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## Improving Patient Portal Enrollment Through Education and Technology at Rural Family Practice

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Title: Improving Patient Portal Enrollment Through Education and Technology at a Rural Family Practice.

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## Abstract

**Background:** Patient portals are available through many healthcare offices. They offer the opportunity to improve patient engagement and quality of patient care, but few patients enroll. At a small rural primary care office, less than 20% of the patients were enrolled in the patient portal.

**Objective:** The purpose of this quality improvement project was to address the barriers reported by patients at this clinic and determine whether changes in portal enrollment volume occurred. Reported barriers included a lack of knowledge about the portal and difficulties with the sign-up process.

**Methods:** Over three months, strategies included the development of a website with an educational video on a dedicated patient portal page, an educational brochure, and in-office promotion. Data regarding the overall percentage of patients enrolled in the portal, and the rate of enrollment 12 weeks before the project started was obtained. The project was implemented, and the overall enrollment percentage and enrollment rate for 12 weeks post-implementation were compared with the pre-implementation data. The inclusion criteria for this project entailed patients over age 18 who presented to this primary care office for an appointment. Patients 17 and under and telemedicine appointments were excluded. To determine the impact of the education available on the webpage, participants were asked to complete a survey both before and after watching the educational video. This was accomplished by convenience sampling of website visitors. Interest in education was determined by comparing the number of visits to the website to the number of times the video was viewed.

**Results:** 1,076 patients met criteria. The percentage of patients invited increased by 16.3% and enrollment increased by 11.7% over the project time. There was a significant

difference in the percentage of patients that enrolled in the portal before and after interventions occurred ( $t_{2.1962} = 7.38$ ,  $p=0.0137$ ). The average percentage of patients enrolled post-intervention was over 19% greater than the average percentage of individuals enrolled pre-intervention (95% confidence interval 12.3344, 26.9989). Due to the low sample size, the planned t-test to evaluate education effectiveness could not be performed. Of 495 website visitors, 14 viewed educational videos (2.82%).

**Conclusion:** Portal enrollment did significantly increase at this small rural primary care clinic; however, it is unlikely that this was due to education. Factors that may have increased enrollment include in-office promotion and in-person point of contact, increased patient awareness of the portal, and an increased number of invitations sent to patients. Factors that may have resulted in the low response rates for the educational component include low patient interest, small target audience, patient population, minimal promotion, inconsistent implementation, and limited project timeframe.

**Key Words:** Adult, Education, Health Information Technology, Patient Portal, Primary Health Care, Quality Improvement, Rural Population

## Introduction

Patient portals offer many benefits. Studies show that portals improve patient engagement, quality of care, communication, and office efficiency while reducing medical errors and health care costs<sup>1-3</sup>. For example, Devkota (2016) found that active diabetic portal users had lower hemoglobin A1C levels than nonusers<sup>4</sup>. Additionally, Lyles (2015) noted improved medication adherence in patients that requested refills through the portal<sup>5</sup>. However, portal utilization rates remain low. It is estimated that less than one-third of patients are enrolled in portals, but 90% of providers offer access<sup>1</sup>. Patients and providers miss out on many opportunities to improve practice due to underutilization.

This initiative occurred at a small rural primary care practice located in a healthcare provider shortage area. This practice is affiliated with a large healthcare system in the area, although each entity uses different electronic health records (EHR). Before this project, less than 20% of the patients were enrolled in the portal. Staff reported spending a significant amount of time contacting patients to review normal testing results, which can be accessed through the portal. A survey was created and distributed to 42 patients at the primary care office when they arrived for their appointments to determine why portal utilization rates were low. Survey results regarding the top two reasons for low portal utilization were a lack of knowledge about the portal and its functions (19%) and difficulties with the sign-up process (14%). The Technology Acceptance Model (TAM) was chosen to help guide the creation of this project<sup>6</sup>. The TAM assesses four main factors that impact an individual's actual use of new technology including perceived usefulness and perceived ease of use.

Two separate rapid systematic literature reviews were performed based on PRISMA guidelines. Search diagrams can be found in Appendices A and B. The first literature review was completed to determine interventions that have been implemented to increase patient portal enrollment. The second review was performed to determine the best methods for educating adult patients. The results were used to design and create evidence-based interventions to increase portal enrollment. The ADDIE model was utilized during the implementation of this project due to its focus on developing and designing educational programs<sup>7</sup>.

