



# Patient Portal Implementation: Resident and Attending Physician Attitudes

Lynn E. Keplinger, MD; Richelle J. Koopman, MD, MS; David R. Mehr, MD, MS;  
Robin L. Kruse, PhD, MSPH; Douglas S. Wakefield, PhD; Bonnie J. Wakefield, RN, PhD;  
Shannon M. Canfield, MPH

**BACKGROUND AND OBJECTIVES:** Electronic patient portals are increasingly common, but there is little information regarding attitudes of faculty and residents at academic medical centers toward them.

**METHODS:** The primary objective was to investigate attitudes toward electronic patient portals among primary care residents and faculty and changes in faculty attitudes after implementation. The study design included a pre-implementation survey of 39 general internal medicine and family medicine residents and 43 generalist faculty addressing attitudes and expectations of a planned patient portal and also a pre- and post-implementation survey of general internal medicine and family medicine faculty physicians. The survey also addressed email communication with patients.

**RESULTS:** Prior to portal implementation, residents reported receiving much less e-mail from patients than faculty physicians; 68% and 9% of residents and faculty, respectively, reported no email exchange in a typical month. Residents were less likely to agree with allowing patients to view selected parts of their medical record on-line than faculty physicians (57% and 81%, respectively). Physicians who participated in the portal's pilot implementation had expected workload to increase (64% agreed), but after implementation, 87% of those responding were neutral or disagreed that workload had increased. After implementation, only 33% believed quality of care had improved compared to 55% who had expected it to improve prior to implementation.

**CONCLUSIONS:** Residents and faculty physicians need to be prepared for a changing environment of electronic communication with patients. Some positive and negative expectations of physicians toward enhanced electronic access by patients were not borne out by experience.

(Fam Med 2013;45(5):335-40.)

Electronic patient portals have received increasing interest with Meaningful Use criteria and the move toward patient-centered medical homes.<sup>1-4</sup> Portals

typically allow patients and physicians to send electronic messages to one another in a secure environment. Other functions might include renewing prescriptions, making

appointments, and viewing portions of one's own medical record. Despite potential challenges and need for revised workflow, there are scant data regarding attitudes of faculty and resident physicians at academic medical centers toward electronic patient portals integrated with an electronic medical record (EMR).<sup>5</sup> In a 2007 residency program survey, the American Board of Internal Medicine found that only 31% of clinics provided the opportunity for secure email consultations with a provider (including resident physicians).<sup>6</sup> Thus at least until recently, patient portals have not been commonplace. Physicians are surrounded by technologic advances such as computers, smartphones, gaming devices, and other daily use electronics, but it is not clear whether health information technology (HIT), such as patient portals, are viewed by either faculty physicians or physician trainees in a positive manner.

While physician perceptions of new patient portals are largely unknown, there is evidence that physician perception of the EMR plays

---

From the Department of Internal Medicine (Dr Keplinger), Curtis W. and Ann H. Long Department of Family and Community Medicine (Drs Koopman, Mehr, and Kruse and Ms Canfield), Center for Healthcare Quality, Department of Health Management and Informatics (Dr D Wakefield), and Sinclair School of Nursing (Dr B Wakefield), University of Missouri-Columbia.

a crucial role in their adoption.<sup>7,8</sup> Moreover, very limited patient and physician use of the UK HealthSpace system, an Internet-accessible personal electronic record, has been attributed to a design-reality gap, a difference between the current reality and the assumptions built into the model for the new technology.<sup>9</sup> Even though physicians generally appreciate that electronic tools may ultimately be helpful, they are concerned about potential negative and unintended consequences, including increased workload, disrupted workflow, and generation of new types of errors.<sup>10</sup> Physicians using EMRs believe that they spend more time per patient for a period of months or even years after EMR implementation, resulting in longer workdays, fewer patients seen, or both.<sup>11</sup> Because physician perception plays a crucial role in the adoption of new EMR tools, it is reasonable to measure their perception of integrated patient portals.

We used the opportunity provided by system implementation of a new patient web portal to study faculty and resident attitudes toward the new portal. Additionally, we evaluated attending physician perceptions in both pre- and post-implementation settings. We anticipated that residents would be more open to electronic communication than attending physicians and that faculty attitudes would improve after initiation of the web portal compared to prior attitudes.

