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Improving Health Prevention Screening in a Rural Health Clinic

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Title Page

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Abstract

Background: Health prevention screening has recently been highlighted in many initiatives from leading countries around the world. Breast cancer screening, cervical cancer screening and osteoporosis screenings are among the highest objectives for many of these initiatives as national health agencies focus on reducing morbidity and mortality by early detection.

Local problem: Baseline quality metrics reported for one clinic show the appropriate ordering of these health screenings is below the national benchmarks and the organizational benchmarks.

Methods: The project was designed as a quality improvement project based in a critical access region serving a rural population.

Interventions: The project intervention was designed using evidence-based literature analysis and input from stakeholders. The intervention facilitated use of the existing electronic health record to incorporate a passive clinical prompt and identify needed health screenings for the patient during the scheduled visit.

Results: Outcomes showed a statistically significant increase in the amount of breast cancer and osteoporosis screenings that were ordered at the clinic during the post-implementation data collection period. However, there was no change noted in cervical cancer screenings during the same period.

Conclusion: The interventions used in this quality improvement project are generalizable to many primary care settings and may easily be incorporated into established workflows to improve appropriate health screening recognition during a patient visit.

Key words: health screening, cancer screening, women's health, primary care

Introduction

Problem Description

The U.S. Department of Health and Human Services (2020) has listed health prevention screenings as high objectives as part of the "Healthy People 2030" initiative, and acknowledge early cancer detection as the most useful component in the current healthcare system to continue mortality reduction in at-risk populations. Breast cancer, cervical cancer, and osteoporosis screenings are among the highest objectives on this list to be addressed in the ten-year period of 2020-2030. The national data from the preventive task force reveals that all noted screenings are below the minimal screening percentage set by the task force guidelines. Baseline quality metrics reported for the clinic show provider orders of these health screenings are below the national benchmarks and the organizational benchmarks.

The assessment for practice change was conducted as part of a comprehensive organizational assessment and SWOT analysis (see Table 1). The need for change was realized during review of the organizational quality data revealing multiple health screening metrics were below organization benchmarks of 90% for cervical cancer screenings, 80% for breast cancer screenings, and 80% for osteoporosis screenings. These metrics were then compared to national benchmarks of 84.3%, 80.5% and 81%, respectively, indicating orders placed for each of these screenings within this organization were below national benchmarks with all three metric measures below the 70^{th} percentile at the clinic. The best evidence of change was located during a literature review of meaningful health screening, and interventions related to improving screening ordering were analyzed to establish implementation into existing organizational workflow. Furthermore, the health management

application in place within the electronic health record was not being fully utilized within practice.

Available Knowledge

An intentional review of the literature was conducted pertaining to the clinical relevance of completing identified health screenings. The U.S. Preventive Services Task Force (2020) recommends screening for cervical cancer every three years with a Pap test in women ages 21 to 65 years. Breast cancer is one of the most common types of cancer in American women and the U.S. Preventive Task Force (2020) recommends annual mammogram screening ages 40 to 74 for women without high risk factors. The Centers for Disease Control and Prevention (CDC) (2020) recommends bone mineral density scans for all women aged 65 and older every two years. Significant evidence was found in the review of literature to substantiate the need for increasing the number of appropriate health screenings in the population to reduce morbidity and mortality. While early osteoporosis diagnosis is typically associated with a reduction in morbidity, it is critical to note that approximately one-fourth of those who experience a hip fracture related to osteoporosis die within one year of fracture (U.S. Preventive Services Task Force, 2018). It has also long been established that early detection of cancer is correlated with reduced mortality, and the literature reviewed supports this claim. The U.S. Department of Health and Human Services (2020) reported 76.4% of females age 50-74 years received breast cancer screening in 2019 with a target of 80.5 percent. In 2018, 80.5% of females age 21-65 received appropriate cervical cancer screening according to current guidelines with a target of 84.3% (U.S. Department of Health and Human Services, 2020). These reports indicate the expected ordered screenings in these

categories fell below the target goal, and as a result have been renewed as future objective goals nationally.

Furthermore, a review of recent literature found significant support for health screenings being performed at the earliest available time based on the CDC and U.S. Preventive Task Force recommendations (U.S. Preventive Services Task Force, 2018). Seely & Alhassan (2018) describe how mortality has incurred a steady decline since the inception of these guidelines. Specifically, over 90% of women diagnosed at an early stage of cervical cancer live for five years or more, compared to less than 17% of those diagnosed with late-stage cervical cancer (Seely & Alhassan, 2018). Articles reviewed during the literature search revealed favorable outcomes supporting the use of clinical prompting or reminding in the applicable setting, including more substantial outcomes with active clinical prompting (Wu et al., 2021), mixed results with the use of passive prompting (Cohen et al., 2020), and increased prompting effectiveness when targeting a smaller number of intended outcomes (Parkhurst et al., 2020).