## **Methods**

This quality improvement project was designed for a small rural primary care practice. Patients were included if they were 18 years or older at the time of their appointment over three months. Excluded patients included those 17 or younger and telemedicine appointments. Due to online promotional aspects, convenience sampling of patients who visited the office website were included based on website views. Various staff members, including secretaries, medical assistants (MA), information technology personnel, and providers were included in the development of the project. Evidenced-based implementation strategies included tailoring strategies to overcome barriers, developing and distributing educational materials, intervening with patients to enhance portal uptake were utilized, and creating an observation checklist to check implementation fidelity<sup>8</sup>.

Staff meetings were conducted to discuss the project purpose, current workflow, and changes needed to support the goal of increased portal enrollment. A script was

designed, and it was determined that MAs were in the best position to implement the educational quality improvement strategies during the patient intake process. A website was created for the clinic including a webpage dedicated to the patient portal. This newly created webpage contained information that described the purpose of the project and the patients' role if they chose to participate. In addition, a survey was embedded at the top of the webpage followed by an evidence-based educational video. An identical survey was subsequently placed below the video to evaluate its impact.

Primary outcomes of the project included the effectiveness of education, interest in portal enrollment, and interest in the educational video. The effectiveness of the education was broken down into three sections based on TAM concepts to evaluate the patient perspective of portal usefulness, ease of use, and patient attitude. Questions regarding patient age, sex, and presence of one or more chronic diseases were included. Chronic disease was defined and stated at the beginning of the survey. These surveys were intended to be analyzed using descriptive statistics and the TAM concepts. Each concept would have a paired t-test performed in addition to an overall paired T-test of the scores.

Interest in portal enrollment was determined by auditing the EHR. The EHR displays the portal invitation date and separate portal enrollment date. Patient charts were audited on those who met inclusion criteria over three months before implementation and three months after implementation. Demographic information was obtained at this time and all information was entered into an excel sheet. Interest in portal enrollment included a percentage comparison of individuals who received an invitation to those enrolled. Interest in education was analyzed by determining the

number of individuals who visited the website compared to the number of video views by reviewing the website and video analytics.

Secondary outcomes of the project included the percent of patients enrolled for three months before the intervention and compared to the percent enrolled after. All information was entered in an excel sheet. An independent one-tailed t-test was performed using SPSS software to evaluate for any change in the percentage of enrollment.

The EHR company tracks the percentage of patients who were offered access to the portal. Access includes participants that have chosen to opt-out of receiving an invitation. The pre-implementation percentage was compared to the percentage post-implementation. Fidelity to the implementation strategies was evaluated based on the observational checklist. These observations occurred for five hours per month during the implementation period. The interactions were only observed if the patient had not previously received an invitation. Fidelity was determined by the percentage of time the project was implemented correctly.

### ***Ethics Approval***

This project was determined to be a quality improvement and approved by the Office of Compliance and Integrity at Grand Valley State University. Reference number 22-087-H.



## **Results**

### ***Demographics***

Over the project timeframe 1,076 patients presented for an appointment and met the inclusion criteria for this project. Out of 1,076 eligible patients, 447 were sent portal invitations. The age of patients included 18-35 years (12.8%), 35-54 years (19.9%), 55-74 (47.9%), and 75 years and older (19.2%). Tables 1- 3 contain demographic information on all eligible participants. Tables 4-6 contain demographic information on participants who received an invitation.

### ***Primary Outcomes***

**Effectiveness of education:** The before video survey received 15 responses while the after-video survey received four. Analysis of the effectiveness of education on patient perception of the portal's usefulness, ease of use, and attitude towards using was unable to be completed. The paired t-tests could not be performed because assumptions were not met due to the low sample size.

**Interest in Portal Enrollment:** A total of 139 new invitations were sent to the 1,076 eligible participants (12.9%). Out of these 139 new invites, 58 patients enrolled (41.7%). Table 7 displays the monthly data for total invitations, new invitations, and newly enrolled patients.

**Interest in Portal Education:** The website was viewed 495 times over the implementation period. The video received 2.82% of website traffic and was viewed 14 times.

