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# Does Electronic Physician-to-Patient Communication Improve the Quality of Care in an Ambulatory Setting?

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## ABSTRACT

Several studies suggest that patients want the ability to communicate electronically with their physicians and that electronic communication can facilitate patient-centered care. However, despite patient demand and a myriad of possible benefits, most physicians have resisted providing this option. This study uses patient provided quality data from a leading online physician-rating site. This novel approach allows us to compare the quality ratings of 1275 general practitioners and family physicians in the U.S. and Canada. Our data suggest that patients rate the quality of care received higher for general practitioners and family physicians who answers patient email. Next, our data suggest that patients in Canada rate the quality of care they receive higher than American patients. Finally, while email makes a difference in perceived quality of care in both countries, our data suggest that it makes a greater difference for American patients.

## Keywords

Health Information Technology (HIT), physician adoption of email, quality of care, online physician-rating sites.

## INTRODUCTION

Patients want the ability to communicate with their physicians via electronic mail, and more would use it if the option were available (Rosen, 2007). A 2002 Harris Interactive Poll found that 90% of respondents would like email access to their physician (Roter, Larson, Sands, Ford, & Houston, 2008). Several research studies have linked electronic physician-to-patient communication to a wide array of benefits for both patients and physicians (Couchman, Forjuoh, & Rascoe, 2001; Liederman, Lee, Baquero, & Seites, 2005; Leong, Gingrich, Lewis, Mauger, & George, 2005; Neville, Marsden, & McCowan, 2004).

Patients want online access to their physicians because *they already have online access to many other areas of their lives*. Most patients already have access to email and the Internet (Couchman et al., 2001). Many are already using the Internet to gather health information, and using email to discuss health issues with family, friends and others (Baker, Wagner, Singer, & Bundorf, 2003). Even among patients least likely to use electronic communication, those over 65, nearly half would like the ability to communicate electronically with their doctors (Singh, Fox, Petersen, Shethia, & Street, 2009). Related studies have found that many patients would be willing to pay for the ability to communicate with their doctors via electronic mail (Bergmo & Wangberg, 2007; Virji, Yarnall, Krause, Pollak, Scannell, Gradison, & Østbye, 2006). However, to date, despite demand from patients and a myriad of potential benefits, few physicians are using e-mail to communicate with their patients (Guseh, 2009).

Physicians do use email – just not with their patients. Most doctors use email at home and in the office (Brooks & Menachemi, 2006). They use email to communicate with suppliers and other physicians. (Kittler, Carlson, Harris, Lippincott, Pizziferri, Volk, & Jagannath, 2004) found that 38% of physicians used email to communicate with their own doctor. However, even those doctors who do communicate electronically with patients, typically only use it for a select few (i.e., 1-5% of their patients) (Pizziferri Pizziferri, Kittler, Volk, Hobbs, Jagannath, Wald, Middleton, & Bates, 2003).

In this work, we use data from the online physician-rating site RateMDS.com to compare the quality ratings of 1275 general practitioners and family physicians in the U.S. and Canada. Using patient provided quality data allows us to investigate whether physicians who answers patient email received higher quality ratings. Our data also allows us to investigate whether U.S. or Canadian patients give their physicians higher marks.

Our patient-provided data suggest that patients believe that the quality of care they receive from physicians who answers patient email is better than the quality of care they receive from physicians who do not. Next, while there is a great deal of debate in the United States over the best way to deliver quality health care, our findings suggest that Canadians are happier with the quality of care they receive. Our data suggest that email is positively correlated with higher perceived quality of care in both countries. However, it appears to make a greater difference for American patients.

## REVIEW OF THE LITERATURE

Extant literature suggests that electronic physician-to-patient communication promotes patient centered care (Anand, 2005; Lateef, 2011; Roter et al., 2008). Electronic communication reinforces patient-physician relationships by increasing rapport and keeping the lines of communication open (Patt, Houston, Jenckes, Sands, & Ford, 2011). The asynchronous nature of email relieves patients of the time pressure of an office visit, allowing them to gather their thoughts, ask better questions and express their concerns more lucidly (Roter et al., 2008). As (Roter et al., 2008) notes, patients can not only feel at home, they can actually be at home while communicating with their physician.

In addition, recent literature suggests that electronic physician-to-patient communication may result in a reduction of patient office visits and phone calls, as well as a reduction in the amount of time administrative staff spend tracking down patients (i.e., playing phone tag) to confirm appointments and relay test results (Couchman et al., 2001; Liederman et al., 2005).

