily use of e-mail, only 6% reported ever sending an e-mail message to their healthcare provider, although more than half indicated that they would be interested in communicating by e-mail with their providers.<sup>13</sup> Similarly, a 1998 survey of physician members of the American College of Physicians–American Society of Internal Medicine indicated that fewer than 7% of physician respondents reported exchanging e-mail with their patients on a weekly or daily basis.<sup>15</sup> Although this literature suggests that the diffusion of electronic communication between patients and their providers continues to lag behind growth in general e-mail access, there is a paucity of information examining patient and provider attitudes toward this new form of communication.

The research reported here is an analysis of baseline survey data from patients, their physicians, and their physicians' staff who participated in a randomized control trial of e-mail use in a managed care primary care clinical setting. The trial compared patients and physicians with and without access to a triage-based e-mail system with respect to phone and visit volume, response time, and satisfaction. For the purposes of the research presented here, we were most interested in current practices, attitudes, and barriers regarding use of e-mail for patient-provider communication in a primary care managed care setting. Our research questions included the following: (1) What are e-mail utilization patterns among patients, physicians, and staff? (2) How do patients, physicians, and staff view the benefits and risks of e-mail?

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... METHODS ...

**Survey Development**

Four versions of the survey were developed as part of our research: one for patients who use e-mail, one for patients who do not use e-mail, one for physicians, and one for office staff. Our survey development process included exploratory interviews with selected patients, physicians, and staff in our target group to gain an understanding of how they viewed the concepts related to patient-provider communication; question drafting (based on the wording and response options suggested in the open-ended inter-

views); pretesting early versions of questions with respondents to assess clarity, meaning, recall, and burden; and revision. The patient instruments were designed at a sixth-grade reading level.

**Study Population and Data Collection**

*Clinic Setting.* The study sites were 2 large, university-based primary care clinics that had 32 faculty physicians averaging 5 half-days per week of direct patient care and 100 resident physicians who spent about 1 half-day a week in clinic. These clinics combined reported about 38,000 visits in the year 1999. Approximately 53% of patients were members of the university health maintenance organization (HMO), with 93% of all patients reporting coverage by some form of managed care (eg, HMO, preferred provider organization).

*Patients.* Consecutive primary care patients attending these clinics were invited to participate in the study. Each primary care site was surveyed for 2 consecutive weeks between August and October 1999. All patients who arrived at the clinics were approached for enrollment. Inclusion criteria included age 18 or older and the ability to read English and fill out a survey unassisted.

Patients were approached in clinic waiting rooms and asked to complete an anonymous survey about patient-provider communication. Those patients who agreed were then asked whether or not they used e-mail (whether they had an active e-mail account in the prior month that they used to send and receive e-mail messages). Self-defined e-mail users were given one questionnaire (a 20-item survey that took about 10 minutes to complete), and nonusers were given another (a slightly abbreviated version). Observable demographics (eg, gender, age group estimate) and self-reported e-mail user status were assessed for patients who refused to participate.

*Physicians and Clinic Staff.* All general internists and family physicians working in these 2 clinic settings during the study period were asked to complete a 13-item survey that took about 5 minutes. All nurses and office staff at these outpatient clinics were asked to complete a 17-item survey similar to that completed by patients and physicians.

**Data Analysis**

Data were entered and cleaned using Microsoft Access software (Microsoft, Inc, Redmond, WA), and statistical analysis was performed using SPSS for Windows 97 (SPSS Inc, Chicago, IL). Basic descriptive statistics, including frequencies and means,

were calculated for each variable. Univariate analyses were conducted using the Pearson correlation, the Student *t* test, the  $\chi^2$  test, and the Kruskal-Wallis test. Multinomial logistic regression was used to calculate odds ratios and to test for differences between groups while controlling for other factors.

... RESULTS ...

**Response Rate and Nonresponder Characteristics**

*Patients.* Of the 600 patients approached, 61 (10.2%) refused to participate and 59 (9.8%) failed to return a completed survey. Four hundred and eighty patients completed and returned surveys (80.0% response rate). Four were removed from the analysis because they were less than 18 years old, yielding a total sample of 476. Reasons for refusal included not speaking English well (4.8%), not feeling well (4.0%), poor vision (3.2%), very elderly/confused (3.2%), too busy (2.1%), being a university employee (1.8%), or difficulty reading (0.9%). Those who refused to participate were more likely to be older and nonusers of e-mail ( $P < .001$ ) than the 80% of patients who returned complete surveys.