## **Secondary Outcomes**

**Enrollment Rate Pre and Post:** An average of 25% of patients were invited to the portal over a three-month pre-implementation period and 19.3% enrolled (Table 8). The number of patients invited increased to an average of 41.3% with 31% enrolled over three months post-implementation (Table 9). This indicated a 16.3% increase in invitations and an 11.7% increase in enrollment post-implementation.

**Change in Portal Enrollment:** After normality had been ensured, a t-test was performed to determine if this project had a significant impact on portal enrollment (Table 10). There was a significant difference in the percentage of patients that enrolled in the portal pre and post-intervention ( $t_{2.1962} = 7.38, p=0.0137$ ). The average percentage of patients enrolled post-intervention was over 19 percent greater than the average percentage of individuals enrolled pre-intervention (95% confidence interval 12.3344, 26.9989).

**EHR Tracking:** Before implementation, 19% of the office's total patients had been offered portal access. This number includes those who chose to opt out as well. An increase to 37.5% was noted post-implementation, indicating a 19.5% overall increase in access (Table 12).

**Fidelity To Implementation Strategies:** Throughout the implementation timeframe, brochures were seldom distributed to the patients (16%) and the script was used 50% of the time (Table 13).

## **Discussion**

This project was designed to assess if use of health information technology and education could improve patient portal enrollment in a small rural primary care practice. The poor response to the online portion indicates that the use of health information technology and education had minimal impact on enrollment. The increase in enrollment is likely due to multiple factors, including increased awareness of the portal. As indicated in the preliminary survey, knowledge about the portal was the most common barrier. In-office signage, educational brochures, social media promotion, and staff inquiry about portal sign-up may have addressed this barrier.

In alignment with the literature review, the use of in-office promotion, staff education, and a point of contact person can increase enrollment<sup>9</sup>. Staff reported increased comfort with promoting enrollment and assisting patients after receiving education. Although the strategies were not consistently implemented, staff were considered a point of contact. Offering patients the opportunity to enroll increased the number of invitations sent. Promotion in the office may have inspired some patients who had previously received an invitation to finish the sign-up process.

Multiple factors may explain how and why the online educational strategies received low responses. The most evident factor may be low patient interest. Website analytics provided the data regarding how many individuals visited the website but did not specify which specific webpages were viewed. Therefore, it was difficult to determine how many patients viewed the provided portal information. The video was designed for those who had little knowledge regarding the portal. Patients may have found this information unnecessary and required no assistance. Despite the explicit

explanation, the small number of survey responses may have been due to a lack of intrinsic motivation or realization of the importance of this survey for future educational endeavors. Lastly, patients may have had decreased interest in the portal due to more pressing medical issues.

Another cause of the low response rate may have been this specific patient population and the method of delivery. A study by Pew Research demonstrated that older individuals with less education are less likely to utilize the internet than their younger counterparts<sup>10</sup>. Over 65% of participants were 55 and older and 90% reside in rural areas and only 12.1% of individuals in the county have a bachelor's degree or higher<sup>11</sup>. Additionally, age bias was noted during observation with staff assuming older individuals would not be interested in the portal.

Inconsistent implementation likely impacted the success of the online strategies. As noted previously, patients were asked if they would like to join but there was minimal discussion of the website, online video, or surveys, including on the in-office signage. Inconsistent implementation and lack of script use resulted in the reduced promotion of this project aspect.

### ***Implications for Practice***

While previous research has found online videos on modules to be effective for educating patients, this project demonstrated low patient interest in this delivery method. This remained true despite multiple methods of promotion and descriptions of how this information would be used to improve the office stated on the portal webpage. This project was designed based on existing evidence regarding an in-office point of contact which can significantly increase portal enrollment rates. Staff promotion and

motivation greatly impact the likelihood of success for a project focused on portal enrollment.

The information gleaned from this project may be utilized for future endeavors. Continual promotion within this primary care office is the most impactful strategy for this project. In addition to inquiring about the patient portal, offering dedicated time for in-office education and automated portal invitations may increase enrollment rates. However, these strategies may only result in increased enrollment and may not impact portal utilization.

Although the educational aspect revealed limited impact within a three-month time frame, the provider and staff at this office have noted an increase in the number of messages sent through the portal. This indicates that certain features of the portal are being used more often. Promoting specific functions of the portal most beneficial to patients may result in increased patient interest in the portal itself.

