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Meaningful Use and the Patient Portal: Patient enrollment, use and satisfaction with patient portals at a later-adopting center

Joan Neuner, MD, MPH[1], **Megan Fedders, MA, MBA**[2], **Mary Caravella, DBA**[3], **Lisa Bradford, PhD**[1], and **Marilyn Schapira, MD, MPH**[4]

Joan Neuner: jneuner@mcw.edu; Megan Fedders: mfedders@mcw.edu; Mary Caravella: mary.caravella@business.uconn.edu; Lisa Bradford: bradford.lis@gmail.com; Marilyn Schapira: mschap@upenn.edu

[1]Medical College of Wisconsin; Patient Care and Outcomes Research

[2]Medical College of Wisconsin/Froedtert Hospital; Bioinformatics Department

[3]University of Connecticut School of Business; Marketing Department

[4]Perelman School of Medicine, University of Pennsylvania; Division of General Internal Medicine

Abstract

Many physicians are adopting patient portals in response to governmental incentives for meaningful use (MU), but the stage 2 requirements for portal use may be particularly challenging for newer electronic health record (EHR) users. This study examined enrollment, use based on MU requirements, and satisfaction in a recently adopting fee-for-service multispecialty system. Between 2010–2012, overall portal enrollment increased from 13.2% to 23.1% but varied substantially by physician specialty. In 2013, over 97% of physicians would have met requirements for a stage 2 MU utilization measure requiring that patients download personal health information, but only 38% of all physicians (87% of primary care physicians [PCPs] and 37% of other specialists) would have met e-mail requirements. Satisfaction with the portal overall and with portal-based e-mails was high. These results suggest that later-adopting PCPs can succeed in providing satisfactory record and e-mail access but specialists may find reaching e-mail thresholds more difficult.

Background

The Centers for Medicare and Medicaid Services (CMS) financial incentives for "meaningful use" (MU) [1] likely will persuade many reluctant doctors to adopt electronic health records (EHRs).[2] However, there are strong concerns about whether most physicians will be able adopt and utilize these EHRs to meet MU standards.[2–5] These concerns may be greatest for regulations regarding patient record access and electronic communication: in a national survey of US primary and specialty physicians, only 28% of physicians reported having EHRs that allowed patient access to records.[3] Despite this, the architects of the MU rules have set the bar high for patient EHR access and communication.[6] The 2014 stage 2

Corresponding author: Joan M. Neuner, MD, MPH, Medical College of Wisconsin, Center for Patient Care and Outcomes Research, 8701 Watertown Plank Road, Suite H2755, Milwaukee, WI 53226, Phone: 414-955-8856; Fax: 414-955-6689.

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MU regulations require that patients themselves initiate interactions with the EHR; specifically, they require that 5% of patients 1) download or otherwise view electronic health information and 2) use secure electronic messages (e-mail).[1]

Patient portals linked to commercial EHRs probably offer the most practical way for new EHR users to meet CMS MU patient access regulations. Reports from early adopters of patient portals also support the portals' potential. In some centers, portal enrollment is now as high as 50–60%,[6–8] and patient satisfaction with portal features like appointment scheduling and access to medical records is high. A substantial number of patients at these centers also initiate emails to doctors using the portals, and most are very satisfied with this communication.[7,9]

However, the literature from early-adopting centers may be limited in its ability to predict the experiences for later-adopting centers of patient portals. First, much of the currently published evidence has come from health maintenance organizations, wherein physicians are salaried and receive monetary incentives per individual e-mail.[6] Convincing physicians outside of health maintenance organizations to provide care – such as prompt responses to e-mails – for which they are not paid may be substantially more difficult. In addition, much of the data has come from centers that were heavily involved in portal development.[8] Later-adopting physicians may face additional barriers not encountered in those centers, such as difficulties incorporating commercial "off the shelf" portals into processes of care. Finally, growing patient comfort with electronic communication throughout their lives may foster enrollment in the portals, but may offer an important challenge as well. An extensive non-health marketing literature regarding the role of prior expectations in satisfaction suggests that later-adopting physicians may face high expectations for timeliness and perhaps comprehensiveness of electronic communications.[10,11] In one report from an early-adopting center,[12] this did appear to be the case; patient satisfaction was already strongly associated with rapidity of e-mail response as early as 2004. It is not known how these challenges will be met at later-adopting centers with regards to portal enrollment, use, and satisfaction or how patient expectations might impact physician's ability to meet MU targets.

