

# Patient-Initiated E-mails to Providers: Associations With Out-of-Pocket Visit Costs, and Impact on Care-Seeking and Health

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Secure electronic messages offer patients and physicians an additional channel for communication and may serve as a unique mechanism for healthcare delivery. Although recent estimates show that most physicians in the United States are not yet regularly communicating with their patients electronically, most patients indicate an interest in communicating directly with their healthcare providers online.<sup>1,2,5</sup> In order to receive the second stage of federal incentive payments for “meaningful use” of electronic health records and to avoid eventual financial penalties, clinicians will need to offer patients access to their health information through Web-based tools and to exchange secure electronic messages.<sup>6</sup> However, the effects of these policy-driven shifts toward more electronic information and communication on patient care-seeking decisions and healthcare utilization are unclear.

There is limited information on what types of health concerns patients discuss with their providers using secure messaging, subsequently conflicting with evidence on the ways in which having Web-portal access affects in-person care-seeking behavior. Additionally, there is little attention paid to how patients’ cost-sharing for in-person visits affects their choice to contact their providers by e-mail.<sup>7-14</sup> To understand how patients report their use of secure messaging tools to discuss concerns or questions about their health with their healthcare providers, we surveyed patients in a large health system that offers patient-provider secure electronic messaging tools, focusing specifically on patients with a chronic condition. We examined patient preferences for contacting healthcare providers across a variety of types of questions and concerns, whether cost-sharing for in-person visits was associated with this decision, and the patient-reported impact of secure message use on their in-person visits and overall health. We hypothesized that preferences for first contact method would vary by type of health concern, and that they would be affected by out-of-pocket costs.

## ABSTRACT

**Objectives:** To understand when patients use secure e-mail messaging with healthcare providers across several types of questions or concerns, associations between out-of-pocket costs for in-person visits and use of secure messaging, and to examine patient-reported impacts on care-seeking behavior and overall health.

**Study Design:** Cross-sectional survey of patients in an integrated healthcare delivery system, with access to a patient portal to send secure e-mail messages to providers at no out-of-pocket cost.

**Methods:** The study included patients with a chronic condition (N = 1041). We described patient-reported preferences for contacting providers and patient-reported impact of e-mail use on phone calls, in-person visits, and overall health. We used multivariate analyses to examine patient characteristics associated with using e-mail as a first contact method, and effects on care-seeking and health.

**Results:** Overall, 56% of patients sent their provider an e-mail within 1 year, and 46% reported e-mail as their first method of contact for 1 or more types of medical concerns. After adjustment, higher out-of-pocket costs for in-person visits were significantly associated with choosing e-mail as a first method of contact ( $P < .05$ ). Among patients who had e-mailed their provider, 42% reported that it reduced their phone contacts, 36% reduced in-person office visits and 32% reported e-mailing improved their overall health.

**Conclusions:** Patients reported using e-mail broadly to initiate conversations with their providers, and patients with higher out-of-pocket costs for in-person visits were more likely to choose e-mail as a first contact method. Use of secure e-mails reduced patients’ use of other types of healthcare and resulted in improved overall health.

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## METHODS

### Setting

Kaiser Permanente Northern California is an integrated delivery system with more than 3 million members. Health system members who register to use the password-protected patient portal website are able to exchange secure electronic messages directly with a provider in their healthcare team. Patients and providers are each notified when they have received a new message. There is no charge to the patient for using the patient portal, which also offers patients the ability to view lab results, request medication refills, and to view portions of their health records and visit summaries. Patients in this health system can also schedule nonemergency office visits through the portal website or by telephone.

The Kaiser Foundation Research Institute Institutional Review Board reviewed and approved the study protocol, waiving the requirement for informed consent.

### Study Population

Our source population for this study included all adult patients (18 years or older) who were in at least 1 of the health plan's clinical chronic disease registries for asthma, coronary artery disease, congestive heart failure, diabetes, or hypertension during 2010. We studied patients with chronic conditions in order to focus on patients with at least 1 condition to discuss with a provider, but our survey asked generally about patient-provider messages for any type of condition or concern. Because the survey included questions about the impact of patient out-of-pocket costs (eg, co-payments and deductibles) on care-seeking behavior, we limited our sample to patients who were continuously enrolled through an employer-sponsored health insurance plan with no cost-sharing changes in their health plan benefits during 2010.