A common theme revealed in the review was more substantial outcomes with the implementation of an active clinical prompting intervention. The most significant study found was a quasi-study using simple clinical alerts when ordering an antibiotic for a clostridium difficile diagnosed patient. This was an active prompt requiring action to satisfy the alert before proceeding with ordering. Guideline therapy for applicable patients increased from 71% to 90% in a six-month time frame (Wu et al., 2021). The overall implication noted in this article was the use of a simple alert being directed at a specific goal was more effective while avoiding the concern of alert fatigue in providers.

One randomized control trial did not use active prompting and saw mixed results during result analysis (Cohen et al.,2020). This study used a passive style of prompting clinicians in an outpatient clinic to provide Coumadin education before discharging the patient. The specific alert did not require acknowledgment by the provider or any clinician before the patient was able to be discharged from the facility. This resulted in a small change of education outcomes that the authors discussed as not as significant as was projected (Cohen et al., 2020). The concern noted by the authors in this study pertained to a passive alert of a reminder posted at each workstation may not have been effective as a more interactive alert choice.

The third concept noted in the articles of this review was a focus of using a clinical alert to impact a low number or even singular outcome variable. The studies yielding the most significant results seemed to choose an intervention to impact one desired outcome. One quality improvement study utilized a passive prompt to improve medication reconciliation during a transition of care visit in the primary care office. The team limited provider prompting only to this intervention and found significant improvement reconciliation of up to 30% with providers (Parkhurst et al., 2020). This study also reinforced the concept of utilizing a simple passive prompt with a direct goal of impact, suggesting passive prompting may be more useful with a small number of specific outcomes.

Rationale

Kurt Lewin's model of change was used to evaluate the phenomenon of interest for this initiative pertaining to health screening use. Specifically, the driving force concepts of reasonable, logical, and economic were used to identify needed changes that benefit the patient and the organization. It was also used to identify alterations in workflow that would

be logical and reasonable to accommodate for organization staff members. Several contextual elements were considered important when developing the interventions and implementation of this project. Compatibility with current clinic workflow to minimize disruption was considered when selecting types of interventions. The intervention was expected to be successful based on extensive literature review and applicable framework used for implementation into existing workflow.

The practice change design was created using the Unified Theory of Acceptance and Use of Technology (UTAUT). The premise of the theory focuses on facilitating conditions and moderating factors that influence change in the setting. Each of these conditions was a factor in designing the intervention and promoting successful implementation in workflow along with fidelity to the practice change.

Finally, implementing the change was enhanced with the use of the Donabedian model as framework for interventions. The model has three main constructs to promote a successful process change in an organization. Structure was evaluated within the organizational assessment and reflected in the choice of workflow modification. Process focuses on care delivered to the patient. This aspect is reinforced with current data from a literature review supporting an increase in cancer screening translating to early detection and decreased mortality. Lastly, the outcomes refer to the intended effect on the patient population during post-intervention.

Specific Aims

The purpose of this project was to implement prompting interventions using health information technology to improve timely ordering of health prevention screening

in the rural, underserved clinic population. This quality improvement-based project aimed to provide a passive clinical reminder to the provider with the overall purpose of increasing the number of appropriate health screenings ordered. The purpose of this manuscript is to examine success of implementation, analyze project results, explore study limitations, and discuss dissemination and replication of evidence.

Methods

Context

The setting of this quality improvement initiative is in a rural primary care clinic in the Midwest. Five providers and multiple ancillary staff supported this project. Project participants were chosen by convenience sampling of patients 21 years or older who are current or new patients being seen by a provider at the clinic. Organizational weakness that affected implementation was lack of staff knowledge regarding electronic health record and fluctuation of staff availability due to clinic merger. Inclusion criteria for participants included female patients 21 years or older and were existing or new patients being seen for a patient visit with the provider. Patients were excluded from the project if they were not scheduled at least 24 hours prior to visit time and if they were under 21 years of age.

Interventions

Screening Eligibility Recognition

In accordance with Kurt Lewin's Model of Change and the Donabedian Model, project interventions were designed using evidence-based literature analysis and input from stakeholders. The intervention included screening each patient scheduled for eligibility of the designated health prevention screening, transferring this information to the provider, the provider assessed the information during the patient visit, and placed the order in the

electronic health record with the patient's agreement. Patients who were 21 years or older and scheduled 24 hours or more before the patient visit were screened for eligibility of appropriate health screenings. The clinical support staff assessed the patient chart using the electronic health record to determine eligibility of any applicable health screenings. If the patient was deemed eligible for any health screenings, the specific screening type was entered into the electronic health record in the "patient list". This list was printed daily by clinical support staff and provided to the health provider to be utilized during patient visits. This same list was also available in the electronic health record for the provider to view during each patient visit. The information was made available in both formats based on provider preference variation and in accordance with the principles of the Unified Theory of Acceptance and Use of Technology model.