This article reports the experience with adoption of a commercial patient portal in a Midwestern multidisciplinary group practice that includes 10 primary care clinics. Other than MU payments in 2013, there were no physician or support staff payment incentives for patient portal use at this center. Portal use metrics and a patient survey were used to evaluate the enrollment, use, and satisfaction with the portal, exploring the potential for later-adopting centers to meet patient expectations and stage 2 MU thresholds.

Methods

Overview of Multi-Method Study

The study utilized 2 data sources. First, electronic records of portal enrollment and use (overall and by portal feature type) from the time period from January 1, 2010, to March 30, 2013. Second, an anonymous survey was performed with all patients who had enrolled in the portal. Because the survey was anonymous, there was no link between the 2 data sources.

Patient Portal Description

The study team examined data from 2010 to 2012 of users of a commercially available patient portal (MyChart; Epic Systems Corporation, Verona, WI) linked to the EHR (Epic; Epic Systems Corporation, Verona, WI) of a multispecialty academic group practice and 10 affiliated community primary care clinics (general internal medicine and family medicine physicians). The portal allowed patients to make appointments and e-mail providers, request prescription renewals, and review major medical record content (ie, problem lists of diagnoses, medications, laboratory and radiology results, immunizations, and instructions from in-person visits). Diagnosis and laboratory information were linked to a commercial library of patient educational materials (Healthwise; Healthwise, Incorporated, Boise, ID).

Patient portal rollout was staged starting with primary care offices in 2008. The portal was fully implemented in most ambulatory areas by 2009 and in cancer-related clinics in early 2010. Throughout implementation, portal availability was advertised with signs at each clinic and with electronic information on the practice's Web site. Portal registration could only be done in person, so that picture identification could be examined. No online registration was allowed during the study period.

The patient portal home page included 3 large 1-click links: test results, health summary (current health issues, current medications, allergies, immunizations, and preventive care summary), and upcoming appointments. A link to secure messages was available in a more extensive set of links on a left-side vertical bar. The log-in page included a warning not to use secure e-mail for urgent issues, and a notice to anticipate a 2-day turnaround time for response. The format of the patient portal webpages changed only slightly during the study.

Laboratory results were released automatically to all enrolled patients during the study period. The timing of this changed slightly during the study period. Until the end of 2011, all laboratory test results were automatically released to patients 5 days after they were released to the ordering physician. In 2012, they were released after 2 days.

Survey Description

We examined satisfaction with the patient portal using an anonymous survey sent electronically to all active portal users a single time in January 2011. Survey items included demographics, general satisfaction with the portal, satisfaction with specific features of the portal, satisfaction with portal functionality, and desire for additional portal elements. Items also included patient satisfaction measures from the 2009–2010 Consumer Assessment of Healthcare Providers and Systems (CAHPS) clinician and group surveys regarding timeliness of telephone and electronic communication.[13] Most items used 4-point Likert scales (eg, very dissatisfied to very satisfied, never to always). Subjects were asked to respond to the CAHPS questions for only 1 of their providers.

Analysis

Electronic measures—Portal enrollment (defined as registering for an account and activating the account online) was examined in 2010–2012 as a percentage of the unique ambulatory visitors to the center. Enrollment was compared by patient age and number of

comorbidities (congestive heart failure, coronary artery disease, myocardial infarction, diabetes, kidney disease, stroke, lung disease, peripheral vascular disease, liver disease, chronic obstructive pulmonary disease, and carotid artery disease).

