SHARING DIGITAL HEALTH INFORMATION

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Introduction

UNC Health Care is a non-profit, integrated health care system owned by the State of North Carolina. UNC Health Care consists of multiple hospitals and ambulatory care (outpatient) clinics, as well as clinical programs in the UNC School of Medicine.[1] The UNC Practice Quality and Innovation (PQI) team works with ambulatory care settings to improve patient "experiences and outcomes, operational processes, and business performance."[1] The goal of PQI is to make sure patients have adequate access to appropriate care. One of the areas of focus in achieving this goal is use of an online health portal known as My UNC Chart. The online patient portal is important because it helps improve patient engagement and allows patients to become active partners in their health.

Background

Patient engagement is a broad term that has a number of interpretations. In recent years, patient engagement has become a strong focus for a number of hospitals, especially with the implementation of the Affordable Care Act (ACA). Additionally, with the Electronic Health Records (EHR) Incentive program under the Health Information Technology for Economic and Clinical Health (HITECH) Act hospitals are required to begin using EHR technology in patient care. Also known as the Meaningful Use program, the incentive program was mandated to encourage hospitals and health systems to implement EHR technologies with the goal to improve the quality and safety of care, engage patients and families in their healthcare, improve care

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[1] "About Us." *UNC Health Care*. Web. http://www.unchealthcare.org/about-us/

coordination, and maintain privacy of health information.[2] The implementation of these

technologies have implications for better patient outcomes and efficiency in healthcare.

Meaningful Use serves to provide hospitals with a financial incentive to implement EHR

technologies. As defined by the Centers of Medicare & Medicaid Services (CMS), there are three

components of Meaningful Use: (1) use certified EHR in a meaningful manner; (2) use of

certified EHR technology for electronic exchange of health information; and (3) use of certified

EHR technology to submit clinical quality measures and other measures selected by the

Secretary of Health and Human Services.[3] Under Stage 2 of the Meaningful Use program,

hospitals are able to choose from a set of "health care policy domains," one of which is "patient

and family engagement."[4] CMS defines patient engagement as providing patients with the

ability to view online, download, and transmit health information and use secure electronic

messaging to communicate with patients on relevant health information.[5] UNC Health Care's

answer to the goal of improving patient engagement and meeting Meaningful Use goals is the

implementation of My UNC Chart. My UNC Chart is an Epic Systems (Epic) product[6], which

serves as an online patient portal. The online website allows patients to access their health

information, interact with their provider directly using messaging, pay bills online, access lab

results, monitor chronic diseases, and manage appointments.

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[2] "HealthIT.gov." *Meaningful Use Definition and Meaningful Use Objectives of EHRs*. HealthIT, 6 Feb. 2015. Web. https://www.healthit.gov/providers-professionals/meaningful-use-definition-objectives.

[3] "Medicare & Medicaid EHR Incentive Program." *Meaningful Use Stage 1 Requirements Overview*. Centers for Medicare & Medicaid Services, 2010. Web. https://www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/downloads/MU_Stage1_ReqOverview.pdf

[4] "Stage 2 Overview Tipsheet." Centers for Medicare & Medicaid Services, Aug. 2012. Web. https://www.cms.gov/regulations-and-guidance/legislation/ehrincentiveprograms/downloads/stage2overview_tipsheet.pdf

[5] "Stage 2: Engaging Patients in Their Health Care." *Centers for Medicare & Medicaid Services*. 18 Sept. 2013. Web. https://www.cms.gov/eHealth/ListServ_Stage2_EngagingPatients.html

[6] "My UNC Chart." *My UNC Chart*. Web.www.myuncchart.org.

The My UNC Chart team at PQI is focused on enhancing the capabilities of My UNC Chart to improve the user experience. My UNC Chart also allows parents, friends, and patients to gain access to their family or friends' accounts using a process called "proxy access." The adoption and use of the patient portal is a strong focus area for UNC Health Care, and has been heavily promoted within clinical appointments and throughout the community (i.e. buses, print and radio advertisements). Even after easing the barriers of proxy access and promotion, UNC Health Care consistently finds that some pediatric clinics still have low rates of activation for My UNC Chart, while others have steadily improved since the original implementation of the tool, in April 2014.