Clinical Prompting Use

The patient list was utilized by each provider during every patient visit to assess for applicable health screenings that could be ordered. Shared decision making was used during the patient visit and the appropriate order was placed in the electronic health record after patient agreement. Fidelity to the intervention was ensured by weekly random audits performed by the author or clinic leadership. This audit was only satisfied as complete if every patient list had been modified with the intervention on that day.

Study of the Interventions

Data was collected for the number of cervical cancer, breast cancer, and osteoporosis screenings ordered by clinic providers. Data was also collected for the number of these health screenings ordered and compared to the number of screenings that could have been ordered. This was represented in a percentage of completion format for each provider. Pre-

implementation and post-implementation data were analyzed for statistical significance to determine if any changes in outcomes occurred from the intervention.

Measures

Outcomes include two primary measures of evaluation that are both related to the number of health screening orders being placed in the electronic health record by the provider. The first measure describes the raw number of orders being placed for health screenings in the clinic. The second refines some of this data to analyze the order being placed in the recommended time frame for initial screening and frequency. Both measures were gathered by data extraction from the electronic health record 30 days pre and post implementation. Both measured outcomes are quality measures currently collected and assessed by the organization and reported to the Centers for Medicare and Medicaid Services as valid quality data sources. Data was extracted from the electronic health record by a quality specialist and then verified by another team member for accuracy of extraction.

Analysis

Data was analyzed using quantitative analysis and the methods of analysis were determined after consultation with a statistician. The first primary measure was collected from raw data by number of orders placed post-intervention and was compared to pre-intervention data using a contingency table and analyzed with t- testing. A paired t-test using proportions was conducted comparing number of screenings orders placed to the number that could have been appropriately placed by each provider individually and then as a whole. This data was derived from an existing quality data application tool in current use at the organization. This application uses data from the health management system in the electronic health record to determine eligibility of screening based on the patient profile and then

compares the information to the eligible ordering being placed. This is a percentage comparison derived from data automatically collected by the electronic health record platform.

Ethical Considerations

The main purpose of data collection was to determine if appropriate health screenings were ordered at the recommended time. This entailed extracting electronic health record patient information including names, birthdays, sex, and health management criteria such as previous testing and family history. This information was gathered and secured by the existing quality metric collection system. This system de-identifies the information and transitions this data to raw percentages based on each provider and the clinic. The project proposal was also submitted to the organizations institutional review board and received approval as a quality improvement project. The author reports no conflict of interest.

Results

A randomized audit of intervention completion was conducted during the 30 days post-implementation. It was found that the intervention was appropriately completed 95% of the time. To satisfy as appropriate completion of the intervention, every provider list had to be modified according to the intervention standard and made available in the electronic health record. This high level of intervention fidelity reinforces the probability of the following screening results being associated with the intervention implementation.

Cervical Cancer Screening

The screening ordering data was compared pre-implementation to post-implementation for each screening of interest in this project. Approximately the same number of patients in

the 30 days pre-intervention (n = 1718) were seen at the clinic post-intervention (n = 1752). The number of cervical cancer screening orders placed by the provider post-implementation decreased (n = 17) as compared to pre-implementation (n = 19) (see Table 2). No statistically significant difference was seen in the percentage of cervical cancer screenings ordered by the provider in pre-implementation and post-implementation patients at the clinic (paired t-test, p = .1028).

Osteoporosis Screening

DEXA (dual-energy X-ray absorptiometry) scan orders were recognized as the primary diagnostic ordered for the purpose of osteoporosis screening and data was collected from the electronic health record-based quality tool. A statistically significant increase was seen in the number of DEXA scan orders placed for post- implementation (n = 38; t-test, p = .0228) as compared to pre-implementation. A statistically significant difference was also observed in the percentage of DEXA scans orders placed by the provider at the clinic. Percentage of orders placed post-implementation was higher (72%) than pre-implementation (64%, paired t-test, p = .0038).

Breast Cancer Screening

Mammogram screening orders were identified as the primary order used for breast cancer screening and such order were extracted directly from the electronic health record. No statistically significant difference was seen in the number of mammogram orders placed pre-implementation (n = 277) compared to post-implementation (n = 288; t-test, p = .1060) (see Figure 1). However, a statistically significant difference was observed in the percent of pre-implementation and post-implementation patients with appropriate mammograms ordered. The percentage of patients who had a mammogram ordered during the patient visit post-

implementation increased (79%) when compared to pre-implementation patient visits (68%, paired t-test, $p < .001$) (see Figure 2).

