2019

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Deborah Kornacker DNP, RN
Lewis University, kornacde@lewisu.edu

Kathy Fitzgerald Ph.D., RN
Lewis University, fitzgeka@lewisu.edu

Stacie Elder Ph.D.,RN, CNE
Lewis University, elderst@lewisu.edu

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Deborah Kornacker, DNP, MS, RN, *Lewis University, kornacde@lewisu.ed*
Kathy Fitzgerald, Ph.D., RN, *Lewis University, fitzgerka@lewisu.edu*
Stacie Elder, Ph.D., RN, *Lewis University, elderst@lewisu.edu*

Abstract

Certified electronic health record technology (c-EHRT) has the capacity to enhance person-centered care through online engagement between providers and patients. A driver to portal use is the Centers for Medicare and Medicaid (CMS) Meaningful Use (MU) benchmarks. Currently, many health care centers and providers fall short in attracting patients to register and utilize online patient portals thus influencing optimal utilization of the EHR. Barriers cited in the literature include lack of stakeholder interest, multiple government policy and mandates, and lack of resources to implement standards for health information technology (HIT) standards in daily professional workflow. This program evaluation focused on a 90-day "Portal Push" marketing and re-education initiative at a federally qualified health center (FQHC). The theoretical foundation for this program evaluation was the Technology Acceptance Model (TAM).[1] Goals for this program evaluation included: enhanced marketing and re-education of stakeholders towards portal utilization; assessment of portal MU benchmark attestation numbers pre/post the marketing and education initiative; and evaluation of patients, providers, and clinical staff on portal use as related to "ease of use", "usefulness", and "organizational support" through quantitative surveys. Results found enhanced marketing and re-education efforts increase portal registration numbers and use as well as provider CMS MU benchmark attestation. Data reflected an increase in portal user registration and an increase in provider CMS MU benchmark attestation post the "Portal Push" initiative. Patient, provider/staff survey results indicate a positive relationship between portal use and "ease of use", portal use and "usefulness", and portal use and "organizational support". Results reflect portal marketing efforts by health centers, individualized education of patients, providers, and staff, and continued organizational support with c-EHRT are key drivers in portal acceptance and utilization.

Keywords

Patient health portal, technology acceptance, meaningful use, patient engagement

Introduction

Legislative guidelines in health information exchange are bringing rapid change to the way providers and health centers are engaging with patients and families online. The *Health Information Technology for Economic and Clinical Health Act* of 2009 *(HITECH)* assisted in the adoption of electronic medical records through incentivized payments to eligible providers.[1] Online patient engagement is supported by the Centers for Medicare and Medicaid (CMS) and requires eligible providers to meet specific standardized Meaningful Use (MU) criteria.[2] In 2017, the Medicare Access and CHIP Reauthorization Act (MACRA) further targeted online patient engagement through the Quality Payment Program utilizing patient portals.[3] MACRA requires eligible health providers and agencies to account for "meaningful use" metrics over a 90-day reporting period annually.[3] With the introduction of MACRA, the Medicare EHR Incentive Program, referred to as meaningful use has transitioned to become one of four components in the new Merit Based Payment System (MIPS). Eligible providers and health care centers must implement strategies to enhance patient-provider engagement through online patient portals.

Foundational to this "portal push" initiative is Advancing Care Information (ACI)-a category within MIPS which aims to increase patient engagement through technology use.[4] Providers and health systems receive monetary incentive payments in their engagement efforts to utilize the certified electronic health record technology (c-EHRT).[4] In 2018, CMS summaries required a report of the following MU benchmarks for each provider:

1. 10% of patient referrals have a clinical summary sent electronically to the portal platform (health information exchange).
2. 5% of eligible patients are actively viewing, downloading, and transmitting health information through the portal.
3. 10% of eligible patients receive patient education materials online through the portal.
4. 5% of eligible patients and providers use secure electronic messaging to communicate relevant

information through the portal.