To ensure a sufficient number of participants who had recently sent a secure message and who had higher out-of-pocket costs for in-person care, we used a stratified random survey sample. Using automated records from the 12-month period before our study began, we randomly selected 25% of our sample from those who had not sent any secure messages and 75% from those that had sent at least 1 secure message. We also stratified the sample to include 25% from patients with a high-deductible health plan and 75% from patients without a high-deductible health plan. The high-deductible plans in our study met the IRS requirements for health savings account eligibility, in-

### Take-Away Points

In a survey of patients with a chronic condition and with access to send secure e-mail messages to providers, nearly half had used e-mail as their first method of contacting providers for various types of health concerns.

- Patients with higher out-of-pocket cost-sharing for visits were significantly more likely to report e-mail as their first method of contact with a health concern.
- More than 1 in 3 patients who sent an e-mail to providers reported that it reduced their phone contacts or office visits.
- Nearly one-third of patients who sent an e-mail to providers reported that it had improved their overall health.

cluding a deductible of \$1200 or higher for an individual (\$2400 for family coverage) that applied to most health-care services, including nonpreventive office visits.<sup>15</sup>

Beginning in June 2011, we mailed each potential participant a study introduction letter, a reply postcard, and a questionnaire with a postage-paid return envelope. We offered the option of completing the survey questionnaire by mail, by Web-based electronic survey, or by telephone interview in order to include as many respondents as possible regardless of technology access or preferences, and in order to maximize response rates. Between June and December of 2011, trained interviewers contacted those who had not responded to our initial mailing in order to conduct telephone interviews, attempting to reach potential participants during different times of the day on weekdays and weekends. As needed, interviewers also called respondents who had mailed the written survey to complete and clarify any missing items. At the end of our data collection period, we again mailed a copy of the survey with a prepaid return envelope to all potential participants we had not been able to reach. All study participants received a \$5 coffee gift card.

Of the total 1314 potential respondents contacted: 117 could not be reached after 15 phone call attempts, 183 were ineligible for study participation (a language barrier or health problem prevented them from completing an English-language interview or survey or they could not be reached due to incorrect contact information), and 1041 patients completed the study questionnaire (the response rate among eligible participants was 79%). Among all respondents, 51% completed the survey by telephone, 34% returned the survey by mail, and 15% completed the Internet-based survey. Comparing respondents with nonrespondents, women and respondents older than 65 years were more likely to complete the survey ( $P < .05$ ).

### Questionnaire

The survey questionnaire asked respondents how often they use the Internet for any reason and what devices

they use to access the Internet. We also asked participants to report if, in the previous 12 months, they had any of 5 types of health concerns: 1) questions about a medical test result, 2) questions about a new health condition, 3) questions about an ongoing or chronic health condition, 4) questions about a medication, or 5) a request for a referral. For each type of concern reported, we then asked respondents how they first contacted their provider or the healthcare system (ie, telephone call for advice or to schedule a visit, e-mailing their provider, visiting the emergency department, or no contact at all). We grouped phone calls for advice and to schedule a visit together since the patients' first method of contacting the health system was by phone.

If e-mail was the preferred method of provider contact for a given type of concern, we then asked respondents what other method they would have used to contact their provider if the option to send a secure e-mail message had not been available. Respondents who reported past use of secure messaging also answered questions about which provider they had e-mailed and how long it took to receive a response from the provider. We also asked whether using secure messaging affected the number of times they contacted their provider by phone or the number of in-person office visits, and if using the secure messaging tool to e-mail their provider had an impact on their overall health status.

We asked all respondents to report their health plan's cost-sharing requirements for doctor's office visits and several demographic characteristics, including education, annual household income, race/ethnicity, marital status, and self-reported health status. Using health plan administrative data, we identified participants' age, gender and DxCG comorbidity score (diagnosis-based risk score).<sup>16,17</sup>

### Analysis

Because our study used a stratified sample, all analyses and results presented were weighted using study sampling proportions to represent the overall source population of patients with chronic conditions. We describe participants' access to the Internet, with participants who reported never or rarely using the Internet categorized as not accessing the Internet. We also calculated the percentages of respondents who reported the 5 specific types of concerns in the last 12 months, their preferred method of contact for each type of concern, and the percentage who had registered to use the patient portal website. Among those who were Internet users and had registered to use the portal, we calculated the percentage who reported using secure messaging with any healthcare provider in the last 12 months, the type of provider e-mailed, and the

average time to provider response. Among those who e-mailed their provider, we calculated the percentages who reported that e-mails with their provider changed the number of calls or visits with providers, or had an impact on their overall health.

