A Content Analysis of E-mail Communication between Patients and Their Providers: Patients Get the Message

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Abstract

Objective: E-mail use in the clinical setting has been slow to diffuse for several reasons, including providers’ concerns about patients’ inappropriate and inefficient use of the technology. This study examined the content of a random sample of patient–physician e-mail messages to determine the validity of those concerns.

Design: A qualitative analysis of patient–physician e-mail messages was performed.

Measurements: A total of 3,007 patient–physician e-mail messages were collected over 11 months as part of a randomized, controlled trial of a triage-based e-mail system in two primary care centers (including 98 physicians); 10% of messages were randomly selected for review. Messages were coded across such domains as message type, number of requests per e-mail, inclusion of sensitive content, necessity of a physician response, and message tone.

Results: The majority (82.8%) of messages addressed a single issue. The most common message types included information updates to the physicians (41.4%), prescription renewals (24.2%), health questions (13.2%), questions about test results (10.9%), referrals (8.8%), “other” (including thank yous, apologies) (8.8%), appointments (5.4%), requests for non-health-related information (4.8%), and billing questions (0.3%). Overall, messages were concise, formal, and medically relevant. Very few (5.1%) included sensitive content, and none included urgent messages. Less than half (43.2%) required a physician response.

Conclusion: A triage-based e-mail system promoted e-mail exchanges appropriate for primary care. Most patients adhered to guidelines aimed at focusing content, limiting the number of requests per message, and avoiding urgent requests or highly sensitive content. Thus, physicians’ concerns about the content of patients’ e-mails may be unwarranted.

Internet to obtain health information, including surveys reporting correlations between patient visits and use of the Internet to obtain health information\textsuperscript{14} and the need for guidelines to address important concerns about the use of e-mail for confidential and nonconfidential communications.\textsuperscript{29} In fact, several organizations, including the American Medical Association,\textsuperscript{30} American Medical Informatics Association,\textsuperscript{29} Hi-Ethics,\textsuperscript{31} and Medem,\textsuperscript{32} have published guidelines to assist clinicians in their electronic encounters with patients.

Largely absent from the literature are studies exploring the appropriate use of e-mail between patients and their health care providers. That is, there is more information about how patients would like to use e-mail to communicate with their physicians\textsuperscript{19} than there is about how they actually do use it.

To learn more about how patients actually use e-mail in communicating with their physicians, we conducted a content analysis of a sample of e-mail messages that patients sent to their health care providers as part of a randomized, controlled trial (RCT) of a triage-based e-mail system performed at the University of Michigan.\textsuperscript{2,17} The larger trial was designed to determine whether a triage-based e-mail system could offset clinical resource utilization, such as telephone calls and repeat visits.\textsuperscript{17} (It did not.) The EMAIL (Electronic Messaging, Advice, and Information Link) system developed for that trial is what was used in the research described here.

**The EMAIL System**

The Electronic Messaging, Advice, and Information Link system is a stand-alone software application developed at the University of Michigan using Perl. It was designed to integrate with the university's existing Novell Groupwise e-mail package, which uses IMAP protocols. Developed in 1999, EMAIL used standard e-mail communication rather than a secure Web-based interface, which was developed later.\textsuperscript{33} EMAIL was used to (1) track incoming e-mail addresses, (2) solicit consent from those patients e-mailing from an unfamiliar or unconsented e-mail address, (3) send auto replies with information about how to use the system (Fig. 1), (4) route incoming e-mails to the triage nurse while sending FYI (for your information) copies to participating physicians, and (5) collect data such as date and time stamps, subject lines, and, in the case of consenting patients, message content. Figure 2 illustrates the flow of messages through EMAIL.

At the time that EMAIL was developed, there were no universal encryption protocols that could be broadly implemented that would still allow access for patients who were not technologically savvy. Users within the university's Groupwise e-mail system were behind a secure firewall, but users outside the university were using unencrypted, open-Internet e-mail to communicate with their providers.

Thank you for using our EMAIL system! This is an automatic reply to the e-mail you just sent your doctor. Your e-mail has been received and will be handled as soon as possible. If this is an emergency, please call 911. If you need immediate assistance but it is not an emergency, please call your doctor.

PLEASE BE SURE TO INCLUDE YOUR FULL NAME, REGISTRATION NUMBER, AND DAYTIME PHONE NUMBER IN ALL EMAILS!!

You should receive a reply to your e-mail within the next 2 business days. If it has been more than 2 days, follow up by calling your doctor's office.