*Physicians and Staff.* A total of 132 physicians (32 faculty physicians and 100 residents) were approached, and 126 returned completed surveys (90.6% of faculty physicians and 97.0% of resident physicians, 95.5% response rate overall). Nineteen office staff members were approached, and 16 returned surveys (84.2% response rate). The 6 physicians and 3 staff members who did not return surveys were no different than the overall sample in terms of age or gender.

**Demographics**

*Patients.* **Table 1** shows the demographic characteristics of the patient sample. E-mail users made up about half of the sample. Users were younger, better educated, wealthier, and healthier than their non-e-mail-using counterparts.

*Physicians and Staff.* The mean age of the faculty physicians was 42.0 ( $\pm 8.5$ ) years, and the mean age of the residents was 28.5 ( $\pm 2.5$ ) years ( $P < .001$ ). About a third of the physicians were female, with no difference by faculty or resident status. Faculty were more likely than residents to have academic degrees in addition to an MD (eg, MPH, MBA, PhD;  $P = .001$ ), and they were more likely to report current use of e-mail with their patients (75.8% among faculty with a mean of 4.0  $\pm$  5.3 patient e-mail messages per week vs 19.0% among residents with a mean of 0.8  $\pm$  0.9 e-mail messages per week;  $P < .001$ ). The 16 office staff members who completed our survey included 7 registered nurses and 9 nonclinical staff. All were women, and they ranged in age from 31 to 60 years (mean age of 43.6  $\pm$  9.0 years). Fifty-three percent reported using e-mail with patients (mean of 3.1  $\pm$  4.3 e-mail messages/week).

**Table 1.** Patient Characteristics by E-mail Use Status

Characteristic	All Respondents (n = 476)	E-mail Users (n = 248, 52.1%)	Nonusers of E-mail (n = 228, 47.9%)	P (Users vs Nonusers)
Age (mean $\pm$ SD)	49.4 $\pm$ 18.5 y	41.7 $\pm$ 14.8 y	58.8 $\pm$ 18.2 y	.001*
Gender (%)				.85 <sup>†</sup>
Male	40.9	40.5	41.4	
Female	59.1	59.5	58.6	
Education (%)				<.001 <sup>†</sup>
High school education or less	26.5	14.7	40.7	
Some college	33.6	30.4	37.6	
College graduate or postgraduate	39.9	54.9	21.7	
Income (%)				<.001 <sup>†</sup>
$\leq$ \$35,000	35.0	22.8	50.6	
\$35,001-\$75,000	37.3	36.6	38.1	
$\geq$ \$75,000	27.8	40.7	11.4	
No. of doctor visits in past 6 mo (mean $\pm$ SD)	4.9 $\pm$ 7.4	4.29 $\pm$ 4.58	5.65 $\pm$ 9.8	.18 <sup>‡</sup>
Self-assessed health (mean $\pm$ SD) <sup>§</sup>	7.0 $\pm$ 1.99	7.45 $\pm$ 1.61	6.45 $\pm$ 2.26	<.001 <sup>†</sup>

\*By the Student *t* test.

<sup>†</sup>By the Pearson  $\chi^2$  test.

<sup>‡</sup>By the Kruskal-Wallis test.

<sup>§</sup>According to a 11-point scale (0 = poor, 10 = excellent).

**Characteristics of Patient E-mail Nonusers and Users**

Among the 228 patients who did not use e-mail (47.9%), 6.9% said they were planning to start using e-mail within the next month, 18.3% said they were thinking about starting to use e-mail within the next 6 months, and 74.8% said they were not thinking about starting to use e-mail within the next 6 months.

**Table 2** shows the characteristics of e-mail users. Many of the users had been using e-mail more than 3 years (49.2%), checked their e-mail daily or several times per day (64.8%), and accessed their e-mail at both home (81.7%) and work (56.7%). However, 89.5% of users had never used e-mail to communicate with their physicians.