### ***Limitations***

There were multiple limitations found during the implementation of this project. The EHR company offers one method of contact for its consumers and has limited problem escalation processes. Additionally, the EHR company did not offer beneficial data for this project, such as a complete list of patients who are enrolled in the portal. This resulted in a time-consuming process of gathering data manually, leading to the risk of inaccurate data extraction. Due to the insufficient sample size with the education video, results were not obtained. Therefore, the impact of education on portal enrollment remains uncertain.

Furthermore, this project had a short implementation time frame of three months which may have impacted the results. Patients may only present to the office yearly, biannually, or quarterly. Engaging patients in their healthcare may be difficult and technology can be intimidating. Multiple encounters with patients may be necessary to achieve portal enrollment.

Lastly, there were minimal resources available for the implementation of this project. Each employee within this small practice has limited time to assist with projects outside of what their job requires. Budget limitations reduced the ability to purchase extra equipment that could be used in the waiting room for patient enrollment or extra staff for assistance.

## **Conclusion**

Implementing patient portals is accompanied by strengths and opportunities for continued development. A successful increase in portal enrollment rates was achieved at this small rural, primary care clinic. Further quality improvement efforts may be directed toward sustainability and collaboration with informatics professionals in working with this patient population as they realize portal benefits. Health care professionals should continue to encourage patients to engage in their health and use the portal and medical records to help reach health goals.

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**Table 1: Demographics: Total Patient Visits by Age**

Age in years	% Visits
18-34	12.8
35-54	19.9
55-74	47.9
75	19.2

**Table 2: Demographics: Total Patient Visits by Disease State**

Chronic Disease State	% Visits
None	17.2
≥1	82.7

**Table 3: Demographics: Total Patient Visits by Sex**

Patient Sex	% Visits
Male	36.9
Female	63

**Table 4: Demographics: Total Patients Invited by Age**

Age In Years	% Visits
18-34	13
35-54	23
55-74	50.2
75+	14

**Table 5: Demographics: Total Patients Invited by Disease State**

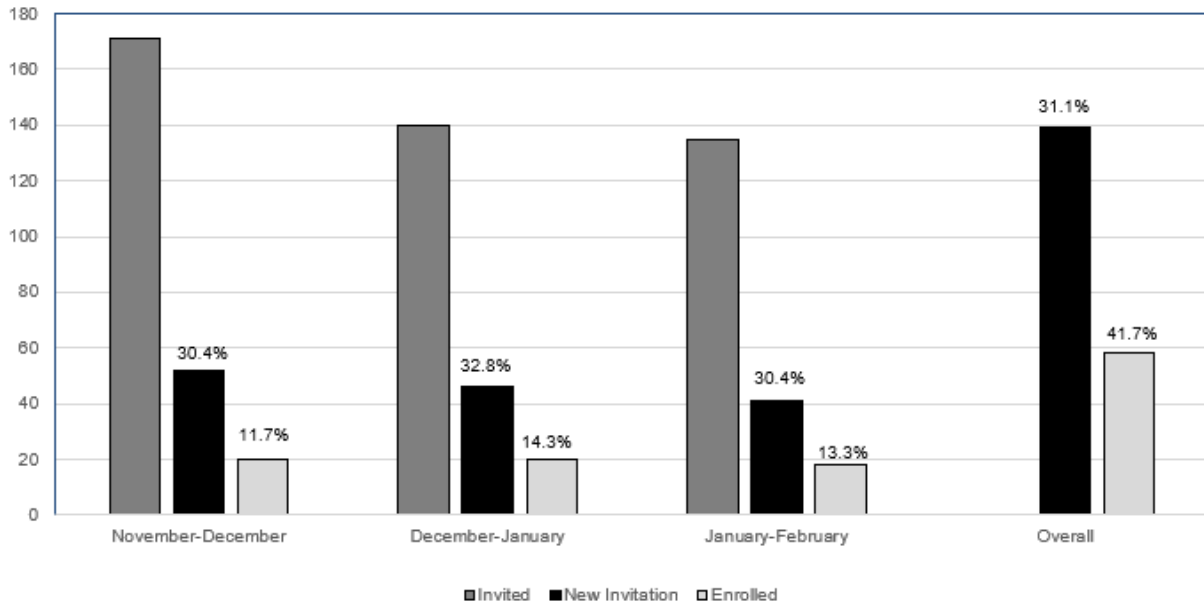
Chronic Disease State	% o Visits
None	13.6
≥1	86.3

