Assessment of Registration, Enrollment, and Use of an Electronic Patient Portal in a Community Health Center

By Michael Krouse

M.D. Candidate, Class of 2017, Virginia Commonwealth University SOM

GE Primary Care Leadership Program Scholar, Summer 2014

Abstract

The Centers for Medicare and Medicaid via its meaningful use criteria has placed an emphasis on patient portals to engage patients in managing their health care and to engage physicians in coordinating care. This technology has become more prevalent in the health care field; but only a handful of studies have examined them in the context of community health centers, especially with regards to patients sending secure messages to their providers. I choose to examine the current state at HealthPoint to provide input for its clinical leadership team and patient portal workgroup regarding patient education on the portal's capabilities and to prepare them for the organization's meaningful use report in the last quarter of 2014. A retrospective analysis of electronic medical record and portal data was conducted. It evaluated patient registration, enrollment, and use across multiple demographic criteria from 2012-2014. Nearly 20% of 51,915 patient population were registered; but nearly 75% of registrants enrolled. Only 22.8% of enrollees − or 3.2% of the population -- sent at least one secure message to their provider. Minorities tended to not be registered for the portal (13.6%, 17.1%, 18.1%, 19.0% for Hispanics, Asians, African Americans, and Other, respectively relative to 24.8% for whites) and did not use the portal to convey information via secure message (13.1%, 15.4%, 17.7%, and 25.4% for Hispanics, African Americans, Other, and Asians) as much as whites (28.9%) (chi-square p<0.05 for all pairwise comparisons). Interestingly, whites accounted for the second lowest enrollment rates (73.3%). Those on Medicaid (21.8%) and the self-insured tended to use the portal the least (18.0%). Patients older than 50 accounted for less than half the population

yet used the portal the most. Patients wanted to use to the portal to convey information about medication, symptoms, referrals, and lab results. As more emphasis is placed on leveraging this technology to improve health access and health care, HealthPoint will need to reach out to minority patients, those on Medicaid, and the self-insured to ensure that they can benefit from the patient portal. It will need to train its physicians in its use so they can adequately explain the portal's capabilities. Lastly, it will need to advocate on its patients behalf to address disparities in its use.

Introduction

Disparities in health status and health care access have interested me since studying social justice as a philosophy major at the University of North Carolina at Chapel Hill. What began as a study in an abstraction presented by Plato and Rawls grew into a passion as the effects of political policies became visible when I entered in my career as a physician in training. As a neophyte in the health care field, health information technology has always remained on the periphery for me. At this point in my training I have not been exposed to electronic medical records such as Epic or NextGen, so I was eager to investigate how technology was being leveraged to improve access and coordination of care.

Additionally, the project aligned well with HealthPoint's strategic aim of meeting meaningful use criteria, as explained below. Although the revenue from meaningful use represents only 1% of its overall revenue stream, the funds are important because they offset the cost of operating its NextGen-based electronic medical record and patient portal. My project prepared its meaningful use analyst by providing a preview of HealthPoint's status in reaching these criteria. Lastly, it guided HealthPoint in reaching as many patients as possible to improve health care.

Background

      Health information technology and infrastructure will play an increasing role in health care delivery as the Centers for Medicare and Medicaid Services continue to develop their meaningful use criteria. Currently, some health centers are in stage 2 of meaningful use; and one of its core objectives is to "provide patients the ability to view online, download, and transmit their health information" (Centers for Medicare and Medicaid Services). In response to this objective, most health IT companies developed patient portals and tethered them to their electronic medical records (EMR), which were required in stage 1. The patient portal is a web-based application which allows patients access to portions of their EMR, including their lab results, treatment plan, and referrals. Patients can also make appointments and request prescription refills using the portal. Lastly, CMS also required that 5% of an eligible provider's panel send secure messages to keep them informed of their health. Therefore, an electronic messaging system was built into the portal. With these functions, the portal bears the potential to increase patient engagement in their own health and health care and enhance the process of shared medical decision making.