Literature Review

Access to health information allows patients to be engaged in their health which can ultimately lead to positive health outcomes. A study observed chronic care patients who had access to a patient portal immediately and compared their portal activation levels to those patients who did not have access (receiving a printed copy of same information). The study found that having immediate access did not have an impact on patient activation.[7] However, patients beginning at a lower level of activation showed a greater positive change in activation compared to patients with a higher level of activation. Additionally, the study found that patients diagnosed during the intervention had a positive change in activation. So, patients that were already invested in their health or patients newly diagnosed were more perceptive to activating a patient portal. The results of this study show the true impact of how patients themselves are instrumental in taking advantage of their health. The study also illustrates the trend UNC Health

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[7] Riippa, Iiris, Miika Linna, and Ilona Rönkkö. "The Effect of a Patient Portal With Electronic Messaging on Patient Activation Among Chronically Ill Patients: Controlled Before-and-After Study." *Journal of Medical Internet Research* 16.11 (2014): E257. *National Library of Medicine*. Web.

Care sees with its pediatric population. Simply offering patients the opportunity to see their health information online does not necessarily mean activation increases at an expected rate. Patients that are invested in their health from the beginning, or have a specific reason to be invested (new diagnosis) will be more willing to use a patient portal.

Another study found there was no short term effect of using patient portals on health outcomes. The study did find that use of patient portals resulted in decreased office visits, a reduced rate of telephone conversations, increased messaging, changes in medication regimen, and adherence to treatment.[8] A different study found patients with higher Patient Activation Measure (PAM) scores benefit more from access to health information than those with lower scores.[9] The PAM is measured using a 13-item scale survey that serves to predict health behaviors. Patients with lower PAM scores are also less likely to have scores of body mass index, hemoglobin A1c, blood pressures, and cholesterol in the normal range.[8,10] Multiple studies have found that access to health information provides evidence for improved health care experiences, and an overall feeling of higher quality of interactions and contacts.[11,12] Additionally, cancer patients utilizing online health resources, such as forums, have reported better feelings about their care, reduced isolation, better comprehension of their health information, and in general more positive psychosocial attitudes.[13] Just as other studies have

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[8] Ammenwerth, Elske, Petra Schnell-Inderst, and Alexander Hoerbst. "The Impact of Electronic Patient Portals on Patient Care: A Systematic Review of Controlled Trials." *Journal of Medical Internet Research* 14.6 (2012). *National Library of Medicine*. Web.

[9] Hibbard, J. H., and J. Greene. "What The Evidence Shows About Patient Activation: Better Health Outcomes And Care Experiences; Fewer Data On Costs." *Health Affairs* 32.2 (2013): 207-14. Web.

[10] Hibbard, J. H., J. Greene, Y. Shi, J. Mittler, and D. Scanlon. "Taking the Long View: How Well Do Patient Activation Scores Predict Outcomes Four Years Later?" *Medical Care Research and Review* 72.3 (2015): 324-37. Web.

[11] Riippa, Iiris, Miika Linna, Ilona Rönkkö, and Virpi Kröger. "Use of an Electronic Patient Portal Among the Chronically Ill: An Observational Study." *J Med Internet Res Journal of Medical Internet Research* 16.12 (2014). Web.

[12] Reed, M., I. Graetz, N. Gordon, and V. Fung. "Patient-initiated E-mails to Providers: Associations with Out-of-pocket Visit Costs, and Impact on Care-seeking and Health." *American Journal of Managed Care* 21.12 (2015): 632-39. Web.

[13] Hong, Yan, Ninfa C. Peña-Purcell, and Marcia G. Ory. "Outcomes of Online Support and Resources for Cancer Survivors: A Systematic Literature Review." *Patient Education and Counseling* 86.3 (2012): 288-96. Web.

mentioned, access to health information has also shown evidence of cost savings due to patients with higher scores having lower billed costs of care.[14]

The use of patient portals provides evidence of a positive return on investment (ROI).[15] A white paper created by Lexis Nexis defines three aspects of ROI in relation to patient portals – the first being patient loyalty. In a study done by Kaiser Permanente, researchers found that patients were more likely to return to a facility offering a portal, and the retention rate at Kaiser Permanente was about 10% higher for patient portal users, compared to non-users. When patient portal enrollment is maximized, patient loyalty increases resulting in less money spent on new patient acquisition. The next point related to ROI is the use of patient portals among chronic care patients. Chronic care patients are regular visitors in healthcare settings for general needs. However, the use of patient portals could decrease unnecessary visits by allowing prescription refills to be done online. Patients with access to this feature may have improved medication adherence and tracking of their health data. Patients with better health management behaviors may have reduced hospitalizations, and positive health outcomes. Lastly, when non-patients have the chance to schedule an appointment online or fill out registration paperwork remotely, the cost and time required to acquire new patients' decreases.