Among enrolled patients, the number of episodes of portal use was calculated for 1) the portal overall and 2) specific portal features (appointments, test results, immunizations and other preventive care, secure messages and medication renewal requests). For the first quarter of 2013, measures of portal utilization also were developed that would satisfy the stage-2 MU criteria regulations that were announced late in 2012 (Table 1).[1] These included 2 measures that according to stage-2 MU regulations must be performed electronically (viewing of health information and use of secure electronic messaging) as well as one that could be done either electronically or in other ways (viewing of health reminders/health maintenance). As stated in MU regulations, the denominator was the percent of active patients, which differs slightly from enrolled patients. Using this definition, we calculated the percent of 1) all physicians and 2) physicians stratified by specialty type that would have qualified for MU payments.

Survey measures—Survey respondents' demographics were summarized and compared with all portal users. Among respondents, summary statistics were developed for measures of overall use and satisfaction, use and satisfaction with individual features, and interest in further features. Patients who reported features were not applicable to them were excluded from analyses of that feature. Given the ceiling effect expected in studies of patient satisfaction,[13] satisfaction measures were dichotomized into the highest of 4 categories (eg, very satisfied) versus all others.

χ^2 Tests and a logistic regression model were used to examine factors associated with surveyed patients' satisfaction, including respondent demographic characteristics and utilization (reported number of uses and proxy use – ie, use by a person designated by the patient) of the portal. Because there were no differences in these 2 analyses, only unadjusted (χ^2) results are shown.

Results

Electronic Data

Among the 124,379 adult patients seen in the ambulatory clinics in 2010, 13.2% were enrolled in the patient portal (Table 2). By 2012, this increased to 23.1%, but varied substantially between the clinic sites from 0–80%. In 2012, the median patient accessed the system 14 times, with a range from 1 to 660. Over 93% accessed the system at least 2 times, 78% accessed the system 4 or more times; and 15.3% accessed the system 50 or more times per year. Portal enrollment varied somewhat by age (aged 50- to 65-year-olds more likely to enroll than either younger or older patients) and decreased slightly with increasing number of chronic medical conditions (all $P < .01$).

Utilization of individual portal features in 2011 and 2012 is also shown in Table 2. In 2012, 96% of enrollees examined medical test results (16.9% of the total ambulatory population) and 55.1% used secure messages (e-mail either initiated by the provider or patient).

Quarter 1 of 2013 utilization measures based on stage 2 MU criteria generally corresponded with use of features (shown in Table 2), but the number of physicians achieving thresholds varied substantially by measure and by specialty type. Between 87 and 100% of primary care, medical subspecialty, obstetrics and gynecology, neurology, and surgery physicians would have met the threshold for MU payments for viewing of health information. MU-defined patient viewing of preventive care information varied more overall and by specialty type. Only 38.2% of all physicians would have met the MU threshold for e-mail communications (e-mail initiated by ≥ 5% of their patients), and these varied substantially by specialty (Table 3). More than 87% of primary care physicians (PCPs) and 64.3% of obstetrician/gynecologists would have met thresholds, but only 44% of medical specialists, 10% of surgical specialist, and no interventional radiologists or radiation oncologists (data not shown) would have met criteria.

Among PCPs, much of the difference in patient-initiated e-mail appeared to be explained by differences in enrollment. A few physicians near the median for enrollment only just surpassed the MU e-mail threshold. However, on average, those with e-mails below the MU threshold had substantially lower average enrollment. For example, among the 10.1% of PCPs who had <25% of their patients enrolled, only 1 physician (12.5%) met MU e-mail criteria. Among the remaining 89.9% of physicians with ≥25% enrollment (n = 71), 94.3% met e-mail criteria. On average, specialists had lower enrollment rates, but given the very low rates of e-mails they received, the association between enrollment and MU was not analyzed further in the specialist group.

Survey Results

There were 2,989 respondents to the January 2011 survey, for a response rate of 20.1%. When compared with all portal users, respondents were slightly older and more likely to be female (Appendix Table 1, $P < .001$). Physician specialty type was similar in the surveyed group to the overall population that used the portal.