**Patient Barriers to Healthcare E-mail Use**

We examined patient barriers to use of e-mail with their physicians. More nonusers than users reported agreement with each barrier presented ( $P < .01$ ,

controlling for age, gender, education, and income) (**Figure 1**). The most commonly cited barriers were related to patient concerns about the effectiveness and efficiency of communication through e-mail: I'd rather speak to a real person (46.2% users, 88.7% nonusers), I'd rather call my doctor (36.6% users, 85.2% nonusers), I'm afraid it would take too long to get a response (31.5% users, 50.5% nonusers), and I have concern about messages getting lost (27.4% users, 68.0% nonusers). Security concerns were less commonly cited among both users and nonusers (33.4% of users and 37.7% of nonusers) (**Figure 1**).

We also analyzed the differences between patients who said that they would be willing to use e-mail to communicate with their physicians and those patients who would not be willing to communicate with their providers electronically. Among patients who had e-mail access, 87.6% stated that they would be willing to use e-mail to communicate with their physicians. Willing patients did not differ from unwilling patients with regard to demographic factors, visit utilization, or health status. However, willing patients were more likely than unwilling patients to have positive attitudes towards e-mail use with their physicians. Compared with patients unwilling to use e-mail with their doctors, willing patients were more likely to believe that e-mail communication could improve relationships with their doctors (56.5% vs 11.3%;  $P < .001$ ); thought e-mail was a good way to deal with medical questions (85.4% vs 33.4%;  $P = .003$ ); and were less concerned about e-mail getting lost (39.4% vs 60.7%;  $P < .001$ ) or e-mail being read by others (35.7% vs 64.3%;  $P < .001$ ).

**Physician Attitudes Toward E-mail Use**

Among surveyed physicians, 61.1% agreed that e-mail is a good way for patients to reach them, 60.0% said that e-mail was a good way to handle patients' administrative concerns, 51.6% said they did not mind if patients e-mailed them, and 44.4% said they thought patient e-mail messages would add to their workload and not substitute for other tasks. Nearly half (47.6%) said they were afraid they would be overwhelmed by patient e-mail messages if they gave out their e-mail address, although less than a third (30.1%) cited not having enough time as a problem in communicating with patients. There were no significant differences between faculty and resident physicians. However, physicians who reported daily use of e-mail for any reason (52.8% of sample) had somewhat more positive attitudes

**Table 2.** Characteristics of Patient E-mail Users (n = 248)

Characteristic	Percentage
Length of time using e-mail	
<1 y	15.7
1-3 y	35.1
>3 y	49.2
Frequency of checking e-mail	
Once a week or less	14.3
Several times a week	20.9
At least daily	64.8
Where e-mail is used	
Home	81.7
Work	56.7
School	13.0
Friend's house	15.0
Library	3.6
To whom e-mail is sent	
Bosses/coworkers	57.3
Family/friends	88.7
Companies re products	49.8
Professionals (including doctors) re services	17.8
Use of e-mail with doctor	
Never	89.5
Once	2.5
2-3 times	2.9
4-5 times	1.7
More than 5 times	3.3

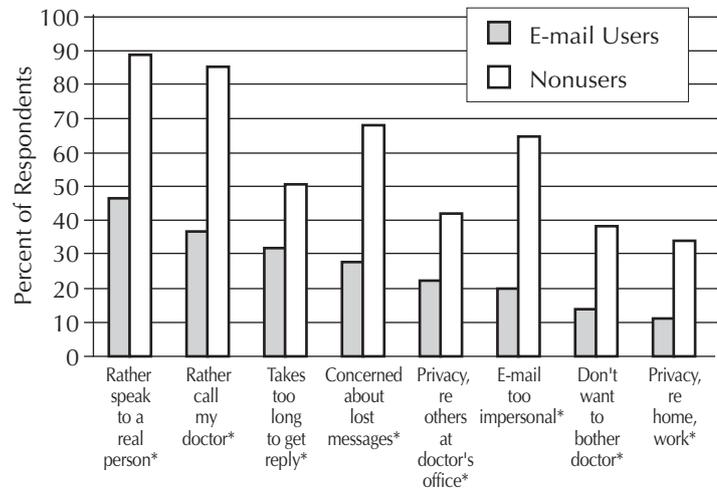
toward e-mail use with patients than physicians who used e-mail less frequently. For example, regular users were less bothered than infrequent users by time pressures associated with patient e-mail (23.0% vs 41.5%;  $P < .01$ ) and more likely to view e-mail as a good way to communicate with patients (73.0% vs 46.2%;  $P < .01$ ).