However, all of these benefits can only be realized if implementation of patient portals is done correctly and offers innovative solutions. A positive ROI can be realized when a strong infrastructure is already in place at healthcare organizations and there is dedication to enhance the user experience. Other studies, such as one done at the University of Rochester, found that in

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[14] Adler-Milstein, J., C. E. Green, and D. W. Bates. "A Survey Analysis Suggests That Electronic Health Records Will Yield Revenue Gains For Some Practices And Losses For Many." *Health Affairs* 32.3 (2013): 562-70. Web.

[15] "Finding ROI in EHRs - 3 Keys to Maximize Patient Portal Benefits." *White Paper*. Lexis Nexis, Apr. 2014. Web. <http://lexisnexis.com/risk/downloads/idm/Finding_ROI_in_EHR.pdf>.

an ambulatory care setting, the implementation of EHR led to an ROI in about 16 months, averaging to an annual savings of $9,983 per provider.[16] Another study utilizing a mixed methodology found that the use of EHRs led to increased numbers of activated patients, increase in clinic net revenue, and an increase in the ratio of activated patients to providers. In this study, activated patients were defined as patients using the online portal. The study also found that the implementation of the EHR had a break-even point of 10 months.[17] A different study found that while some practices saw a ROI, others lost revenue. The loss of revenue was partly due to other medical expenses, such as paper billing, or staff members performing obsolete tasks. These medical expenses can be replaced or better utilized to recognize an eventual ROI. The study shows that Meaningful Use incentives may not be enough to encourage adoption of EHRs if appropriate organizational changes are not implemented to make EHR use more cost-effective.[12]

Another important area related to EHR adoption is implementation theory and change management theory. Lewin's Theory of Change Management, established in 1951, calls for three major steps – unfreezing, movement, and refreezing, as well as a component called force field analysis.[14] Lewin's change model has been utilized to implement change across a variety of industries, including healthcare. Nurses and health organizations have used Lewin's theory as a basis for implementing a clinical change within a healthcare setting.[18,19] Force field analysis (FFA) is the idea of establishing a current state, and mapping out the entire field of behavior or change. The FFA approach helps to understand the many forces at play when implementing a

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[16] Grieger, Dara L., Stephen H. Cohen, and David A. Krusch. "A Pilot Study to Document the Return on Investment for Implementing an Ambulatory Electronic Health Record at an Academic Medical Center." *Journal of the American College of Surgeons* 205.1 (2007): 89-96. Web.

[17] Jang, Yeona, Michel A. Lortie, and Steven Sanche. "Return on Investment in Electronic Health Records in Primary Care Practices: A Mixed-Methods Study." *JMIR Medical Informatics JMIR Med Inform* 2.2 (2014). Web.

[18] Shirey, Maria R. "Lewin's Theory of Planned Change as a Strategic Resource." *JONA: The Journal of Nursing Administration* 43.2 (2013): 69-72. Web.

[19] Manchester, Julianne, Deanna L. Gray-Miceli, Judith A. Metcalf, Charlotte A. Paolini, Anne H. Napier, Constance L. Coogle, and Myra G. Owens. "Facilitating Lewin's Change Model with Collaborative Evaluation in Promoting Evidence Based Practices of Health Professionals." *Evaluation and Program Planning* 47 (2014): 82-90. Web.

new change. The first stage, unfreezing, is getting the organization ready for change. At this

point there is recognition for a change or a new way of doing things. It also involves

mobilization of a group to implement a change. Moving and transitioning is the second stage,

which requires the preliminary work to implementing the change. The second stage serves to

guide people toward the change, helps introduce new social norms for a change, and during this

stage resistance to change decreases. The movement stage requires adequate and comprehensive

training, allowing users to understand and become confident in using a new system. The last

stage, refreezing, is when the organization is accepting of the new change, has adjusted its

processes to the change and ultimately when the change has become sustainable.

Implementation theory also plays a role in patient portal activation. Typically, when an

organization is implementing a new information technology (IT) system which impacts the

organization's daily activities, the external firm follows a general sequence of steps. The steps

mentioned here summarize the methodology used by a smaller IT firm, Vistex[20], however these

steps illustrate the general process used by other players as well. The first is initiation, when the

goals, approach, and planning of the project is done. The next is to define exactly how the new

system should function. The define step involves brainstorming, writing out, and adjusting

functional requirements and technical requirements. Next is design, where the actual IT system is

created to meet the specifications determined previously. At this time there is also change

management, which includes creation of a communication plan so that impacted users are well

aware and prepared for the change. The IT system is then built and validated through a number

of testing waves. Next is "cutover", when old data from the previous system is moved to the new

system, and again testing is done to ensure the IT system is functioning as defined. Last is

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[20] "Implementation Methodology | Vistex, Inc." *Vistex, Inc*. Web. https://www.vistex.com/services/solution-delivery/implementation-methodology/.

nurture, or "hyper-care" where the implementation team makes sure the new system functions as it should, and helps mitigate any problems.