## Methods

The University of Missouri Health System began to implement its Cerner PowerChart® EMR in 1998. In November 2008, an electronic communications portal, Cerner IQHealth, was added for patients in selected clinics in the Division of General Internal Medicine (GIM) and the Department of Family and Community Medicine (FCM). The portal was tethered to the institution's EMR and incorporated clinical data from the patient's record. The main initial function of the portal

was secure patient-provider messaging. Patients could also see their list of allergies, immunizations, and medications. Subsequent to the surveys we report in this paper, patients were also given the ability to see test results.

We surveyed GIM and FCM physicians three times in 2008–2009 about their perceptions of a patient web portal. In spring 2008, we used a paper questionnaire to assess residents' and attending physicians' opinions and perceptions about a future planned implementation of the electronic communications patient portal. Hereafter, we will refer to this survey as the Resident/Attending survey. Subsequently, the institution decided to scale back its original plan from a widespread implementation across all GIM and FCM clinics to a limited pilot implementation in three practices (two GIM and one FCM). Only one of these, a GIM practice, included resident physicians. As FCM and GIM had substantially different clinic organizational models, we decided to assess only attending physicians in the subsequent two surveys to better compare differences in implementation and response. In October 2008, we administered a pre-implementation paper survey to just the attending physicians at the pilot clinic sites. After 1 year of portal use, a post-implementation paper survey was administered to faculty at the pilot sites. Additionally, we conducted post-implementation interviews with key attending physician informants from GIM and FCM. We used these interviews to provide additional insights and context for our quantitative survey results. This study was approved by the University of Missouri Health Sciences Institutional Review Board.

The resident/attending survey asked recipients to estimate the number of emails received monthly from patients. The questionnaire then asked for their perceptions regarding whether a patient portal might increase workload, decrease phone calls, decrease patient

satisfaction, decrease patient visits, improve quality of care, improve patient compliance, negatively affect physician income, and increase professional satisfaction. Respondents were also asked to indicate their level of personal support for implementation of the portal. Ratings were recorded as "strongly disagree," "disagree," "neither disagree nor agree," "agree," or "strongly agree." The "agree" and "strongly agree" responses were combined to indicate general agreement and compared to the other combined categories. Participants were asked yes/no questions regarding whether they would implement an electronic communications patient portal and whether if implemented, they would allow viewing of the electronic medical record by the patient. The pre- and post-implementation surveys were similar, except that the post-implementation survey asked about actual experience.

Survey responses were double-entered and verified. Because the small sample size of faculty physicians surveyed at the pilot sites resulted in expected table cell frequencies that were <5, Fisher's exact test with a two-tailed *P* value ( $\alpha = .05$ ) was used to compare responses between groups for all 2x2 tables. For larger tables, groups were compared with the chi-square statistic. We made two comparisons: (1) Residents and faculty on the resident/attending questionnaire (a cross-sectional analysis) and (2) Pre-implementation pilot site faculty to post-implementation pilot site faculty (pre- and post-implementation questionnaires).

## Results

Response rates were 77% for the resident/attending survey, 61% for the pre-implementation survey, and 68% for the post-implementation survey. Resident physicians reported fewer email communications from their patients than attending physicians (Table 1). Two thirds (68%) of residents reported no email exchange with their patients in a typical month compared with only 9% of faculty

**Table 1: Number of Emails Received From Patients by Physicians in a Typical Month**

Number of Emails	Resident/Attending Survey		Pre-Implementation Attendings (n=11) n (%)	Post-Implementation Attendings (n=15)	
	Residents (n=39) n (%)	Attendings (n=43) n (%)		Conventional Email n (%)	Through Portal n (%)
None	26 (68.4)	4 (9.3)	0 (0.0)	2 (13.3)	4 (26.7)
1–5	11 (29.0)	16 (37.2)	2 (18.2)	6 (40.0)	0 (0.0)
6–20	1 (2.6)	14 (32.6)	4 (36.4)	6 (40.0)	9 (60.0)
21–40	0 (0.0)	5 (11.6)	4 (36.4)	1 (6.7)	1 (6.7)
>40	0 (0.0)	4 (9.3)	1 (9.1)	0 (0.0)	1 (6.7)

( $P<.001$ ). In contrast, nine attending physicians (21%) reported that they received more than 20 emails from patients in a typical month; no residents reported receiving this many emails from patients (Table 1). Table 2 compares resident and attending physicians' perceptions from the resident/attending survey. The same proportion of residents and faculty (79%) said that given the choice, they would implement secure messaging between patients and their providers (Table 2).

Table 3 shows results for pilot site attending physicians before and after portal implementation. Most pilot site faculty physicians surveyed immediately before portal initiation (10/11, 91%) also said they would

implement secure messaging between patients and providers; following implementation, 12 of 15 (80%) endorsed this idea (Table 3).