Among patients who reported having any of the 5 specific types of health concerns, we used multivariable logistic regression to examine the association between reporting a preference for using e-mail to contact providers for any type of concern and visit cost-sharing levels, adjusting for patient characteristics, including gender, race-ethnicity, age, marital status, education, self-reported health, income, and comorbidity score. All multivariate analyses account for the survey sampling strategy in the point estimates and variance estimation (Stata version 9.0 [StataCorp LP, College Station, Texas] using the `svlogit` command). We also used multivariable logistic regression to examine the association between reporting a preference for using e-mail as the first method to contact providers and reported impacts on phone contact and office visit rates, with adjustment for patient characteristics. We categorized respondents as having high visit cost-sharing if they reported having a deductible that applied to office visits or out-of-pocket cost (eg, co-payments or deductibles) of \$60 or higher. We then computed the adjusted percentage of respondents who reported using e-mail as a first method of contact by fitting results from the logistic regression model by each patient characteristic and reported cost-sharing levels for office visits.

## RESULTS

**Table 1** shows the characteristics of the 1041 participants in our study after weighting. Among the 71% of participants who access the Internet at least monthly, 79% reported sending at least 1 secure message to their provider in the past year (24% sent 1-2, 29% sent 3-5, and 26% sent >5 e-mails). **Figure 1** shows the types of providers they e-mailed and the reported provider response times.

Among patients who reported having each type of health concern, **Figure 2** shows the reported first contact method. After multivariate adjustment, patients who were female, who used the Internet more often, or who reported higher out-of-pocket cost for in-person visits ( $\geq \$60$ ) were statistically significantly more likely to choose to e-mail their provider as a first method of contact ( $P < .05$ ) (**Table 2**). After adjusting for patient characteristics, 85% of patients with higher cost-sharing for in-person visits reported choosing e-mail as their first contact method compared with 63% of patients with lower cost-sharing.

Across the types of health concerns, 85% to 91% of those who reported e-mail as their first method of provider contact indicated that if e-mail was not available, they would instead have contacted their provider by phone for advice or to schedule a visit; 4% to 11% reported that they would have scheduled a visit through the health plan website. Less than 3% reported that they would have avoided contact with their provider altogether if e-mail had not been available, and less than 1% reported that they would have instead sought care at the emergency department.

Among all participants who exchanged a secure message with their provider, **Figure 3** shows the reported impact on office visits and phone calls with the health system. Overall, 42% reported that the number of times they contacted the health system by phone decreased because of e-mail exchanges with their provider, 36% reported that their number of office visits decreased because of e-mail exchanges with their provider, and 32% reported that being able to communicate via e-mail improved their overall health. In multivariate analyses adjusting for patient characteristics, participants who reported e-mail as their first method of contact for any type of concern were significantly more likely to report that using e-mail had decreased their number of phone contacts with health system by phone and the number of office visits they had ( $P < .001$ ). After adjustment, 50% of those who reported using e-mail as their first method of contact reported that it decreased the number of calls, 42% reported that it decreased the number of office visits, and 35% that it improved their overall health compared with 14%, 11%, and 22%, respectively, of those who did not have any preference for e-mail as a first method of contact.

## DISCUSSION

In a survey of patients with a chronic condition within a healthcare setting that offers patients the ability to send secure electronic messages to their healthcare provider, we found that a large proportion of patients used e-mail as their first method of contacting providers across multiple types of health-related concerns. Patients with higher out-of-pocket cost-sharing for in-person visits were statistically significantly more likely to report e-mail as their first method of contact with a health question. While the majority of patients who e-mailed their provider reported that this did not affect their number of phone contacts or office visits, more than 1 in 3 reported that their phone contacts or office visits decreased because of e-mail exchanges with providers, and nearly one-third reported that exchanging e-mails with their provider had improved their overall health.