Both change management theory as well as implementation science show the importance of preparing an organization for change. They predict how an organization will be successful when a new system or a new way of doing things is implemented. The models also highlight the importance of training users and generating buy in and promotion of a new system. Patient portals also show improvements in health behaviors and have the potential for a positive ROI.

Purpose

The purpose of this paper is to examine the techniques and methods utilized by clinics for My UNC Chart activation among UNC Health Care pediatric clinics, evaluate their effectiveness and provide recommendations to improving My UNC Chart activation.

Specific Aims

1. Identify the two clinics with the highest and lowest My UNC Chart activation rates among a sample of pediatric clinics at UNC Health Care.
2. Identify procedures and tactics used to encourage My UNC Chart activation through semi structured interviews.
3. Understand opinions about using My UNC Chart and preparedness to use the system.
4. Identify and provide recommendations of "proven practices" that can guide My UNC Chart activation and implementation at other pediatric clinics, and UNC Health Care-affiliated clinics.

Hypotheses

My hypotheses in relation to my specific aims are listed below:

1. My UNC Chart activation rates among a sample of pediatric clinics at UNC Health Care will differ due to organizational differences. This could be the views of the clinic on EHR and patient engagement use, or a difference in procedures.

2. Those clinics with the highest percentage of My UNC Chart activation have implemented a process where patients are encouraged to sign up during visits, or staff are trained adequately when compared to those clinics with low My UNC Chart activation.

3. Clinicians and administrative staff will have varying opinions regarding using My UNC Chart in the clinic, and will for the most part, feel unprepared for their use of the system.

Significance

UNC Health Care collects data relating to use and activation of My UNC Chart to assess its compliance with Meaningful Use requirements. The reporting of these data is important for incentives and to improve quality of care. UNC Health Care is committed to integrating the use of EHRs into its care processes. Additionally, the organization has promoted the use of My UNC Chart within its clinics and within the UNC Health Care community. An aim of this paper is to identify the strategies employed by those pediatric clinics with relatively high activation rates. If these clinics have different policies or procedures, it could serve as a standard for other clinics to follow to increase My UNC Chart activation rates. Understanding effective processes could be used to guide other UNC Health Care affiliated clinics with diverse patient populations, especially those with chronic disease patients that require regular doctor visits.

Conceptual Model

I used the following conceptual model taken from the "Guide to Patient and Family Engagement" created for the Agency for Healthcare Research and Quality by the American Institutes of Research (AIR). AIR also created a toolkit for strategies to increase and improve Patient and Family Engagement for hospital-based patients. The conceptual model was created for a hospital-based intervention, but can be adapted for ambulatory care settings. The model shows hospital-based interventions and materials, individual characteristics of the target audiences, organizational context within hospitals, and organizational and individual behaviors lead to anticipated outcomes. The purpose of the model is to show how certain interventions, as well as complementary services can, facilitate and support patient engagement.[21]