For e-mails about prescription renewals:
- Include the name and dose of the medication, how many pills you have left, the name and phone number of your pharmacy, and your doctor's name.

For scheduling:
- Use e-mail only to confirm or cancel an appointment.

For referrals:
- Include information about whether or not you have seen your doctor about this condition before, what type of specialist you would like to see (if you know), and how you would like to receive your referral form (mailed to you vs. picking it up at clinic).

For billing:
- Include as much information from your bill (such as invoice number, tracking number) as possible.

Thank you
The Clinic
(phone number)

**Figure 1.** Auto reply sent in response to each incoming message.
address this issue, we included prominent text in all solicitation materials and consent forms advising patients to avoid communicating about sensitive issues via e-mail.

**Research Questions**

Our research questions were:

1. For what purposes did patients most frequently use e-mail to communicate with their providers? For example, were most e-mails administrative (e.g., appointment scheduling) or clinical (e.g., health questions) in nature?
2. Were the content and tone of messaging appropriate for a primary care delivery setting?
3. Did patients follow specific guidelines developed by the study team for using e-mail to communicate with their physicians and staff?

**Methods**

This study was conducted as part of an RCT of a triage-based e-mail system that took place in two large university-affiliated primary care centers from August 2000 through June 2001.\(^1\) We briefly summarize the RCT, the details of which have been published elsewhere.\(^2\) We then describe in more detail the methods related to the qualitative study of the content of a sample of e-mail messages collected during the trial (Content Analysis section).

One hundred three physicians in internal medicine and family medicine were asked to participate in a study of patient–provider electronic communication. Physicians were randomized into intervention (n = 50) or control groups (n = 48), with the understanding that the intervention would involve allowing one’s patients to have access to a patient–provider electronic communication tool. Control physicians continued to communicate with their patients through standard channels (primarily by telephone and visits). All participating physicians were asked to fill out a few short surveys as part of the study. Three faculty physicians and two residents declined to participate, for an overall participation rate of 95.1%.

Patients of the intervention physicians were encouraged to use a new triage-based e-mail system to communicate with their physicians and clinic staff. Because there was no valid primary care roster and because we wanted to limit the possibility of contamination across intervention and control group patients, we conducted targeted promotion in several ways.\(^1\) First, intervention physicians distributed cards during patients’ clinic visits with their study-specific e-mail address on it (e.g., Dr.Alias@umich.edu instead of doctorname@umich.edu) and instructions about using E-MAIL. Second, promotional flyers were mailed to a random sample of 5,000 patients who had visited an intervention physician in the previous six months or were scheduled to visit an intervention physician in the next six months. Third, all patients who used the e-mail system received automatic responses to each message they sent, reinforcing the information sent in the flyers and included on the physicians’ cards. Finally, nurses were encouraged to ask patients of intervention physicians who called the office if they might be interested in using e-mail in the future as well as providing them with the physician’s study-specific address.

Promotional materials informed patients that E-MAIL was designed to facilitate communication with their physician’s office; thus, messages would be read by their physician as well as a nurse or other clinic staff member. Patients were also asked to follow specific guidelines in communicating with their health care providers, including the following: (1) do not use e-mail for emergencies or urgent messages; (2) do not use e-mail to communicate about sensitive topics, such as HIV; (3) use e-mail to communicate with your physician and health care team about appointment scheduling, billing questions, health questions, prescription renewals, referrals, and test results; (4) send separate e-mails for each type of request; and (5) include relevant topic-specific information (e.g., for referrals, include information about whether the referral was requested by a physician, previous visits, and preferred specialist). These guidelines were included in promotional material sent to patients (information cards and brochures) as well as in an automatic reply sent back in response to every incoming patient message.

Patients of control physicians contacted their physicians through traditional modes and were not given access to the triage account. However, independent of our study, patients of both intervention and control physicians could e-mail their physicians by using the physician’s personal e-mail account available through a few physicians’ personal cards or by searching the medical center directory. Consent was obtained from all study physicians and those intervention patients who participated in a post-intervention survey.

**Figure 2.** E-MAIL (Electronic Messaging, Advice, and Information Link) system flow.
Patient consent was not required for use of the EMAIL system.

All incoming e-mails from patients were automatically sent to a central resource account managed by a triage nurse at each site, a registered nurse with many years of experience working in the study clinics. All the triage nurses in this study had been trained in the use of EMAIL, and all were familiar with human subjects research protocols. Triage nurses continued to execute their normal duties in the clinic in addition to checking the EMAIL account, responding to messages, and ensuring that all messages had been handled in a timely manner.