**Table 6: Demographics: Total Patients Invited by Sex**

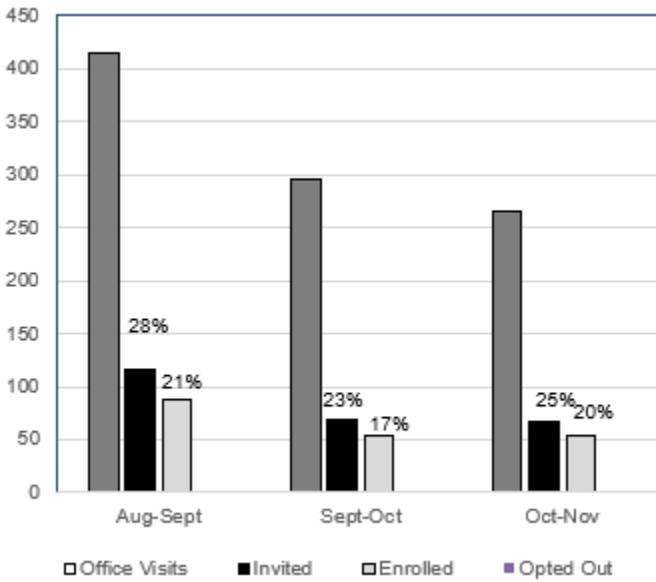
Patient Sex	% Visits
Male	35
Female	64.7



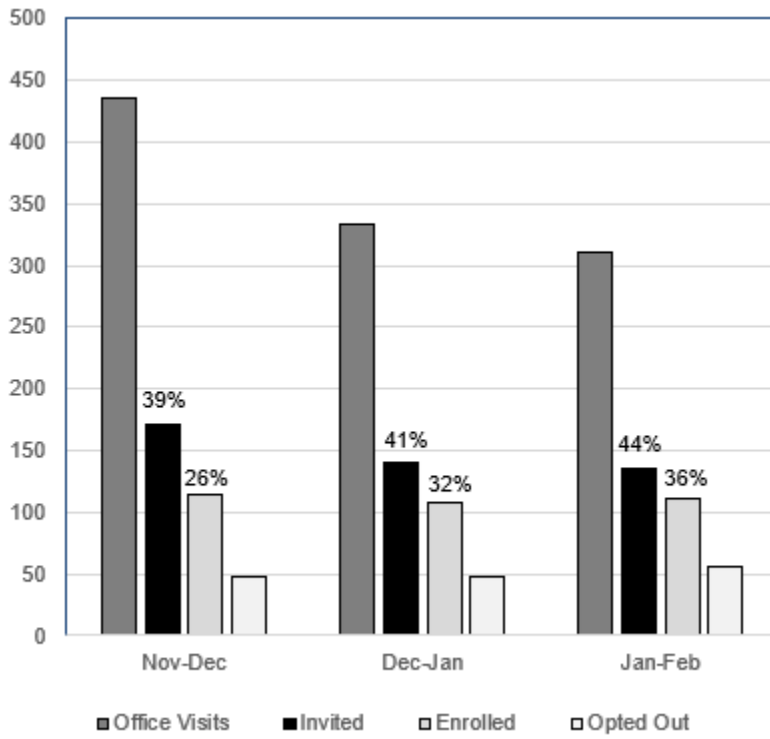
**Table 7: Interest in Portal Enrollment: Invited vs Enrolled Patients**