**Staff Attitudes Toward E-mail Use**

Nearly three quarters (73%) of the surveyed staff said that they thought e-mail was good for handling patients administrative concerns, 60% said e-mail was a good way for patients to reach them, and 60% said they didn't mind if patients e-mailed them. However, half of the staff members agreed that they feared being overloaded with patient e-mail messages if they distributed their e-mail address, 46.7% said they didn't think they had time to check e-mail frequently enough to benefit patients, and 57.1% said that they thought e-mail would add to their workload rather than substituting for other tasks.

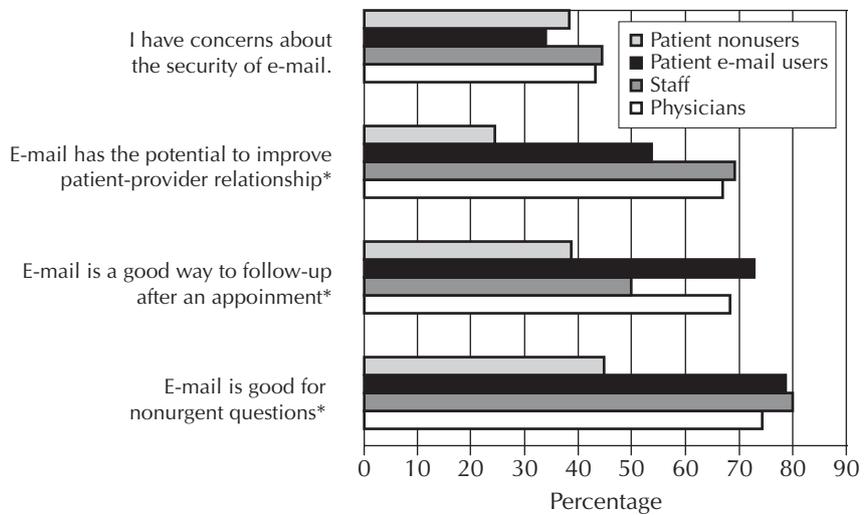
**Figure 2** compares the responses of patients (nonusers and users), physicians, and staff to similar questions about the utility of e-mail. Patient nonusers were more likely than the other groups to harbor negative attitudes about e-mail. For example, they were less likely to agree that e-mail could improve the patient-provider relationship or be a good vehicle for nonurgent questions or postclinic follow-up. Physicians and staff appeared more optimistic than patients about e-mail's potential to improve the doctor-patient relationship. For example, 24.2% of patient nonusers, 53.4% of patient users, and 66.7% of physicians agreed that e-mail has the potential to improve the patient-provider relationship ( $P = .008$ , controlling for age and education). Office staff appeared to have more concerns than physician or patient e-mail

**Figure 1.** Patient Barriers to Using E-Mail to Communicate With Physicians



\* $P < .01$  for users compared with nonusers, controlling for age, gender, education, and income.

**Figure 2.** Patient, Physician, and Staff Attitudes Toward Healthcare E-Mail Use



\* $P < .01$  for comparisons among groups, controlling for age and education.

users about the limitations of e-mail for follow-up after an appointment. Note that patients (nonusers, 37.3%; users, 33.4%), physicians (42.8%), and staff (43.8%) all reported relatively low levels of concern about the security of e-mail, with no significant differences between groups.

... DISCUSSION ...

