

Research article

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Results of a content analysis of electronic messages (email) sent between patients and their physicians

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Abstract

Background: Email is the most important mechanism introduced since the telephone for developing interpersonal relationships. This study was designed to provide insight into how patients are using email to request information or services from their healthcare providers.

Methods: Following IRB approval, we reviewed all electronic mail (e-mail) messages sent between five study clinicians and their patients over a one-month period. We used a previously described taxonomy of patient requests to categorize all patient requests contained in the messages. We measured message volume, frequency, length and response time for all messages sent to and received by these clinicians.

Results: On average the 5 physicians involved in this study received 40 messages per month, each containing approximately 139 words. Replies sent by the physicians contained 39 words on average and 59.4% of them were sent within 24 hours. Patients averaged 1 request per message. Requests for information on medications or treatments, specific symptoms or diseases, and requests for actions regarding medications or treatments accounted for 75% of all requests. Physicians fulfilled 80.2% of all these requests. Upon comparison of these data to that obtained from traditional office visits, it appears that the potential exists for email encounters to substitute for some percentage of office visits.

Conclusion: Electronic messaging is an important method for physicians and patients to communicate and further develop their relationship. While many physicians worry that either the number or length of messages from their patients will overwhelm them, there is no evidence to support this. In fact, the evidence suggests that many patient requests, formerly made over the telephone or during office visits, can be addressed via email thus potentially saving both patients and physicians time.

Background

Patient-provider electronic messaging (e-mail) is defined as computer-based communication between clinicians and patients within a contractual relationship in which the health care provider has taken on an explicit measure of responsibility for the clients care [1].

Email was the first "killer application" of the Internet and the most widely used form of computer-mediated communication developed to date. Crystal (2001) argues quite persuasively that computer-mediated language represents the fourth medium of communication (spoken language, written language, and sign language represent

the first three) developed in the history of the human race [2]. Those who have used email, along with those who have studied it extensively, argue that it is the most important mechanism since the telephone for developing interpersonal relationships [3].

Within healthcare there is great hope (and considerable fear that the opposite will occur) that use of email will provide a means of improving the quality and lowering the costs of healthcare [4]. With that said, it is critical that we begin to understand computer-mediated language in terms of its strengths as well as its limitations as a communication vehicle [5]. In particular we need to understand how patients are using email to communicate with their healthcare providers.

Towards that end, we undertook the following study to begin describing: a) the extent of the workload encountered by clinicians as a result of patients sending messages to their physicians; b) the size (in terms of number of words contained in each message) of individual patient and provider email messages; and c) the types of requests patients made to their physicians in these messages and whether or not they were fulfilled.

Kaiser Permanente

Kaiser Permanente Northwest is a large group model, Health Maintenance Organization. Over 8000 employees serve approximately 450,000 members in northwestern Oregon and southwestern Washington (i.e., the Portland, OR metropolitan area) from 31 geographically separate clinical sites. The physician's group consists of 700+ clinicians, representing over 20 medical and surgical specialties.

Description of the E-mail System Utilized in this Study

Until early 2003, Kaiser Permanente NW provided all physicians with a special-purpose email account that is designed to facilitate patient-provider messaging. This email system did not provide any assurances of patient or provider confidentiality since all messages were transferred via the standard SMTP email protocol and therefore passed unencrypted through numerous unsecured Internet gateways. In addition, all messages were entered as free-text since no message templates or any other means of helping patients or providers "structure" their messages existed in this email system. This shared email account allowed multiple Kaiser employees to login, read, and respond (if appropriate) to the physician's messages in the event that he/she is out of the office. This email system had a black and white, character-based, menu-based interface typical of mainframe-based systems developed in the 1980's. The system did not support sending or receiving attachments and did not allow users to simply click on a Uniform Resource Identifier (URI) (formerly known as

Uniform Resource Locators – URLs) to view websites. Physicians could "cut and paste" portions of their patients' email messages into their electronic medical record system [6].