Provider and staff acceptance and promotion of online patient portals is deemed most influential in promoting registration and utilization numbers followed by usability of the portal interface and perceived privacy and security of online health information. [5] In addition, portal functions such as scheduling appointments, viewing recent lab results, and messaging are deemed impactful to patient adoption. [6]

Authors report barriers to patient portal enrollment include: security concerns with online health information, confidentiality issues with sensitive diagnoses, difficulty remembering user name and passwords, previous personal experiences with online security breaches or viruses, and lack of skills to read and type online. [7, 8] A key barrier to portal use in minority populations found that patients fear the online portal might diminish a personal relationship with their health care provider.[9] Other reported portal barriers include health literacy status, age, educational level of the user, computer literacy level and internet access. [7,8] The literature reflects a safety net in health systems must include adult education and training on portal use.[10] Education should support patient's basic computer skills in registering and utilizing online patient portals.[10]

Organizational Considerations in Portal Use

Chang and Ritchie reveal six organizational success factors critical to front-line acceptance of patient portals: strong leadership, a supportive organizational culture, financial support, coordinated quality improvement strategies, easy-to-use portal technology platforms, and active patient involvement.[11] Krist et al. notes facilitators to portal registration include having staff "champions" who accept and promote portal utilization. [12] Health care systems should create and support printed educational materials that clarify the portal registration process adapted for cultural and linguistic differences for patient populations served.[8,10] Health care centers should offer in-person or online training programs enhancing patient activation of portals particularly among communities with health literacy and linguistic barriers. Written materials should supplement but not substitute for in-person education.[10]

Kovac-Burns' et al. analysis of "practical" resources to support online portal engagement require training of all key stakeholders to enhance involvement and achievement of intended outcomes. [13] Luxford et al. encourages continuous active measurement and feedback from stakeholders, adequate resourcing and staffing to support daily portal use and lastly, an organizational "culture" supportive of change and learning. [14] The *Guide to Patient and Family Engagement Environmental Scan* report by the Agency for Healthcare Research and Quality (AHRQ) reflects that patients are more likely to engage online when

their provider invites the patient to use the portal tool and supports the digital platform use. [15]
In a state-of-the-science review, Irizarry et al. reports that adoption of portals occurs when the functions align with patients and providers informational needs as related to online patient engagement.[5] Health literacy, usability, utility, and provider endorsement are important ideas to consider in online patient engagement. In addition, online patient engagement must consider the concepts of trust in data accuracy, data privacy, and data security as health information is exchanged between provider, patient and practices. [14,22] MU financial initiatives are not enough to push providers into adoption of online patient portals; patient demands for access to personal health information online is the stronger driver. [20]

Description of the "Portal Push" Setting

This multi-specialty federally qualified health center (FQHC) provides services to >39,000 patient visits annually across adult primary care, pediatric, behavioral health, obstetrics, and dental care clinical services. In 2015, providers and clinical nursing staff were first educated to the FQHC online patient portal platform. Upon survey by the health center's Quality Improvement subcommittee in spring 2017, the majority of providers (18/24) and clinical staff (6/6) reported little daily utilization of the center's portal platform. Reasons cited by the providers and staff included lack of understanding "who was responsible for what" when opening the online portal each morning and the need for re-education on how to use the portal functions since the orientation had occurred "so long ago". During this same survey, 50% of providers and 100% of clinical staff reported the need for re-education of portal functions, policies, and processes. Since few patients were registering for or using the online portals, the responsibility and workflow process across the clinical areas was also unclear. Further substantiating the need for a "portal push" initiative was the *CMS 90-day MU Benchmark Summary report* dated April 30, 2017 reflecting 18/24 providers not meeting the national MU benchmarks expected.

The same *CMS 90-day MU Benchmark Summary* report reflected a minimal number of patients registered for the online patient portals (748) out of 12,669 unduplicated patients in 2017 and even less patients using the portals regularly (348). The original process for portal registration developed by the FQHC in 2015 involved patients receiving a temporary portal token number on a printed sheet of paper, which allowed access for registration to the portal account across a 30-day period-of-time. Patients received no individual education on how to complete the process except for the token sheet of paper and a portal brochure written in English (the FQHC has a dominant Hispanic patient population) therefore, few patients ever

completed the registration process before the token number expired.