Triage nurses used subject headings and message content to route incoming messages to appropriate clinic staff via folders within the central resource account. For example, billing questions were sent to a folder for the billing clerk to check and appointment scheduling questions were sent to a folder for the scheduling clerk. Nurses and other clinic staff entered the central account directly to respond to messages. Physicians were copied on all incoming messages from patients (to which they could reply as they thought appropriate or as suggested by the triage nurse) and on all responding messages from nurses and clinic staff. Thus, physicians were kept apprised of their patients’ messaging activity and were not asked to address nonclinical messages (Fig. 2).

Content Analysis

All patients of intervention physicians who sent a message through the EMAIL system were asked whether they would be willing to participate in a study of the content of patient-provider e-mail communication. They were sent an electronic consent form that asked: Can we remove the identifiers in your e-mails and save them to a database so that we can analyze how patients are using e-mail to communicate with their health care providers? Patients who indicated that they did not want this done (4.8%) were excluded from the content analysis study, but they could still use the EMAIL system to communicate with their health care providers. All consent forms and protocols were approved by the University of Michigan Institutional Review Board.

After excluding messages from patients who declined to participate in the content analysis and after limiting our sample to messages sent from patients to their health care providers (as opposed to messages from health care providers back to patients), a total of 3,007 messages were received from 1,000 patient e-mail accounts from August 2000 to June 2001. Messages were saved to a database, and then a single researcher went through the database and removed all identifying information in preparation for analysis. This included information in the message headers as well as any identifying information embedded in the message.

We identified an approximate 10% sample (326 messages) by random selection (assigning a random number to each message, sorting numerically, and then analyzing those numbered 1 to 326). After we eliminated those messages with no text in the main body of the message (n = 22), those that could not be coded (such as automatic vacation replies or incomplete messages) (n = 20), those that related only to the study consent forms (n = 4), those that were in a foreign language (n = 2), and those that were clearly not patient–doctor messages (n = 5), a final subsample of 273 messages remained. For the purposes of this analysis, messages were studied independently of any previous or future correspondences on that topic in the same e-mail “thread.”

Each message was coded independently by three of the authors (CBW, CAM, DTS), and codes were compared for interrater agreement. The coders included a primary care physician with a PhD degree in education, a medical school assistant dean/administrator, and a senior research associate who was the e-mail study coordinator.

Results

Coding Schema

We incorporated several communication theories34–39 to develop a coding schema that yielded nine main message content categories (ordered by frequency of appearance): health information updates for the physician, prescription requests, other (including thank yous, apologies, and nonmedical messages), health questions for the physician, requests for test information or results, requests for referrals, information seeking about non-health-related issues (such as directions to the clinic), appointment scheduling, and billing questions. Additional content categories included medical (vs. nonmedical) content, updates on outside medical care, to whom the request was directed (physician, staff, both, or neither), the necessity of a response by a physician, and complaints. We also coded each message based on tone; categories here included formality, conciseness, and courteousness. Finally, we coded each message according to whether it followed the study guidelines of limiting messages to a single request about a single health condition as well as avoiding emergency or urgent requests or sensitive content. Coders agreed in advance that although all personal health information could be regarded as sensitive information, “especially sensitive content” would be defined as messages including information about mental health issues such as depression or anxiety (conditions or medications) or substance abuse, sexual conditions or functioning, and sexually transmitted diseases.

The nine main message content categories were determined with 94.4% interrater agreement. Additional content and tone categories yielded interrater reliabilities ranging from 84.5% to 100% agreement (Table 2), and the number of conditions per e-mail, inclusion of sensitive content, and the number of messages regarding emergency or urgent requests were determined with 100% interrater agreement. Discrepancies in coding were negotiated by consensus among the coders.

The Patients

Subjects were all primary care patients who sent an e-mail to their internal medicine or family medicine physician through a triage-based e-mail system during the study period and consented to participate in a research study examining e-mail content. As mentioned, there were 1,000 unique e-mail accounts represented, although some patients used more than one e-mail address to communicate with their providers.