Satisfaction with patient portal—Over 56% of respondents reported using the portal at least monthly. Respondents generally reported satisfaction with the functioning of the portal (Appendix Figure 1). More than 96% of survey respondents were either very satisfied (66.5%) or satisfied (30.0%) with the patient portal overall (3% were dissatisfied and 1.5% were very dissatisfied). Nearly 98% of respondents reported they would strongly recommend (71.3%) or recommend (26.4%) the portal to a friend/family member (1.7% would not recommend and 0.6% would recommend against). Subjects were slightly less likely to agree that the patient portal had improved communication with the health team (60.4% strongly agreed, 32% agreed, 4.6% disagreed, and 2.3% strongly disagreed). Only 23.9% strongly agreed that it was a factor in where they received health care.

Patients' satisfaction with the individual patient portal features is shown in Figure 1. The greatest satisfaction was with secure messaging with their physician(s), with 61.5% of patients reporting being very satisfied. A substantial number of respondents responded to questions about proxy use, and less than half of them reported being very satisfied with it. Less than half of respondents reported being very satisfied with patient education. The

proportion very satisfied with each of the individual features was significantly lower than the proportion very satisfied overall (data not shown, all $P < .001$).

Portal satisfaction and respondent characteristics—Self-reported higher portal use was associated with being very satisfied with the portal (Table 4) as well as its individual features (Appendix Table 2). There was a strong association of greater portal use with increased likelihood that patients would recommend the patient portal to others. Proxy users also were more likely to be very satisfied and report that they would recommend the portal to others. In contrast, age was not associated with satisfaction or likelihood of portal recommendations, and patient sex was only marginally associated.

Interest in future capabilities—Only 6.6% of patients reported that they used any other personal health record or patient portal, but nearly 33% reported that they had an iPhone or other smartphone at the time of the survey. Only 11.0% reported that ability to access the patient portal on a smartphone was a very important future addition, and no other potential improvement to Internet capabilities was considered to be very important by more than one-third of participants (Appendix Figure 2). However, interest in adding each of these features increased with increased patient use, although these trends were not all statistically significant (Appendix Table 2).

Portal Communication Timeliness and Quality

Both electronic assessment and survey responses were used to examine e-mail response time. In the statistics obtained from the EHRs for 2010, there were 34,263 e-mails (ie, requests for medical advice), and 84.8% received a reply to the request within 8 business hours. Survey respondents were asked about timeliness of e-mail responses, both subjectively and objectively; 72.9% of the overall group strongly agreed with a subjective question that responses to patient-initiated emails messages were timely. A subset of patients (n=1865) was also asked objective items about communication quality from the CAHPS 2009–2010 clinician and group survey.[13] Among the 1078 respondents that reported they had e-mailed one of their physicians with a medical question in the prior 12 months, 47.5% reported that they always received an answer to their medical question that same day. For comparison, subjects were also asked about responses to telephone calls. A similar number (60.1%) of the CAHPS survey participants reported calling the office during regular office hours, and 50.1% of them reported that they always got an answer to their question the same day (data not shown).

Discussion

Enrollment during the first few years of a patient portal in this Midwestern multispecialty health system was similar to enrollment during early-adopting centers' early years. However, among patients who had enrolled, use was nearly as high as most early adopters' current reports. Findings regarding MU targets reflected these patterns but varied substantially by physician specialty. Portal users were generally very satisfied, and e-mail communication and laboratory result information appeared to be acceptable and important to satisfaction.

Most PCPs in this study would meet MU thresholds for all stage 2 MU patient access measures, but the data suggest that specialists may struggle to reach the e-mail communication stage 2 MU thresholds. The stage 2 MU regulations target both patient viewing of their health record and e-mail communication, hypothesizing that these will engage patients in preventive and chronic illness care.[14] It was found that, once enrolled, patients of both specialists and PCPs viewed their health record, but only PCPs received e-mails at rates substantially above thresholds. The study team could not investigate patients' reasons for sending fewer e-mails to specialists than to PCPs, but surgeons and some medical specialists who do not perform much chronic care are unlikely to generate substantial numbers of e-mails over time. Given these findings, it might be more appropriate for specialists to have alternative requirements for MU payments, such as providing patient education or postoperative instructions online. Further research into patient communication with such specialists could focus on patients' perceptions of the most valuable online information as well as the role of care teams consisting of both specialists and PCPs.