Description of the "Portal Push" Marketing and Education Initiative

A "portal push" initiative began in the summer of 2017 supporting the FQHC in advancing patient acceptance, registration, and utilization of their online portal platform. Early efforts began with the development of marketing posters across all clinical areas. Signs entitled *Have You Signed Up for Your Patient Portal* are located at the health center's main entrance, within each of the 18 clinical rooms, and at the four exit stations. Signs remind patients that providers want to communicate with their patients online. Updated *Patient Portal* brochures (in English and Spanish) include information on the registration process using the new smart phone app *NextGen Patient Portal* available from the App Store as a free download. Employees display their *Get the App-Patient Portal* buttons. The Information Technology department updated "easy to find" portal registration links on the health center's home web page to facilitate the registration process. A *Portal Push* news article highlighted the health center's initiative on their *Facebook* page. Portal resource staffs' contact numbers were available to patients, providers, and staff. Interested patients participated in one-to-one portal education sessions in the health center's main lobby. In addition, the Information Technology staff members supported the re-education of providers and staff in portal function use.

To clarify provider and staff job responsibilities and workflow process, the Chief Medical Officer (CMO), the Chief Operating officer (COO), and this author created a "Portal Workflow Process" guide clarifying each employee's role in supporting online portal usage daily- see *Figure 1*. In addition, a pediatric and adult *Portal Utilization Policy* supporting federal and state patient portal guidelines was developed. These policies clarified the purpose of online portals, general rules of use for the provider, general rules of use for the clinical staff, general rules of use for the patients, general guidelines for parents/legal guardians, security and privacy issues, medical advice disclaimers, special considerations for minors 12-17 years of age, and an *Adolescent Authorization and Consent* form. This consent form would require annual completion between the provider and adolescent patient through the age of 12-17 years in the home state of the FQHC.

Conceptual Model for the "Portal Push" Initiative

The Technology Acceptance Model by Davis has been a part of research for over 30 years. [16] The Technology Acceptance Model (TAM) originated in the psychological theory of reasoned action and theory of planned behavior. [16] The TAM has evolved to become a key model in understanding predictors of human behavior toward potential acceptance or rejection of technology use.[16] The TAM survey developed by Davis in 1989 provided an early query into understanding computer "use" as explained by internal beliefs and attitudes as related to "perceived ease of use" and "perceived usefulness of the technology." [17] Authors Marangunic and Granic performed an extensive literature review on TAM resulting in 85 publications incorporating the model across multiple disciplines of research.[18] Information system technology has long supported the TAM as a behavioral model. [19] The TAM is increasing portrayed as a fitting theory for health care studies supporting the increased use of c-EHRT systems including the online patient portal.

Methodology for the "Portal Push" Initiative

A comparative analysis was performed of two *CMS MU 90-day Summary reports* relating the outcomes of provider MU benchmark attestation prior to (April, 2017) and post (December, 2017) the "portal push" marketing and education initiative. While examining early survey studies by Davis, Seigel, and Naser and meeting with FQHC administrators, a *Patient Portal Engagement* survey was developed.[17, 22, 23] Concepts within the surveys are similar to these previous authors but not the same. Survey questions were developed related to patients' perceptions of the online patient portal platform and the support received from the FQHC. In addition, a *Provider/Clinical Staff Portal Engagement* survey was adapted from the Davis, Seigel, and Naser survey studies. [17, 22, 23]Attempts to contact these authors were unsuccessful. The FQHC CMO and CEO reviewed both surveys for health literacy considerations. No pilot testing took place.

The *Patient Portal Engagement* survey contained 20 items. Questions 1-15 were measured with a 5-point Likert style scale (1= strongly disagree, 5=strongly agree). Constructs examined include perceptions of online patient portal use, portal use functions, organizational support and frequency of portal access. Questions 16-19 were on portal function items (view online health information, access clinical summaries, message the provider, and open educational resources) and scored yes/no or N/A response format. Question 20 were in a frequency format (how often does the patient open the portal: daily, weekly, monthly, and yearly). *The Provider/Clinical Staff Portal Engagement survey* also contained 20 items. Questions 1-19 (perceptions of portal use, portal functions, and organizational support) measured with the same 5- point Likert scale and question 20 described a frequency format for portal use (open daily, every other day, once a week, and monthly) .

