The Impact of Patient-Physician Web Messaging on Provider Productivity

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ABSTRACT

Patients increasingly want electronic access to providers, but physicians have been slow to offer e-access, fearing they will be overwhelmed by unreimbursed patient messages. This article reports on efforts to measure how patient-provider web messaging affects physician productivity. To measure productivity, researchers analyzed the work of a group of physicians using a secure Web messaging system, compared with a control group that did not use the system. Results showed that physicians using the electronic media to communicate bad about a 10 percent increase in productivity. Secure Web messaging’s benefits also outweigh those of e-mail in increasing productivity and allaying concerns of physicians.

KEYWORDS

- Electronic mail
- Internet
- Telemedicine
- Remote consultation
- Web messaging

Electronic communication tools such as e-mail and web messaging offer patients and providers new ways to interact, with the potential of increasing and improving access to care.1,2,3,4 By not requiring patients and providers to both be available at the same time, the asynchronous nature of electronic communication has the potential to free both parties from the restrictions associated with traditional communication methods, such as telephone calls and face-to-face visits.5,6,7

“Telephone tag,” interruptions and lost or incorrectly transcribed messages all can be replaced with electronic communication.5,6,7 Recognizing these advantages, the U.S. Institute of Medicine and Department of Health and Human Services have recently advocated electronic patient-provider communication as a core functionality of an electronic health record.8,9

Patients and physicians are increasingly using the Internet to communicate with everyone but each other.10,11,12 Almost all physicians report that they access the Internet; however, only 5 percent regularly communicate electronically with their patients.13,14,15 Providers report that the lack of reimbursement for electronic communication12,16,17 and the fear of additional unpaid work15,16,17,18,19,20,21 make them reluctant to offer electronic access to their patients. In other words,
physicians fear that e-messaging with patients would make them less productive, get them home later, and reduce their incomes.

These concerns stem partly from the limitations of e-mail; fully 84 percent of e-mail in 2004 was spam, up from 63 percent in 2003, and keeping unwanted e-mail out is notoriously difficult to accomplish. A University of Michigan study lent credence to providers’ negative perceptions of e-mail, finding that e-mail may increase the communication burden on physicians and staff and concluding that e-mail may not improve the efficiency of clinical care. Secure web messaging may be an alternative to e-mail. It is like the structured, encrypted communication via Web browsers commonly used to buy goods and services online. Web messaging is used when someone buys a plane ticket, pays a bill, transfers funds, or buys a gift through a Web browser. The tools and structure available with Web messaging are a major improvement over the weaknesses of e-mail, and patient-provider Web messaging has been shown to generate high levels of satisfaction for both physicians and patients. User IDs and password authentication for patients, providers, and staff protect privacy, control who gets access, and eliminate the possibility of spam. Structured forms—for example, one for making an appointment request, another for reporting a head cold—can elicit the right information from patients, can be tailored to specific areas of clinical practice and can deliver concise messages to the right person at the physician’s office automatically, improving efficiency for everyone. Just as encryption and credit card processing enable e-commerce, they also can enable the payment of medical fees and co-payments.

While Web messaging is commonly used to facilitate business in other industries, few studies have evaluated the impact of patient-provider Web messaging on healthcare costs and productivity. Some have estimated that online patient consultations could trim 20 percent of the 830 million U.S. office visits annually, saving consumers $7 billion. Practices could benefit from fewer telephone calls, lower administrative costs, and increased patient recruitment.

One recent study found that providers who use Web messaging with patients experienced an 18 percent drop in telephone call volume and a 14 percent drop in total message volume. A Stanford University study reported that patients using Web messaging incurred $1.92 per member per month less in office visit costs and $3.69 per member per month less in total health expenditures than patients in a control group. Another study concluded that as e-mail is increasingly used as a visit substitute by patients with chronic illnesses, it may begin to reduce physician workload.

The impact of these benefits on individual practices will depend on payer mix and physician-patient ratios. Where capitation is prevalent and in underserved areas, moving clinical encounters to the Web will likely be perceived as helpful. In physician-heavy communities with little capitation, such a transfer may be perceived as threatening, although the recent trend of payers to compensate for online visits’ should help alleviate these concerns.