The results of our study suggest that although patients and their physicians are both connected to the Internet, there are barriers to connecting to each other. About half of the patients surveyed used e-mail and most used it regularly, and all physicians and staff at our study sites reported regularly using e-mail. Two thirds of all patients surveyed said they would like to communicate with their doctors via e-mail, yet only 10% of e-mail users (less than 5% of all patients) reported ever having done so. These findings are fairly consistent with previous research.<sup>13</sup>

Our results suggest that, at least early on, the communication burden in ambulatory managed care settings may not diminish as patient-provider e-mail diffuses into clinical practice. This is because early adopters of e-mail appear to be healthier, younger, more educated, and less likely to use clinic resources such as visits than those who do not use e-mail. Thus, patient-provider e-mail generated by this group may not substitute for visits and phone calls, but rather, increase the total communication workload in clinical practice. Although research suggests that those patients who contact their physicians frequently by phone tend to utilize other clinic resources at a higher rate than their nonphoning counterparts,<sup>4,16</sup> the same logic may not apply for e-mail, given the characteristics of e-mail users. However, as e-mail and access to the Internet diffuse more broadly, it is possible that we may see e-mail being used increasingly by sicker, older patients in a way that does substitute for other clinic resources.

Our findings suggest that physicians and staff may view the benefits and risks of e-mail differently than their patients. Although providers appeared to have positive expectations that e-mail can be an efficient source of communication and can improve the patient-physician relationship, patients appeared less convinced. Sixty percent of physicians said that e-mail is a good way for patients to reach them and that it would be helpful for handling patients' administrative concerns. Patients appeared to be concerned that this form of communication remains untested and that they would not get the response they needed in a timely fashion, especially compared with using the telephone. Although many articles have been published predicting rapid adoption of both e-mail and Web-based communication,<sup>4,11,17,18</sup> study patients appeared to have their doubts about e-mail, especially those with less experience with this medium. Although providers were somewhat more likely than patients to endorse con-

cerns about the security and privacy of e-mail, these concerns were endorsed by fewer than half of the individuals in both groups. This suggests that both providers and patients may not understand the substantial limitations of e-mail systems regarding security and confidentiality.

**Limitations**

Several aspects of the study merit comment. First, the study took place in 2 large, university-affiliated primary care centers with a mix of residents and staff physicians. Thus, the results may not be generalizable to other settings such as nonacademic group practices with predominantly full-time clinicians. Second, the survey was done in late 1999. Since that time, it is likely that e-mail use in general and e-mail use between patients and their physicians or staff have increased. It is possible that as the environment has changed and e-mail use has diffused more widely, patient and provider knowledge and attitudes toward its use in the clinical setting have changed. In particular, extensive coverage of federal legislation about the privacy of healthcare data, such as the Health Insurance Portability & Accountability Act of 1996, may have increased patient and provider awareness and concern about privacy issues. Third, our survey was limited to questions about e-mail communication, and thus does not necessarily reflect the attitudes patients, physicians, and staff may have towards Web-based electronic communication.

**Implications for Managed Care**

The results of this research have several implications for managed care organizations. First, differences between patient and provider expectations about the role of e-mail in clinical practice suggest that electronic communication will need to be actively promoted in a way that educates both parties about its appropriate use. Promotional materials such as physician cards and brochures inviting patients to use these new communication methods should include content that educates patients and providers about security issues, appropriate content and use of messaging, and expectations about response time. Automatic e-mail responses also could supplement written materials to educate patients at the time they send initial messages into the system. The low level of concern regarding security and privacy of e-mail we found among both providers and patients underscores the need to address education and "expectation management" with regard to e-mail exchanges.

Providers' concerns regarding the additional workload associated with e-mail should motivate ongoing efforts to build and evaluate communication systems that maximize efficiency and effectiveness of communication in managed care settings. System strategies should include triage of messages to appropriate staff members, management of messaging between providers and staff, and facilitating documentation of clinically important information. Web-based communication "patient portals," which are slowly diffusing into clinical settings, have clear advantages over e-mail because communication can be automatically structured and triaged to appropriate staff, privacy can be ensured, and other systems within the clinical enterprise such as electronic medical records, scheduling, registration, and billing can be integrated with the patient portal systems.

Many providers, payers, and policymakers view electronic patient-provider communication as an important vehicle to improve clinical practice by reducing resource use and improving clinical outcomes.<sup>19,20</sup> However, a number of barriers have slowed the diffusion of these technologies into clinical practice, including costs of implementation, integration, and maintenance of new systems; provider concerns about workload; patient access and acceptability; and concerns about security.<sup>21,22</sup> Thus, there remains an enormous need for research into the cost and outcomes of electronic patient-provider communication in clinical practice.

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