Data Collection

The three-month "portal push" marketing and education initiative occurred in fall, 2017 and the patient and

Figure 1. Portal Workflow Diagram for Clinical Staff

Registration Staff	Clinical Care Coordinators	Providers	Exit Station Staff	Appointment Desk	Administration
Assess portal user status upon arrival to the health center.	You will be the first to check portal message inbox daily as related to your group of providers or clinical area.	Check portal inbox daily	Assess portal user status	Check portal appointment requests daily	Active communication with staff in portal utilization concerns to strategize problem- solving actions.
Provide a token portal access code if needed and informational brochure.	Complete portal tasks that you are applicable to your role.	Answer portal messages within 48 hours and complete tasks as referred.	Provide a portal token and informational brochure if patient shows interest.	Send message through the portal or call patient to expedite appointment scheduling.	Communicate portal policy specifics and update portal policy as needed with changes to federal requirements.
Communicate the positive benefits of online patient portals to enhance patient engagement with providers.	Task portal messages or items that require a provider input.	Communicate any outstanding portal questions or patient concerns with CCC during morning huddle.	Communicate the positive benefits of online patient portals to enhance patient engagement with providers.	Communicate the positive benefits of online patient portals to enhance communication with the health center.	Orientate all new staff to portal policies in order to support staff in EHR/portal utilization.
	Communicate the positive benefits of online patient portals to enhance patient engagement with providers.	Communicate the positive benefits of online patient portals to enhance patient engagement.			Analyze and evaluate workflow processes intermittently as patient portal utilization increases.

Figure 1. Note the clarity of stakeholder workflow responsibilities for portal utilization across the health center.

provider surveys were collected in spring, 2018. Surveys were collected in nonrandom, convenience sampling of adults at the FQHC. Patient inclusion criteria for the *Patient Portal Engagement survey* included: (a) a registered portal user, (b) an adult 18-64 years of age, and (c) English or Spanish speaking. A patient "survey station" was located at the exit areas in the health center to enhance paper copy distribution across a six-week period-of-time. Online survey distribution was not an option due to the lack of email addresses available for many of the FQHC portal user patients. Paper copy versions of the survey in English and Spanish were available to enhance participation from minority patient groups. Participation was voluntary.

Provider/clinical staff survey collection utilized a nonrandom, convenience sample of providers/clinical staff in February of 2018 at an "All Staff" meeting onsite.

Provider/clinical staff inclusion criteria for the *Provider/Clinical Staff Portal Engagement survey* included: (a) a current health center employee and (b) a clinical provider or clinical nursing staff member from the primary care, pediatric care, behavioral health, obstetric care, and dental care areas. Participation was voluntary.

Results

Analysis of the two CMS *90-day MU Benchmark Data Summary reports* (April 30, 2017 and December 31, 2017) revealed an increase from 25% to 82% of providers using the online patient portal daily, enhancing the CMS MU benchmark attestation across the FQHC providers. Prior to the "portal push," six of 24 providers were accessing the patient portal link on a daily basis, utilization numbers after the "portal push" initiative showed an increase to 18 of 22 providers meeting CMS MU benchmark attestation -

see *Figure 2.* Two of the original 24 providers had left the health center prior to the December 31, 2017 report run date. Registration numbers for first-time adult portal users at the FQHC reflected a significant quarterly increase after the "portal push" marketing and education initiative - see *Figure 3.*

Thirty-one registered adult portal users at the FQHC returned the *Patient Portal Engagement Survey.* The pilot sample was small because patients were often hesitant to stay to complete the survey claiming "no time" as their reason to abstain and patient surveys were collected over a six-week time-period. All adults requested the English version of the *Patient Portal Engagement survey.* Collection of

Figure 2. Provider CMS MU Benchmark Attestation Numbers Pre/Post "Portal Push"