Patients enrolled in the patient portal across this multispecialty system at rates similar to, but not faster than, early published rates from large integrated health systems, including Kaiser Permanente [9] and Group Health Cooperative.[15] Enrollment in some well-established systems recently reached 40–70%.[6,8] This study was not able to examine reasons why enrollment has not accelerated despite the increasingly digital environment outside of medicine. It is possible that practices focused on primary care will be more successful than the multispecialty practice studied here – over half of this practice's PCPs achieved enrollment rates >40%. Nonetheless, these results suggest that even some large centers with patient portals will have difficulty with some of their physicians' enrollment targets.

In contrast to this study's findings for enrollment, patients in this study who were already enrolled used the portal at rates close to some of the mature groups. Although 62% of Kaiser enrollees were accessing their patient portal 2 or more times in a 6-month period by 2 to 4 years,[9] 78% of patients accessed the portal 4 or more times in 2012. Some of the users accessed the portal very frequently; more than 15% accessed the portal 50 or more times. Median use at GHC, a system that has reported a comprehensive "medical home" model redesign emphasizing "e-visits", was somewhat higher than at Kaiser or the center in the present study. Although it is possible that GHC's practice redesign, their capitated model of payment, or other factors may foster even greater use,[6] the findings of the present study suggest that patients are using the portal with some intensity.

Patient satisfaction with the portal was also generally high. The study team was concerned that increasingly technologically savvy enrollees might have high expectations that the portal could not meet, but instead found overall satisfaction that was similar to or slightly higher than the available comparison literature from the early years at GHC.[15] This satisfaction appears to extend to e-mails: portal users at GHC were only slightly more "highly satisfied" with e-mail than our respondents (65%). Satisfaction among respondents in the present study was similar to that in another earlier university-based study[12] and somewhat better than in a survey study of enrollees in another newly adopting Midwestern medical center, in which only 33% of new portal enrollees strongly agreed that e-mail was easy to navigate or that they received a timely response to their e-mails.[16] Other portal

features were also generally acceptable to patients in the present study, although satisfaction with education and proxy access were lower.

The patient survey also revealed little association between demographic factors (including age) and satisfaction but had other notable findings regarding patients' interests in and satisfaction with the portal. In contrast to the minimal effect of demographics upon satisfaction, increased portal use was strongly associated with higher satisfaction. The results for proxy use were more mixed. Although users of proxy access were more satisfied, perhaps reflecting family members' strong interest in proxy access,[17] patients reported lower satisfaction with proxy access than with other features of the portal. The reasons for this are unclear, but the role of technological expectations is being further investigated through qualitative work at the study institution and warrants investigation at other centers. In contrast to a previous study,[16] portal users expressed interest in additional educational features. They were not as interested in other potential future functions such as adding private notes or uploading health measures done at home, although more frequent users did express more interest.

Our study has several limitations. First, it was limited to 1 medical center's multispecialty practice with 1EHR. However, it included a number of affiliated, community-based primary care practices and, thus, a wider spectrum of practices with different organizational leadership and patient socioeconomic status than in many health care organizations. Second, the study team was not able to examine other patient and physician outcomes relevant to clinical practice and portal adoption. Studies in several centers suggest that use of patient portals can be associated with reduced utilization of medical care, including costly emergency room visits.[18,19] Practices at GHC reported increasing physician burnout as online work increased, however, necessitating redesign of other care processes. Furthermore, a recent study in Kaiser Colorado found higher outpatient and inpatient visits among portal users.[20] The response rate of our survey was disappointing, but given the large number and diversity in age of our respondents, it provides new insights regarding satisfaction with patient portal features among those enrolled. The practice in the present study does not pay physicians for e-mail visits, but it is possible that these replace phone encounters and, therefore, may not increase the overall burden on physicians. The study was not able to examine this. Based on demographics obtained for a subsample of the practice, this study also probably included limited numbers of nonwhite patients, an issue raised in a number of other studies.[8] The study finding that patients with more chronic illnesses were less likely to enroll in the portal may reflect differences in chronic illness epidemiology by age, race/ethnicity and income. In a Boston study that had similar unadjusted findings, patients with more chronic illnesses actually were more likely to enroll once race/ethnicity and income had been accounted for in a multivariate model.[8] The study team was not able to examine this in their sample because reliable race/ethnicity and income information were not available for many of the patients. Expansion of patient portal digital services to include mobile platforms may expand enrollment among these patients.[21]