      As suggested by Ancker et. al (Journal of General Internal Medicine, 2010), as much as the portal can be leveraged to reach these goals, reaping the benefits of use for both patients and providers requires a lot of patients – computer and Internet access, computer literacy, health literacy, and numeracy. Moreover, patients will need to feel confident in their own written communication skills and be able to trust their providers and the health care system to maintain their privacy. Therefore, it would seem possible that those from disadvantaged backgrounds could benefit unequally from this technology.

Hsu et. al began reporting such disparities in 2005 (Journal of the American Medical Informatics Association) using data from 1999-2002 during early adoption of patient portals. He and his colleagues indicated that non-whites and those from low SES neighborhoods were significantly less likely to use the patient portal provided to them by Kaiser Permanente-Northern California. Five years later Goel et. al (Journal of General Internal Medicine, 2010) reported that whites were statistically more likely than African Americans and Latinos to be enrolled in a portal provided to them by a group practice for faculty of the Feinberg School of Medicine of Northwestern University. However, once they were enrolled, all races/ethnicities used the patient portal for advice equally. Because it was conducted at a network of federally qualified health centers, Ancker et. al's study perhaps remains the most relevant to HealthPoint because it tracked the odds of receiving a portal access code, of activating the account, and of using the portal more than once. The data showed that racial and ethnic minorities were less likely to receive access to the portal and additional decreases in their likelihood of activating the portal account and of using it. Men were less likely than women to receive portal access codes, but there were no significant gender-based differences in activation or usage. Lastly, older patients were less likely to receive portal access, but older patients who did receive portal access were actually more likely to activate the account.

The purpose of my project was to mirror Ancker et. al's study in assessing disparities in patient portal registration, enrollment, and use at HealthPoint. Unfortunately, I lack as strong a statistical background as Ancker's team, so my study was more descriptive in nature. However, because increases in health status and better coordination of care stand to be gained by leveraging this technology, all patients should benefit equally from its use.

Methodology

Setting and Participants

I conducted a retrospective analysis of data from portal and electronic medical record from HealthPoint, a federally qualified health center operating eleven medical clinics in King County, Washington. HealthPoint uses a NextGen-based patient portal system contracted through its healthcare services technology organization, PTSO. HealthPoint initially conducted a pilot project at its Bothell location in 2012 and then began a phased-launched of its patient portal at its other clinics beginning in 2013. Patients were registered for the portal by either front desk or call center personnel; were provided a dummy password; and asked to enroll themselves in the portal by logging on, changing the password, and answering some security questions. They could then use the portal freely. There was some variation from clinic to clinic in that some patients were enrolled on site whereas others enrolled at home

To be included in the study, patients had to have been 18 years or older and have had at least one visit with a provider between 2012 and 2014. Data were obtained from NextGen and its patient portal database (NextGen, Horsham, Pennsylvania). The portal database was queried for patient-level data such as registration, enrollment, and usage in the context of secure messages and their content. Demographic information such as sex, age, race and ethnicity, financial class, and income were obtained from the electronic medical record.

Analysis

Demographic Analysis: I first determined the proportion of patients who were registered for the patient portal within their own demographic pool, as opposed to referencing them to all patients registered. Then I conducted the same analysis for those who enrolled after having been registered. Chi-square tests were conducted to assess for significant differences relative to

reference groups. Finally, I examined demographic differences with regards to those who had sent at least one message to their provider over secure message.

Message Content Analysis: To assist HealthPoint in assessing how patients were using their portal and its features they would like to have included, I subjectively analyzed the content of messages sent to providers. Messages were assessed for content related to symptoms, treatment plan, medication management, lab results, imaging, referral requests, refill requests, and medical record request. As this was a subjective analysis without any keyword search software, Appendix A provides examples of each category of message content.