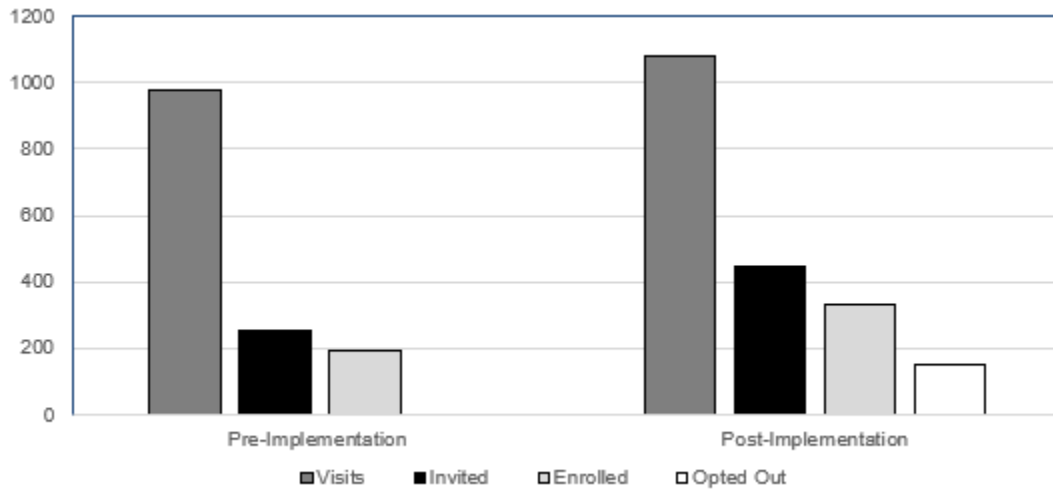
**Table 8: Interest in Enrollment by month: Pre-implementation**



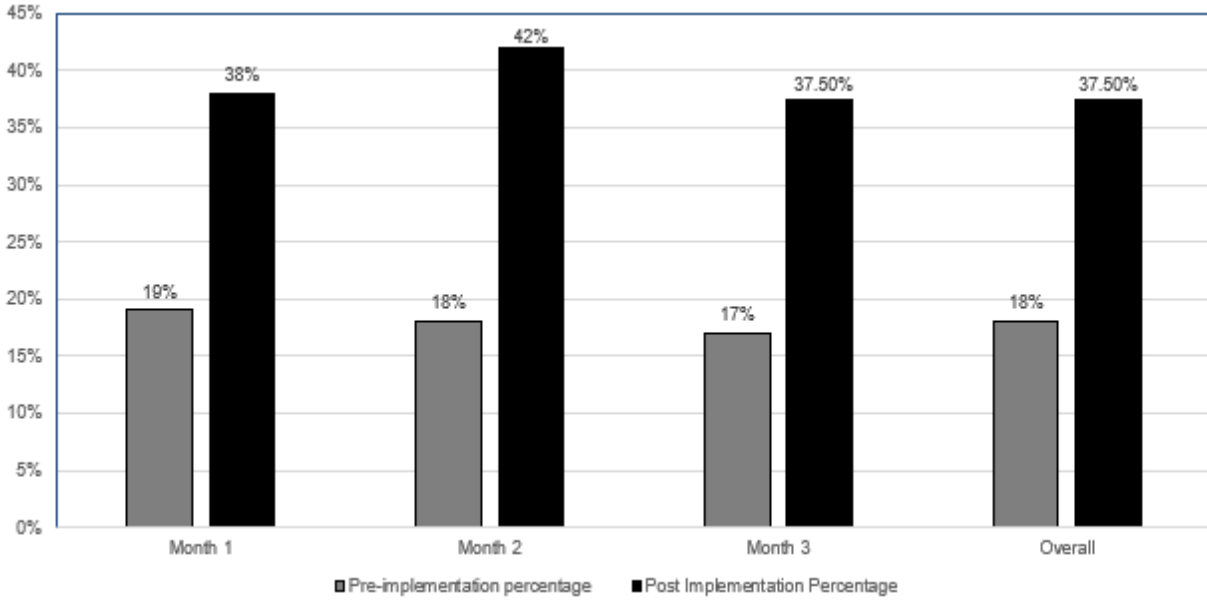
**Table 10: Interest in Enrollment by month: Post-Implementation**