In summary, despite increases in online technology use in other aspects of life, the speed of enrollment in a Midwestern medical center's patient portal remains similar to that of the earliest centers a decade ago. In contrast, both use and satisfaction among those enrolled are

higher than at comparable times for early-adopting centers. Because the patient-communication measures of MU regulations require high-enough enrollment to allow engaged use, further research is needed to understand factors that would facilitate enrollment, particularly at centers with traditional fee-for-service models. This study suggests that patients at later-adopting centers are moving quickly to embrace online programs, and that primary care, but not specialty physicians can satisfy many of their expectations even without large redesigns of care. Given the many questions about the effects of patient e-communication on utilization and care quality, innovative programs to enhance the medical home and develop accountable care organizations should include assessments of online patient access, its facilitators, and outcomes.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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References

1. EHR Incentive Programs - Stage 2. Centers for Medicare & Medicaid Services; http://www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/Stage_2.html [Accessed 2013]
2. Hsiao C, Decker S, Hing E, Sisk J. Most physicians were eligible for federal incentives in 2011, but few had EHR systems that met meaningful-use criteria. Health Aff. 2012; 31(5):1100–1107.
3. Hogan S, Kissam S. Measuring meaningful use. Health Aff. 2010; 29(4):601–606.
4. Mandl K, Khorasani R, Kohane I. Meaningful use of electronic health records. Health Aff. 2012; 31(6):1365. author reply 1366.
5. Adler-Milstein J, Green C, Bates D. A survey analysis suggests that electronic health records will yield revenue gains for some practices and losses for many. Health Aff. 2013; 32(3):562–570.
6. Ralston J, Coleman K, Reid R, Handley M, Larson E. Patient experience should be part of meaningful-use criteria. Health Aff. 2010; 29(4):607–613.
7. Ralston J, Martin D, Anderson M, et al. Group health cooperative's transformation toward patient-centered access. Med Care Res Rev. 2009; 66(6):703–724. [PubMed: 19549993]
8. Yamin C, Emani S, Williams D, et al. The digital divide in adoption and use of a personal health record. Arch Intern Med. 2011; 171(6):568–574. [PubMed: 21444847]
9. Silvestre A, Sue V, Allen J. If you build it, will they come? The Kaiser Permanente model of online health care. Health Aff. 2009; 28(2):334–344.
10. Oliver R. A cognitive model of the antecedents and consequences of satisfaction decisions. J Mark Res. 1980; 7(14):460–469.
11. Bolton R, Drew J. A multistage model of customers' assessments of service quality and value. J Consum Res. 1991; 17(4):375–384.
12. Liederman E, Morefield C. Web messaging: a new tool for patient-physician communication. J Am Med Inform Assoc. 2003; 10(3):260–270. [PubMed: 12626378]

13. [Accessed October 2009] Adult Primary Care Questionnaire 1.0. CAHPS® Clinician and Group Surveys: Consumer Assessment of Healthcare Providers and Systems (CAHPS). http://cahps.ahrq.gov/surveys-guidance/docs/351b6-Adult-Prim-Span-6pt-V1x.doc

14. Hibbard J, Mahoney E, Stockard J, Tusler M. Development and testing of a short form of the patient activation measure. Health Serv Res. 2005; 40(6 Pt 1):1918–1930. [PubMed: 16336556]