Identifiers were removed from all messages stored in the content analysis database, preventing direct analysis of patient characteristics. However, a primary care population-based survey conducted at the beginning of the study1 suggested that, compared with non-e-mail users, e-mail users...
in this study were younger (46.3 vs. 67.1, \( p < 0.01 \)), more likely to be female (62.1% vs. 57.7%, \( p = 0.04 \)), and also more likely to be college graduates (61.2% vs. 21.6%, \( p < 0.001 \)). Whites and Asian race groups were more likely to use e-mail (73.6% and 93.4%, respectively) than African Americans or others (42.9% and 50.3%, respectively, \( p < 0.01 \)). Finally, e-mailers reported fewer physician visits in the previous six months than non-e-mailers (mean, 2.2 vs. 3.0, \( p < 0.01 \)).

The Messages

Table 1 shows message distribution and examples by main content categories for the 273 messages included in the content analysis. Information update to the physician was the most frequently used message type (41.4%), followed by prescription renewal request (24.2%), patient-initiated health questions to physicians (13.2%), messages about test results (10.9%), requested referrals (8.8%), "other" (including thank yous, apologies, and nonmedical correspondence) (8.8%), appointment requests or changes (5.4%), requests for information not related to health (4.8%), and billing questions (0.3%). Two hundred twenty-six messages (82.8%) contained only one message type, whereas the remaining 47 messages (17.2%) contained two or more message types. The distributions of message type were similar for single versus combination messages.

Most of the messages (94.5%) were directly related to medical issues. (See Table 2 for message examples for additional content and tone categories.) Those that were coded as nonmedical included messages that were exclusively "sorries" or "thank yous" and those that addressed content not relevant to a patient’s care, such as discussion about an upcoming vacation. A fairly small percentage of messages (7.0%) provided physicians with reports about outside care that the patient had received or would be receiving.

Using a combination of subject headings and message text, it was determined that more than half of the messages (53.5%) were addressed to the physician, 19% were directed to the nurse, 1% were directed to both the physician and the nurse, and the remainder (26.4%) were not clearly directed at either the physician or the nurse. Fewer than half of the messages (43.4%) appeared to require follow-up by a physician, as judged by the physician coder. The coding schema for "requiring follow-up" was fairly liberal in that it included such things as prescription renewals (about half of these messages), which may require only verbal approval by the physician for the nurse to act on.

Only five of the 273 messages (1.8%) were coded as complaints. These focused mostly on the timeliness (or absence) of receiving responses, responses to multiple auto repli-ees, difficulties communicating with the clinic via telephone ("I have been trying to contact the clinic all day and have not been able to speak with a live person"), or irritation about a specific issue ("We must be playing ring around the insurance . . . this needs to be straightened out").

Coding by tone revealed that the majority of messages were formal, concise, and courteous. Interrater agreement for message tone factors ranged from 84.5% to 93.5% (Table 2). Nearly two thirds (64.1%) of the messages included some sort of formal salutation, such as "Dear Doctor," "Dr. Smith,"

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Distribution of Messages by Main Content Categories</th>
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<tr>
<td>Type of Message</td>
<td>Message Count (N = 273) (%)</td>
</tr>
<tr>
<td>Information updates to the physician</td>
<td>41.4</td>
</tr>
<tr>
<td>Prescription renewal requests</td>
<td>24.2</td>
</tr>
<tr>
<td>Health questions</td>
<td>13.2</td>
</tr>
<tr>
<td>Messages about medical tests</td>
<td>10.9</td>
</tr>
<tr>
<td>Referral requests</td>
<td>8.8</td>
</tr>
<tr>
<td>Other (thank yous, apologies, nonmedical, e-mail study related)</td>
<td>8.8</td>
</tr>
<tr>
<td>Appointment requests</td>
<td>5.4</td>
</tr>
<tr>
<td>Information seeking</td>
<td>4.8</td>
</tr>
<tr>
<td>Billing questions</td>
<td>0.3</td>
</tr>
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</table>

*Total percentage points exceed 100 because multiple requests were included in individual messages.*
Courteous vs. noncourteous 84.5%, 0.66

In this study, we examined the content and tone of a random sample of e-mail messages received in the context of an RCT of a staff-triaged e-mail system. The intervention included promotional materials and automatic e-mail replies that instructed patients about appropriate content of medical e-mail and expectations about provider replies. In this context, we found that the content categories of messages reflected the broad needs of patients for communicating with providers and staff in primary care settings. Nearly half of the messages addressed administrative tasks, such as prescription renewals, referral requests, appointment requests, and questions about test results. Yet the single dominant category of communication was health-related information updates for the physician. More than 40% of messages sent by patients were intended to update their physicians on medical events and/or health status.