This study examines the impact of a commercial patient-physician web messaging system on provider productivity by comparing two similar primary care practices in nearby communities; one offered Web messaging to its patients while the other did not. As a check for unknown confounders, the productivity of the OB/GYN physicians at each site was also measured over the same 13 months; neither of the OB/GYN groups offered Web messaging during this period.

Researchers were testing the hypothesis that, contrary to the beliefs of many physicians, the productivity of the internists and family practitioners at the intervention site would be higher and grow faster than that of their counterparts at the control site; and that the productivity of the OB/GYN physicians at the two sites would not differ.

**Methods Used in the Study**

The University of California Davis Heath System (UCDHS) is a 528-bed teaching hospital with a network of 16 primary care offices serving Sacramento and three other California counties. This study was conducted at two clinics and was granted exempt status by the UCDHS Institutional Review Board.

RelayHealth Corp., Emeryville, Calif., provided the Web messaging system, which patients, providers, and staff accessed via Web browsers from computers connected to the Internet. The system offers several types of structured messages, including branched-logic problem-specific clinical messages called webVisits, prescription refill requests, appointment requests, and test result requests. Message routing is automated per each office’s preferences; routing is determined by a combination of the intended physician recipient and the message template that is selected. For example, all appointment requests for Dr. Smith can be routed to Julie, while those for Dr. Jones can be sent to Bob.

Prescriptions are electronically routed to the fax machines of retail pharmacies. RelayHealth’s help desk is notified of all failed fax attempts; the most common cause is no paper in the pharmacy’s fax machine. Security tools include secure servers, firewalls, 128-bit SSL encryption, user ID and password authentication, and auditing of all views and transactions.

UCDHS marketed the availability of RelayHealth services through direct mail, office brochures, newsletters, and television news stories. Patients self-register with RelayHealth online. When they select a provider for the first time, a message requesting an online relationship is
automatically sent to that provider’s office. To comply with California law, which requires the existence of a “good faith prior examination” before a caregiver can prescribe for a patient, only patients previously seen by their selected providers are accepted; others are either rejected or offered appointments to establish a care relationship.

Authorized patients, providers, and staff receive a unique user ID and select their own password. Caregivers can communicate on behalf of dependents as proxies. Although many of the payers with whom UCDHS contracts now reimburse for webVisits, providers received no compensation for Web messaging during the time period of this study. As part of the contractual agreement, RelayHealth provided monthly metrics about Web messaging to UCDHS. These data included the numbers of patients enrolled, message volume, message types, and the age and gender of enrolled patients.

The study compared the productivity of internal
medicine and family practice physicians at the six-provider intervention site clinic at Folsom, Calif., to the nine-provider control site clinic at Auburn, Calif., from November 2001 to November 2002. Folsom served as the UCDHS implementation pilot site for patient-provider Web messaging starting in November 2001. Auburn implemented the system at the end of November 2002 and was the last of the primary care clinics to implement the Web messaging system. Retrospective data were used, as the sites were selected after the study period.

Folsom and Auburn are foothills communities east of Sacramento. Folsom and Auburn provide internal medicine, family practice, pediatric, and obstetric/gynecology services to 19,552 and 15,217 patients, respectively. Both clinics converted to open-access scheduling from July to September 2002. To test for potential confounders, researchers compared results from three Folsom OB/GYN providers to those of two Auburn OB/GYN providers during the same period; these physicians did not use Web messaging.

UCDHS administration provided provider Relative Value Units (RVUs), based on office visits and days worked per month. Primary care physician pay is based on RVUs earned, and Web messaging generated no RVUs during the study period. RVU data were normalized to HCFA 2003 equivalents.

Two-tailed t-tests were used to test bi-directional hypotheses; one-tailed t-tests were used to test uni-directional hypotheses. Time trends were analyzed using linear regression. The UC Davis Statistics Department assisted with the statistical analyses.