15. Ralston J, Carrell D, Reid R, Anderson M, Moran M, Hereford J. Patient web services integrated with a shared medical record: Patient use and satisfaction. J Am Med Inform Assoc. 2007; 14(6): 798–806. [PubMed: 17712090]

16. Wakefield D, Kruse R, Wakefield B, et al. Consistency of patient preferences about a secure internet-based patient communications portal: Contemplating, enrolling, and using. Am J Med Qual. 2012; 27(6):494–502. [PubMed: 22517909]

17. Zulman D, Nazi K, Asch S, Wagner T. Access to the medical record. Ann Intern Med. 2012; 156(9):668. [PubMed: 22547480]

18. Zhou Y, Garrido T, Chin H, Wiesenthal A, Liang L. Patient access to an electronic health record with secure messaging: impact on primary care utilization. Am J Manag Care. 2007; 13(7):418–424. [PubMed: 17620037]

19. Chen C, Garrido T, Chock D, Okawa G, Liang L. The Kaiser Permanente Electronic Health Record: transforming and streamlining modalities of care. Health Aff. 2009; 28(2):323–333.

20. Palen T, Ross C, Powers J, Xu S. Association of online patient access to clinicians and medical records with use of clinical services. J Am Med Assoc. 2012; 308(19):2012–2019.

21. Horrigan, J. [Accessed December 6, 2009] Wireless Internet Use. 2009. [Website]http://www.pewinternet.org/Reports/2009/12-Wireless-Internet-Use.aspx?r=1