Exhibit 1: Preliminary Conceptual Framework[22]
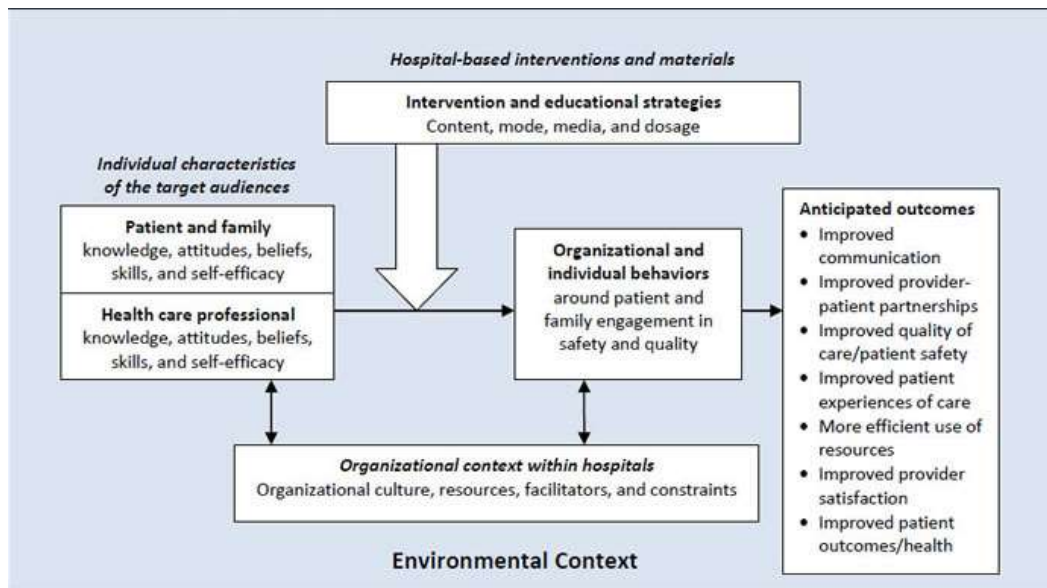
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[21] Introduction. October 2014. *Agency for Healthcare Research and Quality*, Rockville, MD. http://www.ahrq.gov/research/findings/final-reports/ptfamilyscan/ptfamily1.html

[22] Exhibit 1. Preliminary Conceptual Framework. October 2014. *Agency for Healthcare Research and Quality*, Rockville, MD. http://www.ahrq.gov/research/findings/final-reports/ptfamilyscan/ptfamilyex1.html

Applying this conceptual model to UNC Health Care is appropriate. The individual characteristics of the target audiences are those of parents and legal guardians in the general UNC Health Care area. The healthcare professional's characteristics are influenced by UNC Health Care's culture, which is quite positive towards EHRs and the online health portal. The intervention and educational strategies employed in this context is the My UNC Chart online portal, which allows patients and parents of children to monitor their health. Organizational behaviors around quality improvement are positive as the PQI department is focused around quality improvement and improving patient outcomes. Individual behaviors of parents around quality and improvement cannot be explored without an in-depth understanding of the parent's personalities and views on healthcare. The anticipated outcomes of utilizing EHRs and the online portal are in line with the outcomes described in the conceptual model. However, direct outcomes are difficult to evaluate or attribute to the implementation of My UNC Chart and therefore are not part of the scope of this paper. To meet the outlined specific aims, I will focus on the intervention, My UNC Chart, and evaluation of organizational behaviors that promote the activation of My UNC Chart. Understanding how different clinics promote the use of My UNC Chart will clarify the organizational approaches. It will also provide context for other clinics for successful promotion of My UNC Chart (the intervention) into their organization (by changing organizational behaviors).

Research Methods

This study utilized semi-structured interviews and qualitative methods for data analysis. Adults, aged 30 to 39, are likely to be more familiar with technology and open to utilizing

technological methods and EHRs in the monitoring of their health[23]. Since individuals in the specified age range are likely to use patient portals, I hypothesized they would be open and willing to use My UNC Chart to monitor their children's health. The population for this study are UNC Health Care pediatric clinics with physicians participating in Meaningful Use. Pediatric clinics at UNC typically see patients from birth to 26. The primary users of My UNC Chart for the pediatric population are parents and legal guardians of minors that have activated the patient portal on behalf of their children, and access the information as a proxy.

Additionally, clinics with physicians participating in Meaningful Use were used because these clinics are most invested in encouraging the adoption of My UNC Chart. Clinicians participating in Meaningful Use were first identified using data from February 2016. Once clinicians were identified, clinic names were also identified using secondary data from the Meaningful Use program at UNC Health Care. From there, only outpatient primary care pediatric clinics were included in the sample. Using the inclusion criteria described above, nine total clinics were identified.

Using a dashboard report available in Epic, each clinic's monthly My UNC Chart activation rates were identified. The month of February 2016 was used as it was the most recently available data. The data show patients or parents of patients (using proxy access) having activated 30 days before a visit or 30 days after a visit. Using this measure ensures that activation rates are reflective of the true number of patients/proxies using the system. The nine clinics and their activation rates can be found in Table 1 and Figure 1. Two clinics with the highest My

[23] "The Truth about Patient Portal Use." *The Advisory Board Company*. 20 July 2015. Web. https://www.advisory.com/research/medical-group-strategy-council/practice-notes/2015/july/the-truth-about-patient-portal-use.

UNC Chart activation and two clinics with the lowest My UNC Chart activation were identified and contacted for interviews.