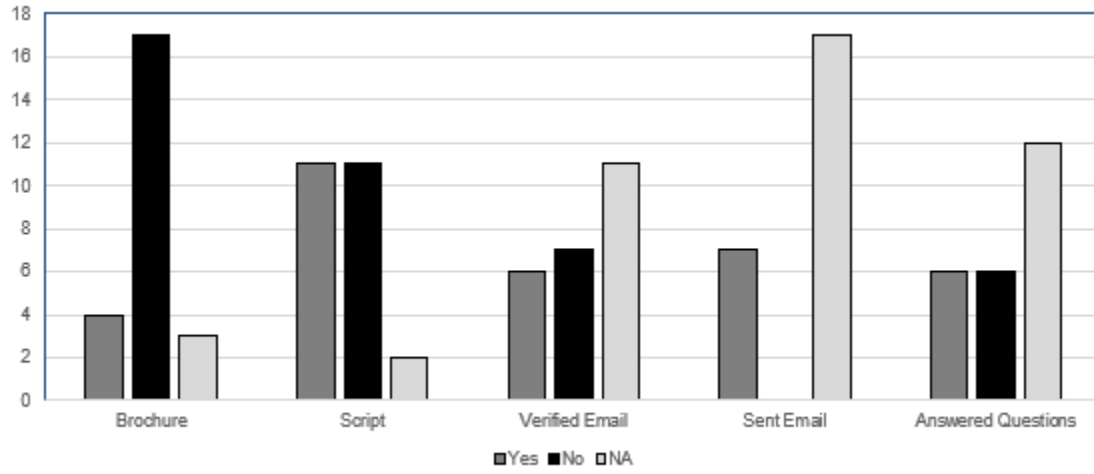
**Table 11: Portal Enrollment: All Patients Invited Pre and Post Implementation**



**Table 12: EHR Tracking Portal Percentage Per Month and Overall**



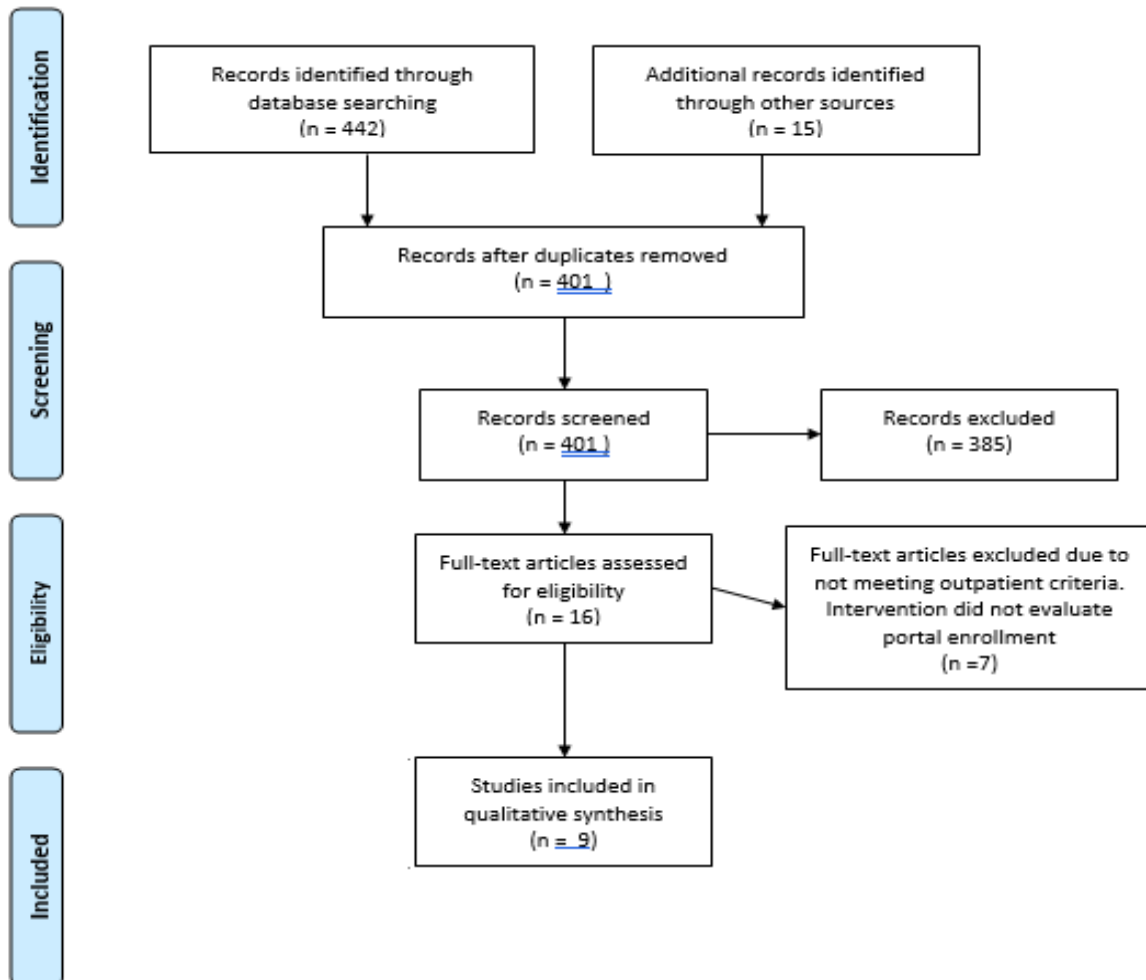
**Table 13: Fidelity to Strategy Implementation**