At the time of this study, Kaiser Permanente had an official email policy in place, which closely followed the email guidelines developed by the American Medical Informatics Association's (AMIA) Internet working group. While there were no system-wide service standards in existence regarding expected clinician response time, it was generally understood that every effort should be made to respond within 1 working day if at all possible.

A Taxonomy of Patient Requests

The taxonomy of requests by patients was developed, evaluated and used to classify patient requests during face-to-face visits in 1999 by researchers from the University of California, Davis [7]. They defined patient requests as "an expression of hope or desire that the physician provide information or perform action. Requests may be expressed as questions, commands, statements, or conjecture." They identified 11 requests for information, 8 requests for action, and 8 categories of physician replies (see table 1). We chose this taxonomy of requests after an early examination of patient-provider emails within our organization showed that patients initiated the overwhelming majority of message exchanges. Therefore, we hypothesized that these patients were initiating requests for information or services from their providers.

Methods

Selection of participants

Following approval by the Kaiser Permanente Center for Health Research Institutional Review Board (IRB), we sent an e-mail message to 15 Northwest Permanente physicians with shared, patient-only email accounts, asking them to participate in this study. Five physicians agreed to participate. Five physicians declined saying they were not currently using e-mail to communicate with their patients. Five physicians did not reply to the message.

Analysis of messaging frequency

In an effort to understand the sustained workload email active clinicians have been facing, we calculated the mean, median, maximum, and minimum number of e-mail messages each participating physician received during each month over the course of the last 18 months (or in the event that they had not been using e-mail for that long, we used all available data).

In an attempt to more accurately depict an "average" month in the life of an e-mail active physician, we analyzed the content of all messages each physician received

Table 1: A Taxonomy of Patient Requests

Requests for Information about
Symptoms, problems, or diseases
Psychosocial problems
The physical examination
Tests or diagnostic procedures
Medications or treatments
Prevention
Patient – provider relationship
Other physicians
3 rd party payer or managed care issue
Other administrative issues
Other requests for information
Requests for Action
Physical examination
Laboratory tests, x-rays, or other studies
Referral to other physician(s)
Referral to non-physician(s)
Medications or treatments
Administrative action: 3 rd party payer
Administrative Action – Other
Other request for action
Physician responses to patient requests
Ignores
Acknowledges only
Fulfills (performs action or gives info)
Partially fulfils
Negotiates, with fulfilment
Negotiates, with partial fulfilment
Negotiates, with denial
Denies

during one month in 2001. For several physicians, this number was so small that we broadened our analysis window so that we had at least 15 messages available to analyze.

In an attempt to determine whether the email workload was due to a small number of patients sending a large number of messages or a large number of patients sending a small number of messages, we calculated the total number of unique individuals who sent each physician at least one message during the study month, and the mean and maximum number of messages each of the patients sent during the study month.

Analysis of message content

For each of the messages received during the study month, we calculated the mean, median, maximum, and minimum number of words in each message. We also counted the total number of, and percentage of, messages received that consisted of more than 300 words. We performed similar calculations for the messages each of the physicians sent (although in this case we considered messages over 70 words in length. For each message we also catego-

rized the type and number of request(s) made by the patients and the type of response the physician gave.

Analysis of patient requests

Each message was read and the patient request contained within it was categorized using the taxonomy of patient requests described in table 1. In addition, we determined whether the request was answered or fulfilled by the clinician.

Statistical analysis

Descriptive statistics were calculated using Excel.

Results

The electronic messages from five, full-time (although in the clinic approximately 1/2 time) physicians (4 male, 1 female; 3 adult primary care and 2 pediatricians) were reviewed. Each of these physicians had approximately 2730 (range: 2015–3579) patients on their panel. On average each of these physicians saw 140 patients (range: 102–158) over the course of 15 (range: 11–18) clinic days during the month of November 2001.