 # Providers Meeting MU Benchmark Attestation
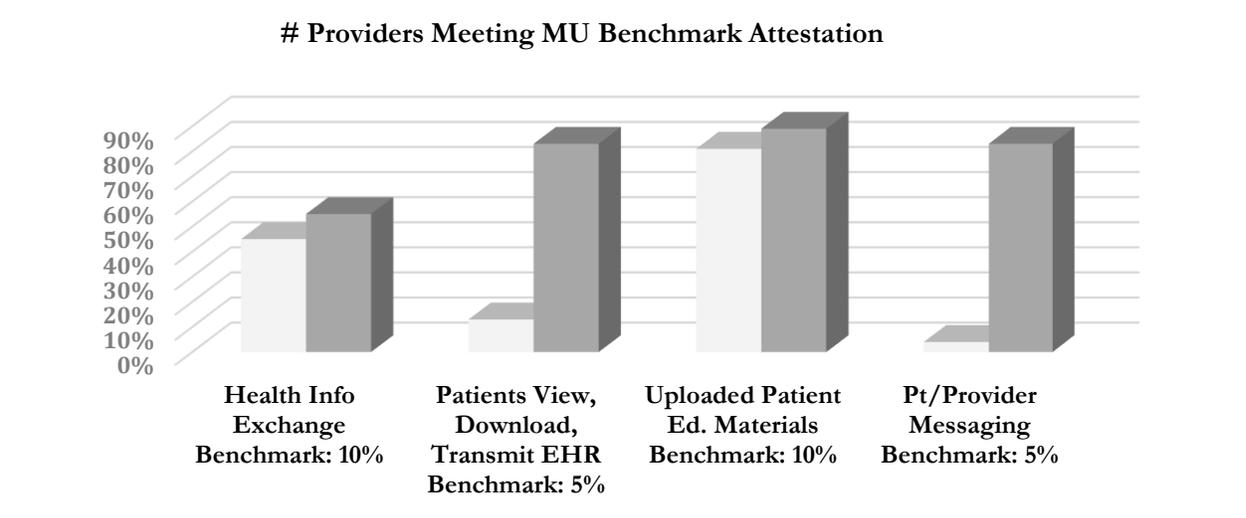
Figure 2. Note increased utilization numbers of providers meeting CMS MU benchmark attestation pre (light grey) and post (dark grey) the "portal push" marketing and education initiative. Note the significant increase in patients viewing, downloading, and transmitting their health data through the patient portal and patients and providers messaging

Figure 3. New Patient Portal Registration Numbers

**Number of New Patients Registering for Portal Access
Before, During and After the "Portal Push" Initiatives**
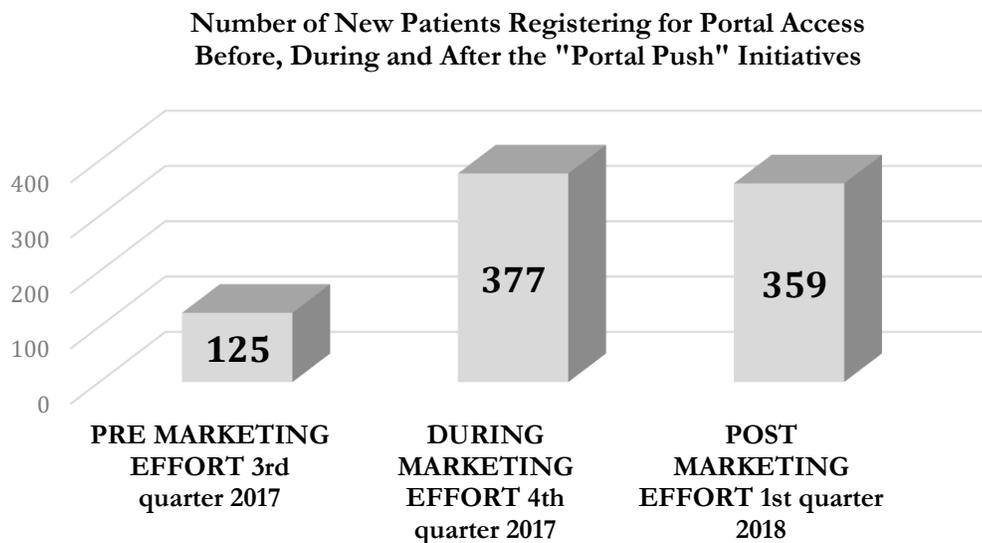
Figure 3. Note registration numbers of new portal users quarterly post the "portal push" marketing and education initiative. This FQHC serves over 12,000 patients annually.

the *Provider/Clinical Staff Portal Engagement surv*eys proved much easier as the CMO encouraged participation at the "All Staff" meeting held in January 2018. Twelve of 22 providers and 6 of 6 clinical nursing staff members completed the survey. Six of the FQHC providers present chose not to participate in the voluntary survey at the time.

The relationships between selections of specific patient survey questions were used for analysis. Because of a small sample size and a non-normal sample, Spearman's Rho correlations were used. Patient survey results indicate a moderate relationship (r_2= .69, p=.000) for subjects' portal use as increasing their communication with the provider. For subjects who use the online portal, the correlations with the question "My medical provider encourages me to use the portal" demonstrated a moderate correlational relationship (r_2=.48, p=.006). There was a stronger correlational relationship for subjects finding portals useful (r_2=.80, p=.000) when the portal is easy to use. For subjects who used the patient portal, patients felt they could reach someone for help if needed (r_2=.51, p=.004).