## Appendix A: PRISMA Flow Diagram for Literature Review: Primary Aim Enrollment



### PRISMA 2009 Flow Diagram



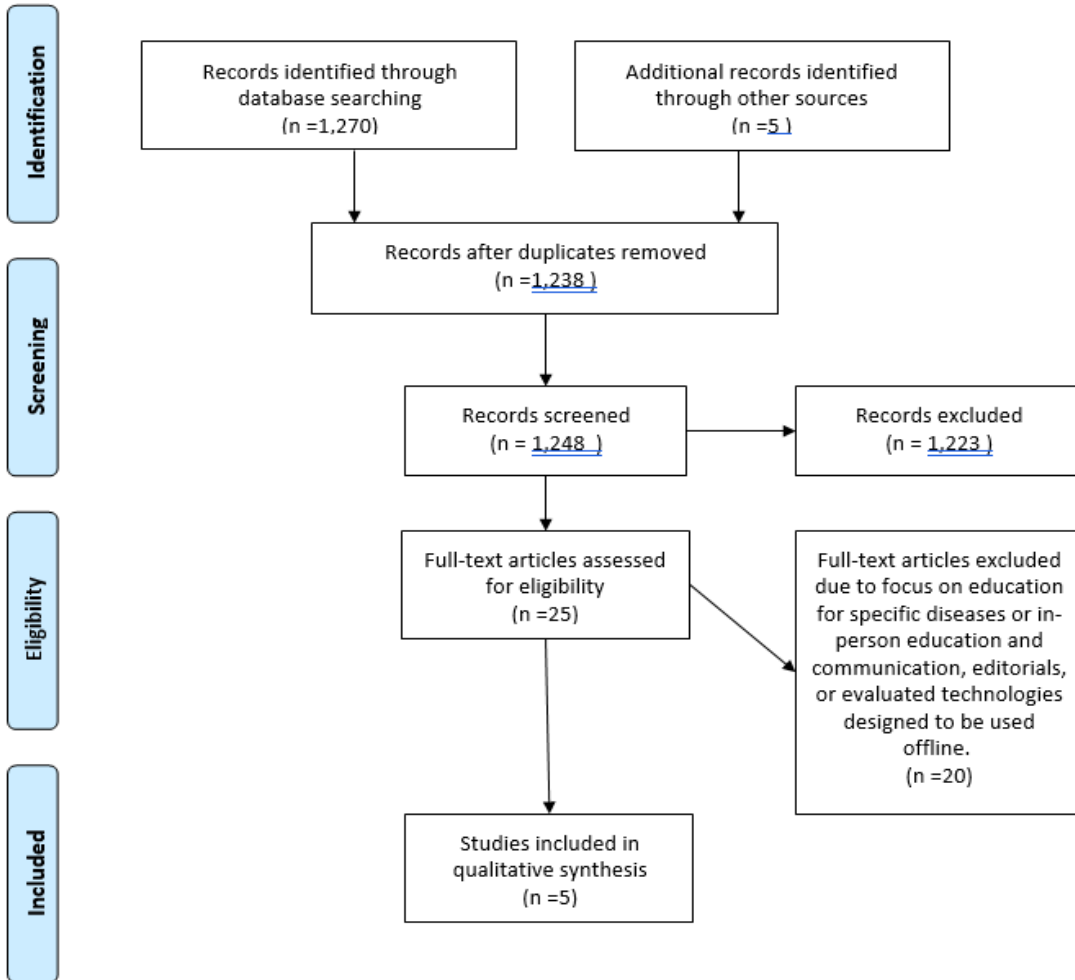
From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. *PLoS Med* 6(7): e1000097. doi:10.1371/journal.pmed.1000097

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## Appendix B: PRISMA Flow Diagram for Literature Review: Secondary Aim Education



### PRISMA 2009 Flow Diagram



From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. *PLoS Med* 6(8): e1000097. doi:10.1371/journal.pmed.1000097

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