Results

Patient Population: A total of 51,915 patients 18 years or older had at least one visit with a provider between 2012 and 2014 (Table 1). Of these, 61.4% were women and 68.2 % were younger than 50 years old. They were predominately white and Hispanic (67.1%). As

Table 1. Patient Population (N, %)

	N	%
Total	51915	
Sex		
Male	20048	38.6
Female	31867	61.4
Age		
18-34	19699	37.9
35-49	15745	30.3
50-64	12299	23.7
65+	4172	8.0
Race		
Asian	6624	12.8
Black/AA	7119	13.7
Hispanic	15089	29.1
Other	3422	6.6
White	19661	37.9
Financial Class		
Medicaid	19781	38.1
Medicare	4760	9.2
Other Public	1602	3.1
Private	6169	11.9
Self Pay	19599	37.8
Income	51312.0	
$0-$10,000	18103.0	35.28
$10,001-$20,000	13403.0	26.12
$20,0001-$30,000	10114.0	19.71
$30,001-$40,000	4985.0	9.72
$40,001-$50,000	2274.0	4.43
$50,001-$60,000	1082.0	2.11
>$60,000	1351.0	2.63

HealthPoint is a federally qualified health center, it bears a substantial number of Medicaid and self-pay patients (75.9%) and patients who make less than $20,000 per year.

Registration for Patient Portal: Of active patients, 10,003 (19.3%) were registered for the portal. Females (21.1%) were more likely than males to be registered for the portal (16.4%). Relative to younger age groups, 50-64 year olds were more likely to receive a dummy password. Whites accounted for the greatest number of patients provided a code and nearly 25% of them were given one. Those privately insured (24.4%) and those on Medicaid (23.6%) were more likely to be given an access code. The only statistically significant difference among income groups was that of those earning $50,001-$60,000, 22.1% were registered.

Enrollment in Patient Portal: Of those registered, 7372 (73.7%) were either enrolled on site or enrolled at home. Females (74.6%) and those 50-64 year olds (76.5%) were more likely than other groups to enroll. Whites (73.3%) represented the second lowest percentage enrolled. Those with other public insurance plans (48.4%) and self-payers (65.9%) also represented lower percentages of enrollees. There were no statistically significant differences based on income.

Communication Over Portal: Of enrollees, 1680 (22.8%) sent at least one message to their provider via the portal. Males and females tended to use this feature equally, whereas those older than 50 years old (63.5%) used this feature more than younger age groups. Whites (28.9%) sent a message more than any other race. Those insured via Medicaid (21.8%) and self-payers (18.0%) accounted for the two least percentages of groups sending messages. The only statistically significant difference was that those earning between $10,001 and $20,000 (21.7%) were less likely to use the messaging feature over those earning between $20,001 and $30,000 (23.1%).

Content Analysis: 181 messages contained questions about the patients' medications, 125 messages reported symptoms, and 115 asked for referrals to a specialist. Other results are reported in Table 4.

Table 2. Analysis for Sign-up and Enrollment for Patient Portal

	Registration	N	% of population	Enrollment	N	% of those registered
Overall		10003.0	19.3		7372	73.7
Sex						
Male		3287.0	16.4		2363	71.9
Female		6716.0	21.1 *		5009	74.6 *
Age						
18-34		3858.0	19.6		2781	72.1
35-49		3147.0	20.0		2304	73.2
50-64		2484.0	20.2 *		1901	76.5 *
65+		514.0	12.3 *		386	75.1
Race						
Asian		1133.0	17.1 *		835	73.7 *
Black/AA		1286.0	18.1 *		978	76.0 *
Hispanic		2055.0	13.6 *		1484	72.2
Other		651.0	19.0 *		497	76.3
White		4878.0	24.8		3578	73.3
Financial Class						
Medicaid		4671.0	23.6		3719	79.6 *
Medicare		758.0	15.9 *		557	73.5
Other Public		275.0	17.2 *		133	48.4 *
Private		1503.0	24.4		1120	74.5
Self Pay		2795.0	14.3 *		1843	65.9 *
Income						
$0-$10,000		3419	18.9		2541	74.3
$10,001-$20,000		2548	19.0		1907	74.8
$20,0001-$30,000		1941	19.2		1418	73.1
$30,001-$40,000		1008	20.2		722	71.6
$40,001-$50,000		423	18.6		292	69.0
$50,001-$60,000		239	22.1 *		169	70.7
>$60,000		264	19.5		205	77.7

*p value <0.05 in Chi Square Test using the following reference groups: Females, 18-34 year olds, Whites, Those

with Private Insurance, and Those Earning Between $20,001-$30,000.