Electronic communication has been shown to improve physician-to-patient communication (Epstein, 2009). Better physician-to-patient communication has been linked with several favorable health outcomes including improved adherence to treatment regimens, persistence with taking medication and a reduction in required laboratory tests (Haskard Zolnieriek & DiMatteo, 2009; Hill, Miller, DeGeest, on Behalf of the American Society of Hypertension Writing Group, 2010). In addition, improved physician-to-patient communication leads to higher patient and clinician satisfaction (Leong et al., 2005; Neville et al., 2004).

An estimated 183 million medical visits, or nearly one in five of medical visits each year are the results of patient nonadherence to treatment and could be eliminated by improved physician-patient communication (Haskard Zolnieriek & DiMatteo, 2009). Haskard et al. (2009) note that electronic communication increases the likelihood that a patient understands the seriousness of their condition and the available treatment options. This leads to increased adherence to treatment regimes and persistence with medicine taking.

According to Groopman (2007), asking and answering questions is the best way a patient can reduce medical errors and improve doctor diagnosis. Email's physical distance makes it easier for some patients to share embarrassing or distressing information with their doctor. As a result, patients are more likely to share potentially lifesaving information with their physician.

Making more information available to the clinician will result in more accurate diagnostic decisions. In addition, the more information available to the patient, the better decisions they will make about treatment options and lifestyle choices. As the Agency for Healthcare Research and Quality (AHRQ) website notes "*Talking with your doctor builds trust and leads to better results, quality, safety, and satisfaction*" (Agency for Healthcare Research and Quality (AHRQ), 2012).

The whole idea behind the agency's public service announcements is to encourage people to talk to their doctor. However, during an office visit, patients may feel too rushed or too embarrassed to ask pertinent questions. Often, patients are more comfortable "speaking to the computer" than they are talking to their physician or pharmacist. Asynchronous online communications, like email, have the potential to improve physician-patient communication by providing a non-threatening medium where patients can share information and express worries and concerns (Ye, Rust, Fry-Johnson, & Strothers, 2010).

## Reasons Physicians Do Not Use Email

There are several reasons physicians are not utilizing electronic communication to correspond with patients. For one, physicians are typically not compensated for the time spent emailing their patients (Weiss & Gordon, 2011). Next, many doctors fear that their workload would increase (i.e., they would spend all of their time answering emails) (Byrne, Elliott, & Firek, 2009). In addition, many are worried about privacy and legal issues. Many experts blame the cost of the Health Insurance Portability and Accountability Act of 1996 (HIPAA) compliance and the associated liability issues for the low level of e-mail adoption by physicians (Wallwiener, Wallwiener, Kansy, Seeger, & Rajab, 2009). One final reason that physicians may be slow to respond to patient demands for electronic access is that many of the benefits of using online communications accrue, not to the physicians, but to the patients and to the medical support staff, who are often responsible for phoning patients and scheduling appointments (Liederman et al., 2005).

However, even when workload and security concerns are mitigated, physicians still prefer the telephone to online communication. The Veteran's Administration (VA), for example, has salaried physicians and has implemented a secure online system which allows patients to communicate with their doctors (Byrne et al., 2009). Yet, according to Byrne et al., 2009, its physicians seldom use the available online communication system with their patients.

In addition, while many physicians worry that patients would flood them with trivial questions, their patients have other priorities. Patients want to use online communication to request prescription refills (90%), for non-urgent consultation (87%), to learn laboratory results (84%) and to make or cancel appointments (78%) (Couchman et al., 2001).

### Research Questions

For this investigation, we use data from the online physician-rating site RateMDS.com to compare the quality ratings of general practitioners and family physicians in the U.S. and Canada. Using patient provided quality data, we investigate the following research questions:

1. *Does physician use of electronic communication with patients increase patient perceived quality of care?*
2. *Do the effects of physician use of electronic communication with patients differ by country (i.e., United States or Canada)?*

### METHODS

While there are several rating websites containing physician information, there is only one site, RateMDs.com, which reports whether, or not, a physician answers email from patients. For that reason, we chose to use RateMDs.com data for our analysis. Started in 2004, Ratemds.com was founded by one of the co-founders of Ratemyprofessors.com and Ratemyteachers.com, which allow students to provide feedback on their university professors and high school teachers (Tanne, 2008). Similarly, Ratemds.com allows American and Canadian patients to rate their interactions with their physicians. Ratemds.com has proven as popular with patients as its sister sites (i.e., Ratemyprofessors.com and Ratemyteachers.com) are with students. In the summer of 2010, Ratemds.com received its one-millionth patient rating.