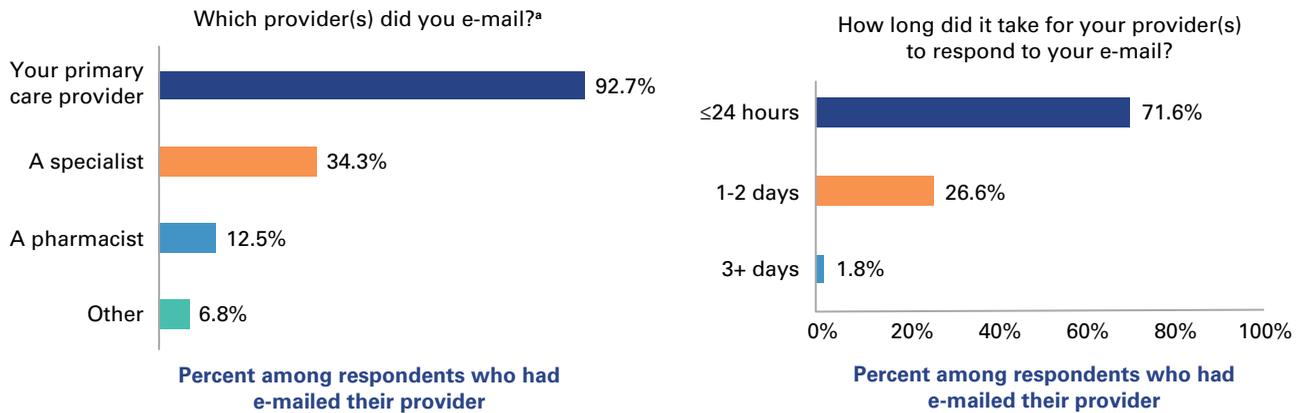
■ **Table 1. Participant Characteristics (N = 1041)**

Characteristics	% of Respondents <sup>a</sup>
Gender	
Female	56.4
Race	
White	59.4
Hispanic	12.2
Asian	12.1
Black	11.6
Pacific Islander	2.0
American Indian/Alaskan Native	0.9
Other	1.9
Marital status	
Married	62.2
Educational level	
Less than college	28.6
Household income	
<\$40,000	26.7
\$40,000-59,000	18.0
\$60,000-99,000	28.1
≥\$100,000	19.7
Age, years	
18-44	10.7
45-54	20.2
55-64	24.8
≥65	44.3
Health status	
Very good/excellent	34.4
Chronic diseases	
Hypertension	80.3
Diabetes	25.2
Asthma	21.2
CAD	10.0
Heart failure	4.1
Frequency of Internet use	
Daily	56.9
Weekly	10.9
Monthly	3.3
Rarely	7.9
Never	21.1
Device(s) used to access Internet (multiple may apply)	
Own computer	90.4
Work computer	41.9
Own mobile device	26.5
Other	15.8
Registered to use patient online Web-portal	70.3
Out-of-pocket cost for visits	
Higher cost (≥\$60)	6.6

CAD indicates coronary artery disease.

<sup>a</sup>The percentages reflect weighted values. There was a 79% response rate.

**Figure 1.** Use of Patient–Provider Secure E-mails: Provider Type and Response Time



<sup>a</sup>Respondents could report exchanging e-mails with more than 1 type of provider. Percentages calculated among respondents who reported that they had e-mailed their provider in the last 12 months (79% of all respondents).

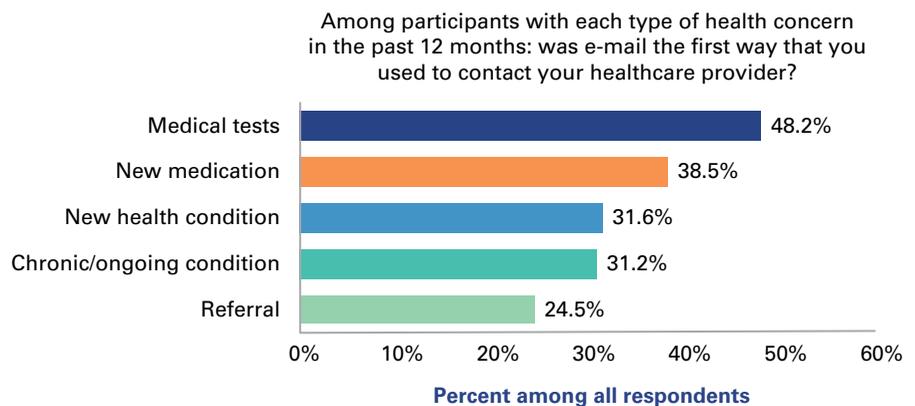
Secure patient portals have been proposed by the Institute of Medicine as a promising method of decreasing medical errors and increasing healthcare quality.<sup>18</sup> Although the majority of US adults value Web-based access to their medical records as important, in 2013, only 28% of Americans were offered access to their online medical record.<sup>1</sup> However, Stage 2 of the Meaningful Use federal programs that offer payment through the Medicare and Medicaid programs for demonstrating “meaningful use” of electronic health records will require clinicians to access and exchange secure e-mails with patients. Still, although our study was conducted in an integrated delivery system, many other reimbursement arrangements may limit the use of patient–physician e-mail, and Medicare does not generally provide separate payment for secure message exchanges.<sup>19,20</sup>