Table 3. Analysis for Messages Sent Over Patient Portal

	N	% of those enrolled	% of total population
Overall	1680	22.8	3.2
Sex			
Male	530	22.4	
Female	1150	23.0	
Age			
18-34	503	18.1	
35-49	495	21.5 *	
50-64	548	28.8 *	
65+	134	34.7 *	
Race			
Asian	212	25.4 *	
Black/AA	151	15.4 *	
Hispanic	195	13.1 *	
Other	88	17.7 *	
White	1034	28.9	
Financial Class			
Medicaid	812	21.8 *	
Medicare	190	34.1 *	
Other Public	60	45.1 *	
Private	286	25.5	
Self Pay	332	18.0 *	
Income			
$0-$10,000	563	22.2	
$10,001-$20,000	413	21.7 *	
$20,0001-$30,000	328	23.1	
$30,001-$40,000	183	25.3	
$40,001-$50,000	54	18.5	
$50,001-$60,000	46	27.2	
>$60,000	57	27.8	

*p value <0.05 in Chi Square Test using the following reference groups: Females, 18-34 year olds, Whites, Those with Private Insurance, and Those Earning Between $20,001-$30,000.

Table 4. Analysis of Message Content

Message Category	Count
Medication Management	181
Symptoms	125
Referral Request	115
Lab Results	113
Treatment Plan	75
Refill Request	45
Imaging	41
Appointment Request	31
Medical Record Request	23

Discussion

This retrospective analysis found significant disparities in registration, enrollment, and use of HealthPoint's patient portal. These data seem to indicate that minorities might benefit unequally from portal implementation, as they are registered less relative to whites and tend to use it less. However, it should be noted that HealthPoint's registration at this time aimed at seeking patients whose primary language was English because NextGen's portal could function only in English. Therefore, these data might be skewed under the policy. NextGen now has the capability to display the portal in Spanish and two versions of Chinese. Interestingly, whites – who presumably speak English as a first language – were second lowest in front of Hispanics for enrollment and differed from their enrollment in a statistically significant way. Language might not play as large a role under this lens. Then again, some clinics enrolled patients on site, thereby skewing the data.

Patients older than 50 years old comprise less than half the population but have better percentages of enrollees and users. This is an interesting phenomenon because patients older than 65 years old had the lowest percentages of registrants but the highest percentages of users. Front desk or cell center staff might possess a bias against registering older patients.

Additionally, older patients might have more chronic health conditions which require greater attention from physicians, thereby increasing the need for accurate and frequent communication.

Although there were two statistically significant differences in the income category (one in registration, the other in use), these could exist only because the reference group was arbitrarily chosen based on one level of stratification above the median income of the population and because the incomes were arbitrarily stratified by increments of $10,000. Perhaps more accurately, it appears as though those on Medicaid and self-pay stand to gain the least from this emerging technology as they used it the least relative to other financial classes.

Patient message content revealed information they would like to convey and features they would like to see as part of the portal software package. These data will be particularly important as HealthPoint explains the current capabilities of the portal and continues to expand the capabilities its portal offers. In particular, explaining symptoms to physicians can help adjust their current medications, particularly for endocrine disorders such as diabetes (Osborn et. al, Journal of Medical Internet Research, 2013). Being able to see referral information and lab results can help patients better coordinate their care and become more educated and active participants in their health care.