Residents were less likely to favor allowing patients to view their clinical data than FCM and GIM faculty physicians, 57% compared to 81%, respectively ( $P=.03$ ) (Table 2). Immediately prior to portal implementation, all faculty at the pilot sites supported patients viewing their electronic medical record data. Post-implementation, most physicians reported being quite comfortable or extremely comfortable allowing patients to view selected laboratory results: chemistry data (9/14, 64%), hematology data (9/14, 64%), coagulation studies (10/14,

71%), microbiology (8/14, 57%), immunology (8/14, 57%), and cytology (8/14, 57%). However, only six of 14 (43%) were comfortable allowing patients access to anatomic pathology reports.

Less than half of both resident (21%) and FCM/GIM faculty physicians (43%) agreed that portal use would negatively impact physician income; fewer residents agreed with this premise ( $P=.04$ ) (Table 2). Substantial majorities of both resident and attending physicians felt that the portal would increase workload. However, there was dramatic change among faculty physicians at the pilot sites, with 64% pre-implementation agreeing workload would increase but only 13% agreeing that it had

**Table 2: Faculty and Resident Physician Agreement\* With Statements Regarding the Potential impact of Implementing a Patient Portal**

Increased electronic communications with my patients will:	Residents (n=39) n (%)	Attendings (n=43) n (%)	P Value
Increase my workload	27 (69)	31 (76)	.62
Decrease the number of phone calls	22 (56)	28 (67)	.37
Decrease patient satisfaction	1 (3)	3 (7)	.62
Decrease the frequency of patient visits	13 (33)	19 (45)	.36
Improve the quality of care	21 (54)	20 (48)	.66
Negatively affect my clinical income	8 (21)	18 (43)	.04
Increase my professional satisfaction	7 (18)	8 (19)	1.00
Improve patients' ability to comply with treatment	19 (49)	24 (57)	.51
<b>Given the choice, would you:</b>			
Implement secure messaging between patients and providers	30 (79)	34 (79)	1.00
Allow patients to view selected parts of their medical records online	21 (57)	35 (81)	.03

\* The responses "agree" and "strongly agree" were combined to indicate agreement.

**Table 3: Faculty Physician\* Agreement\*\* With Statements Regarding the impact of implementing a Patient Portal**

Increased electronic communications with my patients will:	Pre-implementation (n=11) n (%)	Post-implementation (n=15) n (%)	P Value
Increase my workload	7 (64)	2 (13)	.01
Decrease the number of phone calls	9 (82)	4 (27)	.02
Decrease patient satisfaction	0 (0)	Not asked	—
Decrease the frequency of patient visits	1 (9)	2 (13)	1.00
Improve the quality of care	6 (55)	5 (33)	.43
Negatively affect my clinical income	2 (18)	Not asked	—
Increase my professional satisfaction	0 (0)	5 (33)	.05
Improve patients' ability to comply with treatment	4 (36)	3 (20)	.41
<b>Given the choice, would you:</b>			
Implement (before) or endorse (after) secure messaging between patients and providers	10 (91)	12 (80)	.61
Allow patients to view selected parts of their medical records online	11 (100)	Not asked	—

\* Only faculty physicians who worked at the pilot sites are included.

\*\* The responses "agree" and "strongly agree" were combined to indicate agreement.

after implementation (Table 3). Prior to implementation, 82% of pilot faculty physicians thought phone calls would be decreased, but only 27% thought that calls had decreased after implementation. Table 1 shows that at least moderate use of secure messaging through the portal was occurring among pilot site physicians; however, regular email communication was also continuing for most. In comments to the investigators, several physicians commented on how use of the portal had vastly simplified communicating with patients and may have improved the quality of care:

I really do think that patients get answered faster. I really do believe that.

I am getting to them faster because, again, I can reply directly and just cc, you know, my nurse and it saves a step of them having to call. The PSR [Patient Service Representative] takes a message, the message goes to the nurse, the nurse triages it, then sends it to me, I send

it back, you know. So you're saving like three steps in the process.

Before implementation, few residents (18%), FMC and GIM faculty (19%), and faculty at the pilot sites (0.0%) perceived that the patient communication portal would increase their professional satisfaction (Table 2). It is notable that the pilot site faculty physicians went from 0% agreement immediately before implementation to 33% agreement following implementation ( $P=.05$ ), (Table 3).