Message Frequency

The physicians received a mean of 40 (maximum 82) messages per month. The mean number of messages from any single patient who sent a message was 1.5 (range: 1 – 1.9). Overall, 85 percent of the time (47/55) a single patient sent 2 or fewer messages in one month. Physicians received approximately 2.6 messages/clinic day on average.

Physicians responded to the patient's inquiries in 31.1 hours on average (range: 2 min. to 13 days) with 59.4% in under 24 hours).

Content of messages received

On average the messages each of these physicians received contained 139 (range: 3–1248) words, and only 10% of all the messages received (11/108) were over 300 words in length. On average each of these messages contained only 1 request (range: 0–4) and only 23% (29/126) contained more than one request.

Patient requests fell mainly into 3 categories: 1) 26% were requests for information about medication or treatments, such as "*Do you think piroxicam would be an appropriate medication for me?*"; 2) 22% were requests for information about specific symptoms or diseases, such as "*I have a place that itches in the back. I was reading the health book & I wonder if I have shingles?*"; 3) 20% were requests for actions regarding medications or treatments, such as "*I am running out of the tablets and need another supply. Can you send them an approval when you get this message?*".

Content of messages sent

On average the replies sent by each of the physicians contained only 39 words (range: 1–188) and only 12.8% (16/125) contained more than 70 words. Note: There were no instances in which one of the study physicians initiated an exchange of messages with a patient! The physicians fulfilled (items 3 or 5 from physician response type, table 1) 80.2% of all patient email requests.

Discussion**Study Participants**

All of the clinicians involved in this study had significant administrative responsibilities in addition to their patient care activities. Therefore, the workload estimates may not directly generalize to physicians involved in patient care full-time. On the other hand, the analyses of message frequency by patients and message content on the part of both patients and clinicians should.

Message Frequency

Messages were evenly distributed throughout the month. While this should reassure clinicians that were worried that messages might arrive in bunches, it should scare

clinic administrators who are concerned with the delays in responding to these messages. Since the likelihood of a message arriving on a weekend day (or night) are roughly equal to any other day or night, administrators may need to assign one or more clinicians to be on "e-call" to handle these non-business hour requests if they are concerned about meeting a strict 24-hour reply deadline. The fact that clinicians involved in this study did not routinely see patients on weekends, coupled with their administrative responsibilities is the most likely explanation for the poor performance in routinely meeting a 24-hour message turn around time.

Message Content

On average the length of messages received by clinicians was relatively short (avg. 139 words). In addition, since each message contained on average only 1 request clinicians were able to succinctly respond to these requests (avg. 39 words). Analysis of the types of patient requests for information and action in the e-mail messages closely mirrored those found by UC Davis researchers during their analysis of patient requests during actual outpatient visits, although the average number of requests per office visit was 5 times greater than in the email encounters. In both instances requests for information about medications & treatments and information about symptoms, problems, & diseases accounted for 48% of all patient requests. In addition, the third most common request during the physical visits was for actions regarding medications or treatments (20% physical visits vs. 26% in e-mail encounters). While there is absolutely no basis for comparing these two totally unrelated, random samples of patient-physician interactions, it is interesting that the types of requests the patients made of their physicians was similar. This should begin to help dispel the myths email-wary clinicians often relate regarding whether patients will use email inappropriately (e.g., jokes, virus warnings, sales pitches, etc.). At least in this admittedly small sample of messages, this was not the case.

Study Limitations

The main limitation of this study is its small size. Specifically, both the small number of clinicians involved and the limited number of email messages reviewed serves to limit the external validity of the study.

Conclusions

Electronic messaging is an important method for physicians and patients to communicate and further develop their relationship. While many physicians worry that either the number or length of messages from their patients will overwhelm them, there is no evidence to support this. In fact, the evidence suggests that many patient requests, formerly made over the telephone or during

office visits, can be addressed via email thus potentially saving both patients and physicians time.

Competing interests

None declared.

Authors' contributions

DFS conceived of the study, carried out the data analysis, wrote, revised and approved the manuscript.

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