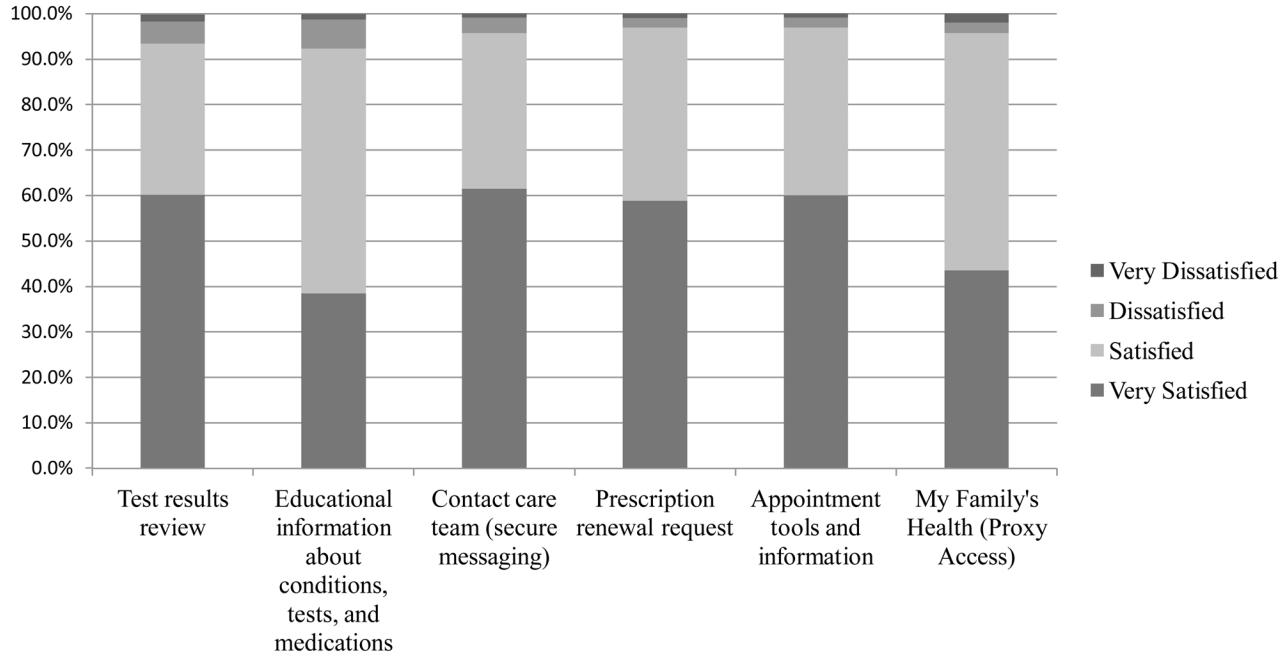

Figure 1.
Satisfaction with Portal Features

Table 1

Meaningful Use Requirements Related to Patient Communication

Name	Description	Measure
Patient Electronic Access	Provide patients the ability to view online, download, and transmit their health information within four business days of the information being available to the eligible provider (EP).	More than 5% of all unique patients seen by the EP during the EHR reporting period are provided timely online access (available to the patient within 4 business days after the information is available to the EP) to their health information
Preventive Care	Use clinically relevant information to identify patients who should receive reminders for preventive/follow-up care and send these patients the reminders, per patient preference.	More than 10% of all unique patients who have had 2 or more office visits with the EP within 24 months before the beginning of the EHR reporting period were sent a reminder, per patient preference when available.
Use Secure Electronic Messaging	Use secure electronic messaging to communicate with patients on relevant health information.	A secure message was sent using the electronic messaging function of CEHRT by more than 5% of unique patients (or their authorized representatives) seen by the EP during the EHR reporting period.

Table 2

Patient Portal Enrollment and Use

Patient Portal Enrollment and Use			
	2010	**2011**	**2012**
Active Portal Users	16377	23928	31712
Ambulatory Unique Patients	128862	136279	148808
% Unique Patients with active patient portal accounts	12.7%	17.6%	21.4%
Percentage of Patients w/appointments who used the portal in the year	12.0%	16.0%	18.1%
Individual Portal Feature Use			

Portal Feature	**Percentage of Ambulatory Patients Accessing Feature (2011)**	**Percentage of Ambulatory Patients Accessing Feature (2012)**	**Percentage of All Portal Users Active in 2012 who Accessed Feature**
Appointments			
Upcoming Appointment	13.8%	15.4%	87.3%
Appointment Request	4.7%	5.2%	29.4%
Medical Condition (Problem) List	13.2%	14.0%	79.6%
Medical Test Results	13.8%	16.9%	96.0%
Health Maintenance (Preventive Care)	12.0%	12.5%	69.2%
Secure Email Messages	9.1%	10.0%	55.1%
Medication Refill Request	5.4%	5.9%	33.4%

Table 3

Portal Use According to Stage 2 Meaningful Use Criteria

		Percentage of Providers Meeting Threshold		
	No. of Providers	**View/Download/Transmit**	**Patient Reminders***	**Secure Messaging**
Primary Care	79	100%	82.3%	87.3%
Obstetrics & Gynecology	28	100%	89.3%	64.3%
Medicine Subspecialty	108	100%	75.0%	43.5%
Other Specialty	66	97.0%	51.5%	16.7%
Surgical Specialty	135	99.3%	48.9%	10.4%
Overall	**416**	**99.3%**	**65.1%**	**38.2%**

* The patient reminders data includes only patients who viewed a preventive care summary in the portal without prompting. At the time of the study, reminders were not enabled.

Table 4

Association of Patient Factors with Patient Portal Evaluation

	Very satisfied (%)	P value	Would strongly recommend	P value	% reporting patient portal improves communication	P value
Age		0.49		0.12		0.86
18–35	65.5		72.5		59.8	
36–45	62.8		65.9		53.8	
46–55	66.2		71.5		54.8	
56–65	68.0		73.5		57.9	
> 65	68.0		70.6		56.1	
Gender		0.24		0.040		0.13
Male	64.9		68.6		57.2	
Female	67.3		72.5		55.2	
Proxy Enrollment		<.001		<.001		<.001
Yes	75.7		80.6		67.8	
No	63.1		67.9		52.5	
Portal use		.001		<.001		<.001
Yearly	54.4		49.5		38.0	
Q 6 months	62.3		58.6		49.4	
Quarterly	66.0		70.4		56.7	
Monthly	69.6		75.6		59.1	
Weekly	69.4		81.5		64.7	