### Discussion

In spite of the Accreditation Council for Graduate Medical Education's efforts to create similar practices for residents and faculty, differences remain.<sup>12</sup> While Reddy and colleagues found that internal medicine residencies were more likely to have an EMR than most practicing physicians,<sup>6</sup> we found that the resident physicians we surveyed were significantly less likely to have electronic exchanges with their patients than were faculty physicians. This was also the case in a 2008 survey

of 16 family medicine residencies.<sup>5</sup> Moreover, we found that residents and faculty have some differences in views about allowing patients to view parts of their medical records and potential effect of patient portals on visits, workload, and income. Many factors could account for these differences, including the differences in salary structure, workflow, and workload of attending and resident physicians. Resident physicians usually have smaller patient panels than attending primary care physicians and less well-developed relationships. Typical of early patient portal implementations, patient enrollment at 1 year was less than 25%.<sup>13</sup> Residents, with their smaller patient panels, may have had a more limited experience to inform attitudes toward a patient portal, which may have contributed to observed differences. While the widespread adoption of technologic devices by Generation Y would suggest that physicians in training would have a positive view of HIT, they may not have similar knowledge or preferences for use of HIT compared to more experienced physicians. We should

not assume that because our Generation Y residents may have more comfort and familiarity with communications technologies in general that they therefore have knowledge and comfort with electronic communication with patients.<sup>5,14</sup> Experience and comfort with the practice of medicine and communication with patients appears to outweigh comfort with technology for this group. This may point to the need for specific curriculum on use of HIT, including on electronic communication with patients.

O'Connell et al found that differential experience with an EHR led to differences in resident satisfaction with a new EHR implementation.<sup>15</sup> Nonetheless, the current generation of physicians in training and those already in practice who may partner with them will equally face Meaningful Use Regulations for electronic health records, which include requirements to establish patient portals and significant financial consequences for those who do not meet requirements, potentially including penalties of up to \$63,750 per clinician.<sup>4</sup>

In this study, not only were resident physicians less likely to exchange email with their patients, but their attitudes differed significantly from faculty physicians regarding whether patients should be allowed to view their medical records electronically via a patient portal. Resident physicians have apparently missed the rising tide of transparency in medicine that is afoot today, as illustrated by its inclusion as a criterion for Meaningful Use.<sup>4</sup> Moreover, resident physicians' opinions are of particular interest with increasing movement toward a patient-centered medical home model with the focus on involving the patient in as many aspects of their care as possible, including self-monitoring.<sup>2</sup> Resident physicians are also less experienced than faculty physicians and more naïve in terms of how workload impacts income. It is not surprising that fewer residents

agreed that using a patient portal would negatively affect income.

As institutions and physician practices implement procedures to ensure compliance with the Meaningful Use Regulations, patient portals will be a prominent topic.<sup>16</sup> It is notable that our post-implementation group of faculty physicians felt the portal did not increase physician workload despite their earlier concerns. Apparently the intuitive sense that shifting "work" from support staff to physicians would mean more work for the physician was not borne out. Comments solicited from physicians after implementation indicated that they liked that they could more quickly and easily send lab reports to patients with many fewer clicks. Secure electronic messages from patients may in part replace phone calls and have the potential to improve the timeliness and efficiency of the flow of information. It is equally important to recognize that shifting work roles may not mean that support staff can be reduced; the physicians in our study did not perceive that there was a decrease in phone communication. Clear information on the actual impact of patient portals both positive and negative will be important as physicians and administrators view new HIT development. It is possible that while overall practice workload is not significantly changed, the portal may have other beneficial effects such as improved quality of service. Certainly practices and institutions need to consider the effect of new patient portals on the flow of information to patients, clinicians, and staff, and on productivity.<sup>17,18</sup> This is certainly an area for future research.

While our respondents did not believe that a patient portal would improve their professional satisfaction, it is notable that the percentage with this perception decreased after actually using the portal. This is a positive omen for those institutions in the process of developing HIT to include a patient communication portal, particularly in light of the fact

that more than 80% of our physician group surveyed agreed that such HIT should be implemented, both in the pre-portal and post-portal groups.

To improve the perceptions of resident physicians about patient portals, and prepare them for their future practices, we will need to focus on educating them about communicating with patients via patient portals. Experience with using patient portals during residency training will also likely improve resident preparation. Fortunately, this type of experience is likely to become more common for resident physicians. We should prepare for this trend by developing and using purposeful and innovative curricula that address this important area.<sup>5</sup>

Our study has limitations. We report on perceptions of residents and faculty physicians in a limited implementation of a specific patient portal in one institution. We did not have any direct observation of how they actually interacted. With the pilot implementation, we only had a small sample of physicians who experienced interacting with patients who had access to the patient portal. Moreover, information technology and attitudes toward it are constantly evolving. Nonetheless, this paper offers a unique look at resident and faculty physician views of establishing patient portals.