Results of the Study

In November 2002, the end of the intervention-control study period, 1,155, or 9.2 percent, of the intervention physicians' patients were using the system. Provider and staff web messaging activity peaked at 6 a.m., 8 a.m., 1 p.m., 6 p.m., and 9 p.m.; no provider or staff use was recorded between midnight and 5 a.m. Patients used the system 24 hours a day, with activity peaking at 10 a.m.

Intervention physicians averaged 11.1 percent more visits per day than those in the control group (25.45 vs. 22.91 visits per day, p = 0.04), and the intervention regression slope (-0.26) decreased at a slower rate than the control (-0.38) (see Table 1 and Figure 1). The two sites' OB/GYN physicians' visits per day did not differ significantly (p = 0.07). Because primary care physicians work approximately 200 office days per year, the annualized mean difference in visits per day is 508 office visits per physician.

Intervention physicians averaged 10.1 percent more RVUs per day than controls (49.63 vs. 45.09 RVUs per day, p = 0.04), and the intervention regression slope decreased at a slower rate (-0.17) than the control (-0.65) (see Table 1 and Figure 2). RVUs per day for the OB/GYN physicians did not differ significantly (p = 0.57). Primary care physicians receive approximately $20 per RVU, so the annualized mean difference in RVUs represents $18,160 per physician.
Intervention physicians’ RVUs per visit did not differ significantly from that of the physicians in the control group (p = 0.28), and the regression slopes were similar at 0.01 and 0.00, respectively. The RVUs per visit for the two sites’ OB/GYN physicians also did not significantly differ (p = 0.11).

Comments
As hypothesized, and contrary to many providers’ fears, the productivity of the physicians who used Web messaging with their patients was considerably higher than that of their counterparts who did not. The intervention physicians averaged 11.1 percent more visits per day, or 2.54 more patients per physician per day, and 10.1 percent more RVUs per day, translating into $95.34 more per physician per day, than the control physicians.

Further, while the productivity of the two groups generally declined, probably as a result of their simultaneous conversion to same-day patient access in the latter half of the study period, the rate of change of the intervention physicians’ productivity was more positive than that of the control group. During the same time period, the productivity of the OB/GYN physicians at the two sites did not differ, nor were their rates of productivity change appreciably different. In contrast to the increase seen in volume productivity among the electronically connected physicians, the “intensity” of their office visits, as measured by RVUs earned per visit, did not differ from that of the control group.

What could account for the increase in volume productivity by the e-connected physicians? Because the compensation of UC Davis’ primary care physicians is primarily based on RVUs, these physicians are highly incentivized to see additional patients if they have time to do so. The intervention providers and staff reported anecdotally that Web messages require much less time than phone calls, and, unlike potentially lengthy phone calls, can be answered during brief breaks throughout the day. And when intervention physicians ask patients to come into the office to address a problem, the physicians reported that they can complete these visits more quickly because patients already have provided the history electronically.

Our data show that many physicians, without being directed to do so, shifted work time by deciding to message patients from home before and after work, freeing up workday time to see more patients. As reported elsewhere recently, Web messaging with patients also dramatically reduces both telephone traffic and total message volume, probably by eliminating “telephone tag,” which also results in high levels of patient satisfaction. Therefore, by increasing office visit availability and reducing phone traffic, Web messaging appears to have increased access to care for Web messaging users and non-users alike.

The small intervention and control sample size limits the study’s ability to exclude the impact of variables. No other clinic used Web messaging for a sufficient period to warrant inclusion in the intervention group. Only the selected control site converted to open-access scheduling at the same time as the intervention clinic, so other sites were judged unsuitable to be included in the control group.

That productivity differences were not observed between the two validating control OB/GYN groups suggests that important unidentified confounders were not present. As a further validity check, we examined the rate of change of each of the productivity measures and found the direction and magnitude of change to be in line with mean differences.

Conclusion
Web messaging appears to improve provider productivity by allowing additional time for further patient visits, and it increases access to care for both patients who communicate electronically and for those who rely on the telephone and office visits. As Web messaging in healthcare becomes more prevalent, additional research will be needed to fully understand its productivity and cost benefits to primary care providers.

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References