It is unclear how these broad changes in electronic data and communication access will change patient care-seeking behavior and outcomes. Our study finding of high rates of use of electronic messaging as the first method of contact for a range of health-related questions will likely become increasingly widespread as more

patients and clinicians gain access to, and begin using, these tools regularly. Because patients in our study largely reported that they would call the health system for advice or to schedule a visit if e-mail had not been available, this initial contact shift likely has consequences for telephone communication and in-person utilization patterns as well. We found that one-third of those who e-mailed their provider reported that this communication decreased their use of in-person visits.

With the rapid growth of healthcare costs, health plan benefits that include high levels of patient cost-

**Figure 2.** Patient Use of Secure Message as a First Method of Contact, by Health Concern Type



Percentages reported among participants with each specific type of health concern in the previous 12 months: 39% had a question about a medical test result, 38% had a medication-related question, 48% had a question about a new health condition; 47% had a question about a chronic condition, and 39% had a question about a referral.

**Table 2.** Among Patients With Any Type of Health Concern and With Internet Access: Patient Characteristics Associated With Reporting E-mail as the First Method of Contact (N = 739)

Patient Characteristic	Adjusted % Reporting E-mail as First Method of Contact	OR	95% CI
<b>Race</b>			
White	63.0%	1.00	Ref
Nonwhite	63.7%	1.04	0.59-1.83
<b>Gender</b>			
Male	56.9%	1.00	Ref
Female	67.4%	1.73	1.01-2.98
<b>Age, years</b>			
18-44	66.2%	1.00	Ref
45-54	59.6%	0.70	0.28-1.75
55-64	67.1%	1.05	0.42-2.65
≥65	61.3%	0.77	0.26-2.30
<b>Marital status</b>			
Not married	63.3%	1.00	Ref
Married	62.7%	1.02	0.59-1.79
<b>Education</b>			
Some college or more	64.7%	1.00	Ref
High school or less	57.1%	0.67	0.35-1.30
<b>Self-reported health</b>			
Good/excellent	63.4%	1.00	Ref
Poor/fair	62.8%	0.97	0.51-1.83
<b>Annual household income</b>			
≥\$40,000	65.2%	1.00	Ref
<\$40,000	53.9%	0.56	0.29-1.08
<b>Frequency of Internet use</b>			
Monthly or more	69.7%	1.00	Ref
Rarely	19.3%	0.09	0.04-0.20
<b>Out-of-pocket cost for visits</b>			
Lower (<\$60)	62.5%	1.00	Ref
Higher (≥\$60)	84.6%	4.48	1.91-10.51

OR indicates odds ratio; Ref, reference.  
The Table shows adjusted percentages and odds ratios from multivariate logistic regression with adjustment for comorbidity score.

sharing (such as high deductibles), in order to curb demand for services, have been growing in popularity with policy makers and employers. High-deductible health plan enrollment will likely increase further with implementation of health reform in the Affordable Care Act.<sup>21</sup> Several studies have demonstrated that cost-sharing, in various forms (eg, co-payments, deductibles), reduces utilization of medical services,<sup>22-26</sup> but may lead to decreases in necessary care, including for chronic conditions.<sup>27-32</sup> In addition to the cost-sharing associated with a doctor's office visit, patients often face additional barriers

and costs to seeking in-person care, such as difficulty getting time off from work or arranging transportation or childcare. The convenience of e-mail may reduce these barriers to accessing care. Also, our finding of higher rates of patients using secure messaging as their first method of contact when facing higher out-of-pocket costs for in-person care may signal changes in patients' care-seeking patterns that could become increasingly common as patient cost-sharing levels continue to grow and the ability to communicate with providers electronically becomes more widespread.