In addition, patient surveys reflected the following portal functions used: 93.5% view their online health information, 90.3% view their clinical summaries, 48.4% review uploaded educational resources and 51.6% communicate with their provider through messaging, Seventy-one percent of subjects reported using the online portal platform between once a week and once a month.

Provider/clinical staff survey responses to "Number of times you open the patient portal tab" reflect that only five of 12 providers open the portal on a daily basis. Therefore, the survey data conflicts with the *CMS 90 day MU Benchmark Summary* report for December 31, 2017 that reflected 18 of 22 providers meeting CMS MU benchmarks. To meet CMS MU benchmark attestation, providers need to access the portal daily to upload clinical summaries, to upload patient education materials, to respond to patient messaging, or to link patient's test results. Two reported opening the portal every other day and five reported opening the portal once per week. Six nursing clinical staff members reported opening the portal monthly or never.

Important provider/clinical staff survey results indicated providers who use the portal regularly, perceived that "A portal increases my engagement in care management with my patients" (r_2=.63, p=.006). Providers who used the portal believed portals save time decreasing unproductive care management tasks (r_2=.75, p=.000). Providers using portals responded that "Portals decrease telephone tag and phone messages left for patients" (r_2=.76, p=.000).

Discussion

Results suggest there was an improvement to portal acceptance and utilization numbers for patients at the FQHC post the "portal push" marketing and education initiative. Patients responded to provider encouragement to register for the online portal particularly when the portal was easy to use and when the patient perceived that it increased their level of communication with their provider. Patients who used the patient portal found benefit in reviewing their clinical information, accessing their patient clinical summaries, messaging their providers, and opening their educational materials uploaded. As patient utilization increased, providers revealed that online portals did decrease time spent on unproductive tasks and did increase their engagement with patients when both parties used the computer platform. Despite these findings, many of the FQHC providers still did not reflect using the online portal platform on a daily basis. Survey results were clear that the clinical nursing staff at the FQHC did not use the patient portal platform despite the marketing and education initiative. Technological updates such as the new smart phone "NextGen" portal app provided quick onsite portal access for registration decreasing the requirement for home computers by patients and families. Both providers and patients became aware of the app availability for easy registration and access to medical record information during educational sessions. Development of a pediatric and an adult portal polices assisted in portal acceptance and utilization by some providers and staff- but more work is necessary to support daily workflow process changes.

Limitations

Collection of the *Patient Portal Engagement Surveys* proved difficult due to the FQHC's relatively small, original portal user population across the clinical areas. Identifying patients willing to stay after their clinic appointment to complete the paper survey was a challenge thus, collaboration with the "Exit Station" team members proved critical to identifying registered portal users from the health center's c-EHRT database. Survey distribution two mornings a week may have created some bias as to who completed the survey and from which clinical area. The small sample size of 31 patients could lead to disparity of survey responses especially since all were completed in English. In addition, collection of the provider/clinical staff surveys was voluntary so six providers opted out of completing the survey.

Implications

Advancements in c-EHRT products, platforms, regulations, and benchmarks require health centers to not only introduce and orientate patients, providers, and clinical staff to the new technologies but also to continue

to support and measure the impact of the c-EHRT changes on patient-centered care outcomes and online patient engagement. Health centers must continue to advance portal utilization numbers through marketing and education initiatives. Health centers must continue to support patients, providers, and clinical staff on portal acceptance and utilization with clear workflow processes and policies supporting national benchmarks set. Health centers must portray a clear message that providers and clinical staff accept and support their patients to utilize online patient portals.

Conclusion

Online c-EHRT patient portals require continuous support by organizations to advance patient engagement in health care management. National efforts to increase online patient engagement and interoperability require health care organizations to be vigilant in their efforts to advance portal utilization through marketing, education, provider communication, and technological support. The increased portal user numbers seen after this "portal push" initiative support the need for patients to be educated on the portal registration process, particularly patients with language or health literacy concerns. Education clarifies portal function use not only for patients but also for providers and clinical staff to enhance online engagement. An organization that promotes, endorses, evaluates, and sustains portal utilization will assist in present and future national health goals and overall enhancement of the patient experience. This "portal push" is relevant to all health centers interested in promoting increased portal acceptance and utilization.

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