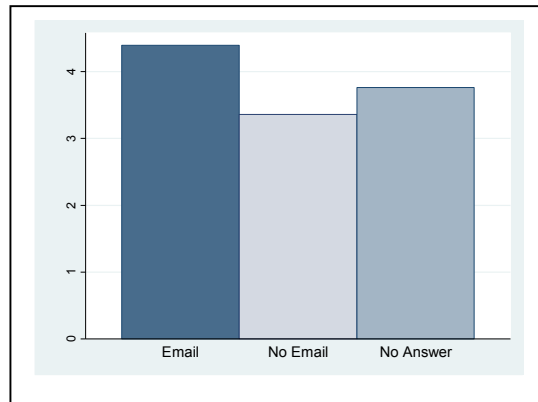
### Data

On RateMDs.com, patients rate their physicians on four scales: staff, punctuality, helpfulness, and knowledge. An additional measure – overall quality – is calculated as the mean of average knowledge and average helpfulness. Patients may also leave comments. Ratemds.com provides and updates all information about doctors on their site. Patients can alert Ratemds.com incorrect information but cannot make changes to the physician's information. This includes the physician's name, gender, specialty, the city and state where they practice, their hospital affiliation, whether or not they are accepting new patients, their phone number, which medical school they attended, and the year they graduated. Finally, there is one unique item that is crucial for our analysis – whether or not the physician answers e-mail.

For our investigation, we collected data on general practitioners and family physicians practicing in California and Ontario, Canada. We chose California and Ontario because of their relative populations. California is the United States' most populous state, and Ontario is Canada's most populous province. In both California and Ontario, general practitioners or family physicians are the most common specialty among physicians.

#### California physician data

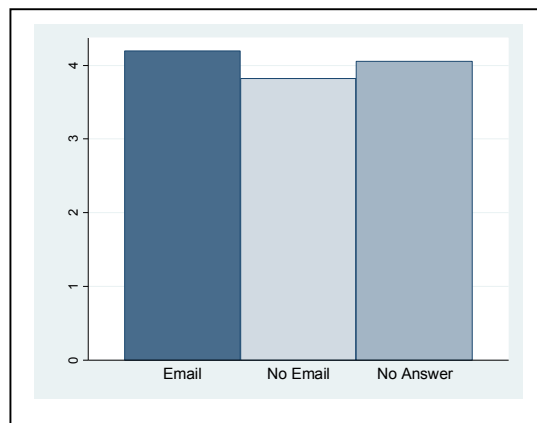
On November 16, 2011, RateMDs.com had patient rating data for over 24,264 health care professionals from the state of California. Of these, 3871 (16%) were identified as either general practitioners or family physicians. We collected rating and email usage data on each general practitioner and family physician. On RateMD.com, patients rate physicians on a scale of 1 to 5, with 5 being "the best." Among the 3871 doctors in our dataset, the average patient rating for overall quality was 3 (SD= 1.377). Of these online profiles, 349 (9%) identified whether, or not, they answered patient emails. Of these, 111 (32%) indicated that they do answer email and 238 (68%) indicated that they do not. For California physicians who answered patient email, the average patient rating for overall quality was 4.395 (95% CI, 4.227, 4.563, SD=0.893). For those physicians who did not answer email, the average overall quality rating was 3.358 (95% CI, 3.187, 3.530, SD= 1.343). A simple t-test suggests that the differences in patient-rated overall quality for physicians who answer email, and those who do not, is significant;  $t(347)=7.387$ ,  $p < 0.001$ . Specifically, our results suggest that physician use of email increases patient perceptions of the quality of care they receive in an ambulatory setting.



**Figure 1. Average Quality Ratings for California Physicians**

Ontario physician data

On December 19, 2011, RateMDs.com had patient rating data for 21,465 health care professionals from Canadian province of Ontario. Of these, 9015 (42%) were identified as either general practitioners or family physicians. We collected rating and email usage data on each general practitioner and family physician. Among the 9015 doctors in our dataset, the average patient rating for overall quality was 4.036 (SD= 0.921). We gather this data, as well as the California data, by using a web spider. Of these online profiles, 926 (10%) identified whether, or not, the physician answered patient emails. Of these, 108 (12%) indicated that they do answer email and 818 (88%) indicated that they do not. For Ontario physicians who answered patient email, the average patient rating for overall quality was 4.194 (95% CI, 4.058, 4.329, SD=0.068). For those physicians who did not answer email, the average overall quality rating was 3.820 (95% CI, 3.763, 3.877, SD= 0.029).