To develop the interview questions, I held meetings with subject matter experts at UNC Health Care. Based on their advice as well as guidance from Trochim, interview questions were developed, reviewed and approved. [24] The goal of the interview was to explore organizational behaviors around My UNC Chart. Specifically, I asked how the patient portal was used in the clinic, how patients were encouraged to activate, how patients chose to activate, training and overall value.

Once the four clinics were identified based on their activation rates, practice managers at each clinic were identified using data from UNC PQI. The practice managers were emailed with information about the study, a request for a 30 minute phone interview and encouraging them to participate. The email also asked for a clinician to contact with the same request. Three clinics agreed to participate, with a practice manager and clinician participating each, for a total of six interviews. The interview questions developed were used as a guide, while probing questions were asked on an as needed basis (See Appendix for a copy of the interview assessment).

Prior to conducting the interview, the interviewees were told their answers were confidential, only shared as a part of this master's paper and with UNC PQI. Consent was also obtained for taking notes during the interview. All interviews lasted approximately thirty minutes and were conducted via phone. After all interviews were conducted the results were coded inductively.[24] Responses to the interviews were reviewed and categorized, then themes were established.

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[24] Trochim, William M. K. *Research Methods Knowledge Base*. Cincinnati, OH: Atomic Dog Pub., 2001. Print.

Results

A total of three clinics participated in the study. Both clinics identified having the highest My UNC Chart activation agreed to participate. Of the clinics identified with the lowest My UNC Chart activation, one clinic was unresponsive while the other declined to participate. To ensure enough data for the study, clinics with the next lowest My UNC Chart activation were identified and contacted. The third lowest clinic was unresponsive, while the fourth lowest clinic was newly acquired and therefore ineligible to participate in the study. The fifth lowest clinic was contacted because they still had less than 10% My UNC Chart activation making them eligible to give the perspective of a clinic with low activation. The clinic agreed to participate and phone interviews were conducted with the practice manager and medical director.

After coding the interviews, five major themes were identified through the inductive process: preparedness, activation process, barriers, usage, and value. All clinics mentioned that they did not feel prepared to use My UNC Chart when the system was implemented. They all received an in depth training for using Epic, and a very brief training relating to My UNC Chart. When asked about their My UNC Chart training all individuals mentioned (1) there was not enough training, (2) it was not specific enough, (3) they did not exactly remember what the training reviewed, (4) it was minimal, and (5) it was hard to anticipate how useful the training would be since they had no prior knowledge of how the My UNC Chart tool worked. Respondents mentioned that they received marketing materials which were mostly rack cards and displays. One respondent mentioned that they did not receive any marketing materials.

The theme of activation process had two subcategories, processes to encourage patient activation and how the patients actually activated. At the two clinics with high My UNC Chart activation, patients were informed about sign up at the beginning of the appointment or at

checkout. They also mentioned that the doctor spoke about My UNC Chart during the appointment, encouraging patients to message them using the system. Clinics that had low My UNC Chart activation did not proactively mention activation; they only spoke about it if the patient or parent asked about it. In terms of how patients activated, all clinics said that patients activated using the After Visit Summary (AVS). The AVS is a printout summarizing the appointment and shows any instructions by the doctor. The AVS also has an activation code for My UNC Chart, allowing patients or proxies to sign up at home for an account. All clinics mentioned that they did not encourage in clinic sign up because it took too long, and that all parents signed up at home.

There were three major barriers mentioned – age, internet access, and language. At UNC Health Care, patients aged 13 and older are able to request that their parents have limited or restricted access to their health information. All clinicians and practice managers said the conversation to ask a patient or parent about restricting access was touchy and difficult to navigate without the conversation becoming contentious. Many clinicians and practice managers said they avoided encouraging My UNC Chart activation with this group of patients. Additionally, two clinics had a significant Medicaid population and interviewees expressed concerns as to whether these patients had access to a computer or the internet at home. Lastly, clinics mentioned many patients were native Spanish speakers. Currently, Epic does not offer a Spanish version of My Chart so clinics were unable to offer or promote the online portal with this population. The next theme was usage. Clinics mentioned that they most frequently used My UNC Chart for patient requests through messaging and prescription refills. Some clinics mentioned they took appointment requests and cancellations using the messaging feature. The last major theme was value. All clinics interviewed stated that they thought My UNC Chart was

a valuable tool that had a positive impact on the patient experience. However many mentioned that they felt they were not utilizing My UNC Chart to the best of their ability and expressed that they did not know enough about the system to effectively use it. Other ideas that were mentioned but not fitting in one of the major themes was lack of information regarding the mobile application, and a better training for the My UNC Chart helpdesk.