Our findings showed that the content and tone of the majority of e-mails were appropriate. Most messages addressed only one content area and were limited to a single request. All messages were deemed nonurgent, and very few messages involved highly sensitive content. Those that did include sensitive content were most often related to medication refills for mental health conditions. Furthermore, the tone of messages was generally formal, concise, and courteous, indicating a strong degree of respect for the physician’s time and effort.

In summary, most patients in this sample who sent e-mail did so with close adherence to our guidelines aimed at focusing content, limiting the number of requests to one per message, and avoiding urgent requests or highly sensitive health issues. Collectively, these results suggest that physicians’ concerns about using e-mail in clinical practice may be unwarranted.

**Study Limitations**

Several aspects of the study merit comment. First, the context of the e-mail exchange was a triage-based intervention evaluated by an RCT in two large academic primary care centers, staffed by both faculty and resident physicians. It is
possible that the content and tone of messaging may vary across different clinical settings with different communication environments. Yet the main finding, that patients will largely adhere to guidelines regarding the appropriate use of e-mail communication with their health care providers, is likely to generalize to other clinical settings, especially those affiliated with academic medical centers. Second, we excluded patients from our study who indicated that they did not want their messages evaluated. Although this comprised only 4.8% of patients, the content and tone of their messages may have been different from our study population. Due to this group’s small proportion, the challenge to validity is not likely to be significant, however. Third, in analyzing the content of messages sent from patients to their providers, we determined the likely need for follow-up based on physician judgment. Although this does not reflect patients’ judgments about the need for follow-up on messages, patients did not indicate that they were unhappy with the responses that they were receiving during the study. Although we managed communication effectively and followed all institutional guidelines, this study occurred prior to the implementation of the Health Insurance Portability and Accountability Act (HIPAA). It is possible that future studies and experiences will be affected by new communication requirements implemented under HIPAA. Finally, this study focused on patients’ messages to their providers in isolation. It did not examine strings of messages or providers’ responses back to patients. Future research should attempt to explore a more comprehensive picture of the back-and-forth exchanges occurring in clinical care.

Implications for Primary Care

Because e-mail remains the most accessible form of electronic communication for patients and providers, its use will most likely continue to grow in clinical settings, especially among smaller group practices with limited resources available for information technology. The results of our content analysis demonstrate that a triage-based e-mail system combined with patient education yields patient messaging that is appropriate and relevant to a primary care setting. These findings combined with other results from our trial, suggest that patient e-mail addresses an unmet need for relevant communication in primary care. Rather than substituting for telephone calls or visits, e-mail may be providing an additional means of communication for patients who might not otherwise communicate with their physicians about such things as new symptoms or resolution of old problems. Addressing this unmet need for communication may improve patient satisfaction or clinical care processes.

Our findings can help providers consider strategies to optimize e-mail use in their practice settings. First, our results suggest that providers can manage patient e-mail using low-cost strategies that emphasize patient education about appropriate content and expectation management about urgency and response time. Indeed, the system that we developed for our trial was built within a widely available e-mail communication package using standard features and functions. Second, our results offer reassurance to providers who are worried about the difficulty of managing lengthy, unfocused, incomplete, or inappropriate e-mail in medical settings. Our findings strongly suggest that patients will adhere to simple rules about “dos and don’ts” of e-mail and that this guidance can be delivered through low-cost auto reply messages, information cards, or brochures, reinforced by physician and staff input. Third, our results can help guide planning with regard to incorporating e-mail into the workflow of primary care clinic settings. Given the myriad of possible content of e-mail in primary care, a staff-based triage system may be more efficient than non-triage-based alternatives. It is not unlike having trained staff handle incoming phone calls: Few policy makers would argue that all patient phone calls should go directly to physicians, yet this is what often happens with e-mail. Because we found that many messages involved health-related content relevant to physicians, a staff–physician communication link should be deployed. Our content analysis revealed that approximately 40% of incoming patient messages appeared to warrant physician responses. This matched quite closely the percentage of all incoming patient e-mail messages that actually received a physician e-mail reply (40.4%). Thus, physicians need not see many messages. However, a system should be developed that allows for physician forwarding and replies.

Conclusion

Web-based patient–provider communication tools are beginning to emerge within larger clinical delivery systems. These tools have many advantages over simple e-mail, including greater security and compliance with federal privacy regulations, more robust features for patients, more structured communication pathways for providers, more efficient patient education, and more robust documentation options. Our findings suggest that patients will use these systems in appropriate ways. Much additional research is needed to evaluate the best ways to deploy electronic communication between patients and providers in a way that improves the efficiency and effectiveness of medical care.

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