Existing evidence on the impact of patient use of patient portal websites on healthcare use and health outcomes has been limited and the results are conflicting.<sup>7,12,33,34</sup> Previous studies do not capture the patient-reported choice to use electronic tools relative to more traditional in-person types of healthcare services; it is challenging to identify switches between types of services or delays in healthcare service use using administrative data sources. We uniquely captured patients' own reports of initial methods for contacting their healthcare providers according to type of health concern and patient-reported impacts of e-mail on visits and health. Some patients explained that issues such as lab orders, medication changes, and patient questions could be addressed by e-mail and could reduce the need for an in-person visit. In addition, patients noted that greater information availability and engagement in their own care improved the management of their conditions and overall health. Overall, we found that patients regularly used secure messages to initiate

conversations with their providers across a wide range of types of health questions and concerns and many report that these exchanges improved their health.

### Limitations

The direct generalizability of our findings is limited to the populations and delivery system setting of our study; however, since we studied patients' self-initiated e-mail exchanges with their providers, our findings may reflect more general patient care-seeking behavior. Also, while our study is based on patient-reported survey data,

automated clinical data sources are unlikely to capture patients' initial health concerns and care-seeking decisions that we present. These patient-reported findings do complement previous studies, in the same integrated delivery system, in which providers report that electronic tools and messaging facilitated care coordination, by improving communication and providing informational continuity.<sup>35,36</sup> Additionally, although our study focused only on out-of-pocket charges for healthcare services such as co-payments and deductibles, patients may have also had other unmeasured personal expenses for transportation, lost wages, childcare, etc, associated with any healthcare encounter. Overall, the study data are cross-sectional; thus, these findings are not designed to establish causality. Future studies should continue to examine the impact of patient-provider e-mail use on healthcare-seeking behavior, clinical care delivery work flow, and patient outcomes.

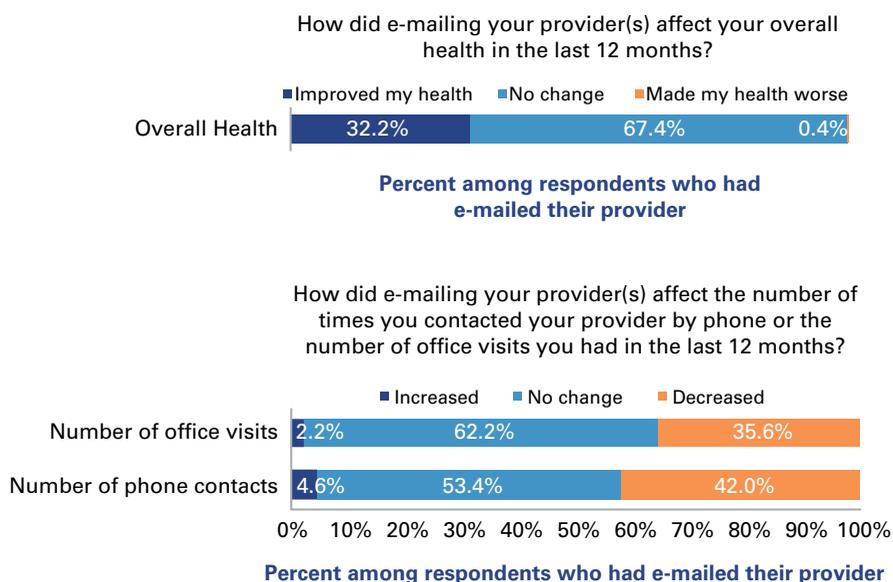
## CONCLUSIONS

We found that patients with chronic conditions sent secure e-mail messages to their providers as a first method of contacting the healthcare delivery system for a wide variety of health concerns, and that higher out-of-pocket costs for in-person visits were associated with use of e-mail. Nearly one-third of respondents who used this tool reported that e-mailing their healthcare providers had improved their overall health, and more than 1 in 3 reported that e-mailing their provider decreased their phone calls to their providers or their in-person doctor's office visits. As more patients gain access to patient portal tools associated with an electronic health record, patient-provider e-mails may shift the way that healthcare is delivered and have the potential to impact efficiency, quality, and health outcomes.

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**Figure 3. Impact of Patient-Provider Secure E-mail on Self-Reported Patient Care-Seeking and Overall Health**



Percentages calculated among respondents who reported that they had e-mailed their provider in the last 12 months (79% of all respondents).

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**Authorship Information:** Concept and design (MR, NG, IG, VF); acquisition of data (MR, IG); analysis and interpretation of data (MR, NG, IG, VF); drafting of the manuscript (MR, NG, IG); critical revision of the manuscript for important intellectual content (MR, IG, VF); statistical analysis (MR, IG, VF); provision of patients or study materials (MR, IG); obtaining funding (MR, IG); administrative, technical, or logistic support (MR, IG).

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