**Figure 2. Average Quality Ratings for Ontario Physicians**

A simple t-test suggests that the differences in patient-rated overall quality for physicians who answer email, and those who do not, is significant;  $t(924)=4.447$ ,  $p < 0.001$ . Like our California data, our results suggest that Canadian physician use of email increases patient perceptions of the quality of care they received.

*United States vs. Canadian patient perceived quality*

As a preliminary test of Research Questions 1 and 3, we performed multiple regression analysis using only data from those California and Ontario-based general practitioners or family physicians where the profile specifically indicated whether or not they answered patient emails. The model follows,

$$(1) \quad \text{Quality} = \beta_1 * \text{Checks Email} + \beta_2 * \text{U.S. Physician} + \beta_3 * \text{Checks Email} * \text{U.S.} + \epsilon$$

where *Quality* is the dependent variable. It denotes the average patient provided quality rating for each California or Ontario-based physician. *Checks Email*, *U.S. Physician*, and *Checks Email\*U.S.* are independent variables. *Checks Email* is a dummy variable set to one if the physician answers patient email and zero otherwise. *U.S. Physician* is a dummy variable set to one if the physician practices in the United States and set to zero if the physician practices in Canada. Finally, *Checks Email\*U.S.* is the interaction between *Checks Email* and *U.S. Physician*.

**Results**

As Table 1 shows, our preliminary data analysis suggests that patients in both California and Ontario rate the quality of care received higher if their general practitioner or family physician answers patient email. Next, our data suggests that patients in Ontario rate the quality of care they receive higher than California patients. In this simple analysis, this could mean that patients in Ontario actually receive better care than those in California or that there are important variables missing from our model. Finally, while email makes a difference in perceived quality of care for both California and Ontario-based patients, the significance of the interaction term suggests that it makes a greater difference for California patients.

Dependent Variable	(Model 1) Quality	(Model 2) Quality
Checks Email	.66666373***	.37346964***
U.S. Physician	-.30992131***	-.46164554***
Checks Email*U.S.		.66272161***
Constant	3.7858535***	3.8200489***

Legend: \* p<0.05; \*\* p<0.01; \*\*\* p<0.001

**Table 1. Regression Results for Model 1**

**CONCLUSION**

There is a giant disconnect between the majority of patients who want online access to their physicians and the paucity of physicians who currently provide that service. Yoo et al. (2010) note that few physicians accepted phone calls in the early days of the telephone. Today, however, few physician offices could function without phone calls to, and from, patients. While the number of physicians who use online communication with patients is small, it is growing (Beckjord et al., 2007).

There are real reasons that physicians have not adopted the use of email in their practices. Perhaps the biggest reasons are HIPPA regulations and the potential medicolegal liability for noncompliance (Wallwiener, Wallwiener, Kansy, Seeger, & Rajab, 2009). It is clear that until HIPAA compliance and associated liability issues are properly addressed few physicians will adopt e-mail for widespread use with their patients. However, Web-based communications, like those implemented in several health information technology (HIT) systems, provide the benefits of email without the security and privacy concerns. These systems have wide reach, are asynchronous and, in many cases, have easy-to-use document management facilities (Sands, 2004).

This work makes several contributions to the growing literature in the area of health information technology. First, this study examines the adoption of email from a patient-center perspective. The bulk of health information technology (HIT) adoption studies look at the benefits to the physician or hospital (e.g., cost savings or error reductions). Few examine adoption from

the patient's point of view. This work makes apple-to-apple comparisons by examining patient experiences both with physicians who have, and have not, adopted the studied technology.

Our findings suggest that patients rate the quality of care received higher for general practitioners and family physicians that answers patient email. Next, our findings suggest that patients in Canada rate the quality of care they receive higher than American patients. Finally, while email makes a difference in perceived quality of care in both countries, our data suggest that it makes a greater difference for American patients.

This work is very preliminary. Follow-up work may wish to examine whether the effects of physician use of electronic communication with patients differ by medical specialty (e.g., does use of electronic communication affect patient perceived quality of care for pediatricians more than it does for geriatricians?). In addition it may be fruitful to determine the number of physicians who are using electronic communication with their patients and whether the adoption differs by medical specialty (e.g., do dermatologists use electronic communication more often than nephrologists?) or by nationality (i.e., United States or Canada).

The ultimate goal of this work is to improve physician-to-patient communication. If physicians are informed of the benefits of using electronic communication with their patients, perhaps they will be more willing to adopt the practice and be more likely to insist that electronic communications be included in future HIT implementations.

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