Discussion & Conclusions

When Epic was implemented at UNC Health Care in April 2014, My UNC Chart was also offered to clinics at the same time. However, at almost two years post implementation My UNC Chart activation among patients and proxies varies greatly. As seen in the literature, patient portals have evidence for improving patient engagement, having a return on investment, and improving efficiency. UNC Health Care has invested substantial time, effort, and resources to making the patient portal a great and useful tool. However, as found in the semi-structured interviews, many clinics are not aware of how to use the system appropriately or do not emphasize activation of the tool.

The results show evidence for certain recommendations that should be made to UNC Health Care – PQI. The first is that a formal training program should be implemented specific to My UNC Chart. The training should be offered to both clinicians and practice managers, and should review the capabilities of My UNC Chart as well as show what the patient sees when using the system. It should also incorporate possible scenarios and Frequently Asked Questions (FAQs), as clinicians mentioned that training they received did not prepare them for questions their patients had. Additionally, the training should be offered to clinics that have already started using My UNC Chart to act as a refresher and to let them know of any features they are unaware of, new or otherwise. The next recommendation is to develop an internal guide that reviews

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when to discuss My UNC Chart (beginning of the appointment vs, checkout), how to approach conversations with the sensitive age range, and how to coordinate discussing My UNC Chart between nurses and doctors. The creation of the guide should be done with the advice of clinicians (both doctors and nurses) as well as subject matter experts. The last recommendation is to determine the feasibility of piloting My UNC Chart in Spanish. Currently a Spanish version of My Chart is being used at other health systems and guidance by Epic is available. Offering a Spanish version of the tool allows hospitals and organizations to have multilingual support, but it would involve the support of a translator as well as an Epic Administrator at UNC Health Care. The website should be piloted at a few clinics that have a high Spanish speaking population. Suggestions by both UNC Health Care staff and patients should be considered when piloting and adjusting the Spanish version website.

Overall, patient portals have a positive impact on patient engagement. They provide an opportunity for patients to become active partners in their health, have evidence for improved outcomes, and reduce barriers for patients to contact their providers. UNC Health Care implemented the My UNC Chart tool with this in mind but must take steps to improve activation. Without the proper training for clinic staff as well as patient buy-in, the tool cannot be used effectively or produce a ROI. Through understanding change management and implementation theory, we can see that having well-trained staff is essential in a change becoming sustainable and evolving over time. It is critical that the training program for the patient portal is improved initially, as well as dedicating resources to move My UNC Chart forward.

Limitations of the study were availability of clinics for interviews, making it difficult to truly understand if there were differences between clinics with high and low activation. Additionally, I was unable to reach a saturation of themes because of the small population size.

Last, generalizability of these findings may not be appropriate, as some issues facing the pediatric population (such as the sensitive age range) are not applicable to older aged populations. Future study on this subject should involve the opinions of the patient population and making sure the tool meets their needs, using a larger sample size, and comparing the results of this study to studies looking at different patient populations.

Appendix

Interview Questions:

I am trying to evaluate how My UNC Chart is utilized in clinics currently and understand what processes are in place to encourage the use of My UNC Chart. The answers to these questions will be used for my Masters Paper which will be shared with UNC PQI. I will be asking general questions about the use of My UNC Chart in your clinic, questions regarding training or preparation for using the system, and your general thoughts on using it in the clinic. The answers you provide during this interview will be confidential and I will be taking notes during the interview if you are okay with it.

1. What is your position in the organization?
2. What types of patients do you see?
3. Do you have clinicians that participate in Meaningful Use?

Now I'd like to ask some more questions about My UNC Chart.