One looming question seems to hover in the background of this study and needs to be addressed. As mentioned earlier, patients need to have a computer and Internet access, as well as possess a certain understanding of computer and health literacy in order to adequately benefit from patient portals. What role should HealthPoint play in training patients how to effectively use the portal if they do not own or know how to operate a computer or do not possess sufficient knowledge to convey their concerns? If HealthPoint wants to maximize the potential of this resource to not only improve the health status of its patients but also receive federal meaningful

use incentive funds, at what cost – in terms of personnel, time, and training budgeting – should it extend its mission? The current and potential values in both arenas of health status improvement and financial cost/benefit need to be examined before HealthPoint undertakes this task.

The study was limited in statistical power because it did not account for number of visits relative to registration (presumably the more times a patient visits a provider, the more likely he or she is likely to be registered. Additionally, it did not provide odds ratios or conduct multivariable logistic regression analysis to show adequate associations. A more rigorous study would contain these elements and would also try to account for education, language, and access to the Internet. Moreover, rather than subjectively analyzing message content, it would use qualitative research software. Conducting focus groups with patients who did not enroll or did not send messages to their physicians would enhance the quantitative data presented here and would provide better insight into why patients abstained.

Because of this study, HealthPoint better understand its portal users and barriers to registration, enrollment, and use. Moreover, it is better prepared for its meaningful use reporting period in the last quarter of 2014. As an organization, it understands the importance of physician and patient education on the portal.

<u>Recommendations</u>

HealthPoint wants to leverage this technology in a just, equitable way, then it should reach out to minorities, the uninsured, and those on Medicaid to make sure they can access and know how to use it. Additionally, enabling the three other languages in the portal will allow certain minorities to communicate more effectively. Lastly, beginning a bulk registration in which every patient with an email address is provided a dummy access code will reduce biases in

registration. If nearly 75% of those registered enroll, then HealthPoint can expand its enrollment numbers through bulk registration.

In order to reach meaningful use criteria, physicians must be undergo sufficient training in the operation and capabilities of the portal. From there, they can adequately promote the portal and educate their patients on it. Patients already want to convey information about their medication and symptoms. Enabling them to do so can only enhance their health care.

Conclusions

Patient portals have tremendous potential in assisting patients manage and improve their health care. However, this study, as well as others, indicate that certain groups might not stand to benefit from this evolving technology as well as others. Physicians, after they have been sufficiently trained, can help patients understand how the portal can advance their health status and encourage them to use it. Ultimately, though, health care organizations will need to advocate on their patients' behalf to address systemic problems in education and access to computers and the Internet.

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Appendix A. Examples of Message Category

Appointment Request: I would like to make an appointment with Dr. Reiter for counseling involving my depression. (I tried using your "request appointment" tab on this website, but it did not work.....)

Imaging: Thank you for the information today, it was nice to meet you. I forgot to get the paperwork for my MRI results and I wondered if you could send them to me.

Lab Results: Hi Do you have my results from my blood draws taken on Friday April 4th, 2014? I thought they would be loaded on this system by now. Thank you for your time.

Medical Record Request: My doctor asked me to request my medical records from my past hospital.

Medication Management: Hello: I was prescribed mirtazapine to replace clonazapam. I've been taking it now for 4-5 days. My feet and ankles are swelling noticeably. WebMD suggested to contact the doctor immediately, if this particular side effect represents. What do I do?

Referral Request: I was wondering if you could refer me to and eye dr that takes my insurance

Refill Request: Please fax refills to my pharmacy SAFEWAY/S. 320th Federal Way.- FERROUS SULFATE- FENOFIBRATE- HYDROCHLOROTHIAZIDE Thank you.

Symptoms: I'm not getting better yet. Still have a terrible cough and now an earache in my left ear. Not sure what to do. Please let me know. Thanks

Treatment Plan: Dear Sir/Madam, Could you please send me a paperless copy of my patient plan as it was prepared on July 8, 2013 after my visit of that date. Thanks for your cooperation