In conclusion, we found that although residents had much less experience with email communication, both residents and faculty had generally positive attitudes toward establishing a patient portal. To our surprise, residents were less open to allowing patients to view parts of the medical record. Concerns about possible increased work load were not borne out by faculty who experienced the patient portal; however, they also did not perceive that the implementation improved quality of care or decreased phone communications. Attention to resident and attending physician views will be important for future curricular changes

and for education and training as patient portals are implemented in academic medical centers.

**ACKNOWLEDGMENTS:** This work was supported by grant numbers R18HS017035 and K08HS017948 from the Agency for Healthcare Research and Quality. The content is solely the responsibility of the authors and does not necessarily represent the official views of the Agency for Healthcare Research and Quality.

**CORRESPONDING AUTHOR:** Address correspondence to Dr Koopman, University of Missouri, Curtis W. and Ann H. Long Department of Family and Community Medicine, MA306 Medical Sciences Building, DC032.00, Columbia, MO 65212. 573-884-7844. Fax: 573-884-6172. koopmanr@health.missouri.edu.

## References

- Gaster B, Knight CL, DeWitt DE, Sheffield JV, Assefi NP, Buchwald D. Physicians' use of and attitudes toward electronic mail for patient communication. *J Gen Intern Med* 2003;18(5):385-9.
- Kellerman R, Kirk L. Principles of the patient-centered medical home. *Am Fam Physician* 2007;76(6):774-5.
- Ford EW, Menachemi N, Peterson LT, Huerta TR. Resistance is futile: but it is slowing the pace of EHR adoption nonetheless. *J Am Med Assoc* 2009;16(3):274-81.
- Blumenthal D, Tavenner M. The "meaningful use" regulation for electronic health records. *N Engl J Med* 2010;363(6):501-4.
- Paladine HL, Miller K, White B, Feifer C. Study of a novel curriculum on electronic communication in family medicine residencies. *Fam Med* 2010;42(5):314-21.
- Reddy SG, Babbott SF, Beasley BW, Nadkarni MM, Gertner EJ, Holmboe ES. Prevalence and functionality of electronic health records in internal medicine continuity clinics. *Acad Med* 2010;85(8):1369-77.
- Van Der Meijden MJ, Tange HJ, Troost J, Hasman A. Determinants of success of inpatient clinical information systems: a literature review. *J Am Med Inform Assoc* 2003;10(3):235-43.
- Ash JS, Bates DW. Factors and forces affecting EHR system adoption: report of a 2004 ACMI discussion. *J Am Med Inform Assoc* 2005;12(1):8-12.
- Greenhalgh T, Hinder S, Stramer K, Bratan T, Russell J. Adoption, non-adoption, and abandonment of a personal electronic health record: case study of HealthSpace. *BMJ* 2010;341:c5814.
- Campbell EM, Sittig DF, Ash JS, Guappone KP, Dykstra RH. Types of unintended consequences related to computerized provider order entry. *J Am Med Inform Assoc* 2006;13(5):547-56.
- Miller RH, Sim I. Physicians' use of electronic medical records: barriers and solutions. *Health Aff (Millwood)* 2004;23(2):116-26.
- Nadkarni M, Reddy S, Bates CK, Fosburgh B, Babbott S, Holmboe E. Ambulatory-based education in internal medicine: current organization and implications for transformation. Results of a national survey of resident continuity clinic directors. *J Gen Intern Med* 2011;26(1):16-20.
- Ralston JD, 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.
- Kron FW, Gjerde CL, Sen A, Fetters MD. Medical student attitudes toward video games and related new media technologies in medical education. *BMC Med Educ* 2010;10:50.
- O'Connell RT, Cho C, Shah N, Brown K, Shiffman RN. Take note(s): differential EHR satisfaction with two implementations under one roof. *J Am Med Inform Assoc* 2004;11(1):43-9.
- Morton ME, Wiedenbeck S. EHR acceptance factors in ambulatory care: a survey of physician perceptions. *Perspect Health Inf Manag* 2010;7:1c.
- Wakefield DS, Mehr D, Keplinger L, et al. Issues and questions to consider in implementing secure electronic patient-provider web portal communications systems. *Int J Med Inform* 2010;79(7):469-77.
- Byrne JM, Elliott S, Firek A. Initial experience with patient-clinician secure messaging at a VA Medical Center. *J Am Med Inform Assoc* 2009;16(2):267-70.