4. Does your clinic currently utilize My UNC Chart?
5. When did your clinic begin using My UNC Chart?
6. Did you receive information or materials regarding My UNC Chart?
    a. Can you explain?
    b. Follow up
7. Did you attend a training
    a. What did the training review
    b. Follow up
8. Does your clinic currently use My UNC Chart as a part of its daily activities?
    a. Could you explain how?
    b. What functionalities do you utilize the most?
    c. Are there any barriers to your staff using My UNC Chart?
9. Do your patients use My UNC Chart?
    a. How do you inform them of it? Do they sign up in Clinic? Or How do they sign up?
    b. Do you have any feedback from them?
    c. Are there any barriers to your patients using My UNC Chart?
10. Value
    a. Do you find using My UNC Chart does anything for the patient experience?
    b. What are your general thoughts on My UNC Chart?
    c. Do you feel you were prepared to use My UNC Chart?
        i. What could be improved?
        ii. What worked?
11. Wrap Up
    a. Is there anything else about My UNC Chart that you think is important to mention that we did not cover?
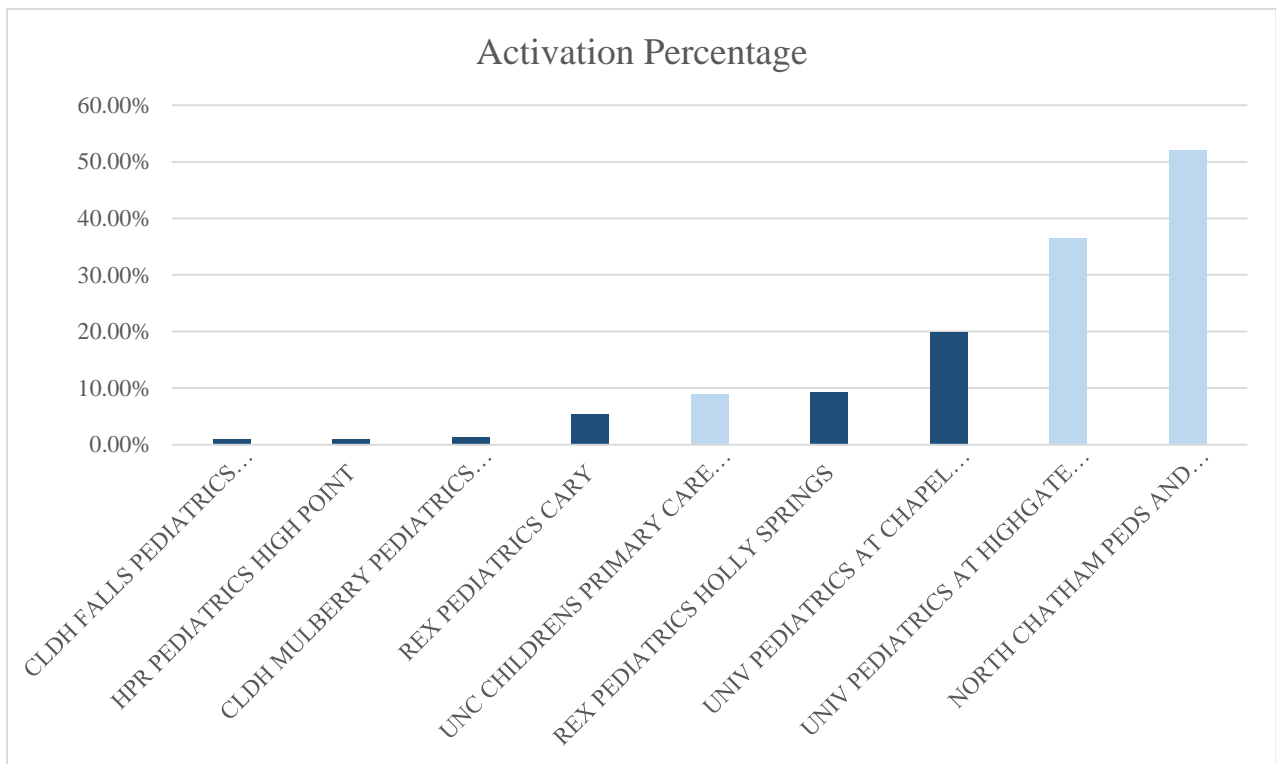
Thank you so much for taking the time to speak with me. Once I have finalized my masters paper I would be more than happy to share it with you if you're interested.

Table 1

Clinic	Activation Percentage	# Activated	Total Patients
CLDH FALLS PEDIATRICS GRANITE FALLS	0.90%	11	1219
HPR PEDIATRICS HIGH POINT	1.03%	4	388
CLDH MULBERRY PEDIATRICS LENOIR	1.25%	12	958
REX PEDIATRICS CARY	5.44%	51	937
UNC CHILDRENS PRIMARY CARE CHAPEL HILL	8.93%	91	1019
REX PEDIATRICS HOLLY SPRINGS	9.36%	50	534
UNIV PEDIATRICS AT CHAPEL HILL NORTH	19.92%	150	753
UNIV PEDIATRICS AT HIGHGATE DURHAM	36.45%	487	1336
NORTH CHATHAM PEDS AND INTERNAL MEDICINE CHAPEL HILL	51.98%	1588	3055

Figure 1
Lightly shaded bars represent clinics that agreed to participate in the study.

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