There are no noted unintended consequences associated with the implementation of this intervention. During data collection, it was found that if the cervical cancer screening was not completed at the clinic, but was completed outside of the clinic, it would only register as completed in the electronic health record if it was entered as such in the electronic health record. This information would need to be identified and entered into the health management portion of the electronic health record by the provider. If this information remained missing, the screening would register as not completed in the data collected for this project.

Discussion

Summary

Grounded in an identified need to improve appropriate health prevention screenings ordered during a routine primary care visit, this quality improvement project was implemented as means of a solution. With the completion of this project, this clinic was better able to identify appropriate health screenings during a patient visit and place the order in the electronic health record. The intended intervention was utilized nearly every day during the monitored implementation period and was available to be used in every patient visit by the provider. A statistically significant improvement was observed for both osteoporosis and breast cancer screening for this project. Although each screening utilized the same intervention there was no significant change in the ordering of cervical cancer screening seen after implementation.

Interpretation

Intervention Fidelity

Intervention fidelity was achieved with the implementation of a passive clinical reminder that was available for provider use 95% of the time during each patient visit. The remaining five percent was attributed to insufficient trained staff available to complete intervention on those days. This high rate of intervention fidelity was integral when determining possible causes of outcomes below anticipated improvement.

Screenings ordered

Mixed results were observed when comparing the number of screening orders placed pre-implementation and post-implementation. There was a decrease in the number of cervical cancer screenings ordered as compared to pre-implementation. There was a moderately statistically significant increase in DEXA scan ordering. No significant difference was observed between mammogram orders placed. This data description does not seem to accurately correlate with percentage of appropriate screenings ordered as anticipated, and this may be attributed to the variation in patient population seen in the two data sets pre-intervention and post-intervention.

Appropriately Ordered Screenings

The proportion of screenings ordered, out of what could have appropriately been ordered, was compared post-implementation to pre-implementation. There was an 8% increase in patient appropriate DEXA scan ordering and an 11% increase in mammography order placement. While there was an apparent decrease in the number of cervical cancer screenings ordered (n = 17), there was no significant change in the percentage of appropriate orders placed. Even with the same intervention applied to cervical cancer screenings, lack of effect

on the screening may be due to patients receiving this screening outside of the organization and the screening not being recorded in this data set. This would indicate no significant relationship to the number of orders placed at the clinic and the amount being appropriately ordered.

In comparison with other reviewed literature implementing passive clinical prompts, this project has shown more improvement than what had been anticipated for the type of prompting. This may indicate better than expected usefulness for passive clinical prompting when addressing a small number of objective outcomes. However, Wu et al. (2021) found a nearly 20% increase in monitored outcomes using active clinical prompts as compared to the 8%-11% found in this project. Realizing that active prompting may still be indicated for desired higher yield results, these results are not unexpected. The improvements observed in health screening ordering related to these interventions may translate to an increased revenue base for the health system and most importantly an increase in health screening completion along with earlier disease detection in the patient population.

Limitations

While the interventions may be generalizable to other clinics in the organization and large health systems, it may be more difficult to implement such interventions in a smaller or private clinic. A lack of technological and personnel resources may prove difficult to implement the types of interventions noted. It is also noted the quality data program used to collect data for this project is reliant on accurate electronic health record ordering and placement of the screening order in any other manner by the provider would not have been credited to this data. This limitation was minimized by provider education of order placement conducted before intervention implementation. The design of this project only included

screening orders placed for completion within the organization and data did not measure outside orders.

Conclusions

Routine assessment of patient electronic health records at this primary care clinic increased identification of applicable health prevention screenings and provided a concise list for the provider to utilize during the patient visit. This led to increased ordering of osteoporosis and breast cancer screenings after implementation. Literature would suggest this will lead to increased screening completion by the patient and an increase in early disease detection in this population. Sustainability was accomplished in that this process change will continue to be utilized at this clinic and have a positive impact on patients at this clinic. This project format may be easily modified to include other routine screening concerns such as immunization and sexually transmitted infections. To build on this project these screening could be added to the workflow for targeted population screening improvement or individualized to meet a specific clinic need.

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Table 1

SWOT Analysis

SWOT Analysis	
Internal	***External***
Strengths	***Opportunities***
• Engaged leadership • Engaged staff members/providers • Small community with personal relationship with many organization team members • Accredited current EHR • Affiliated with larger organization with vast resources • Positive work environment/culture among staff/team members • Competitive pay for region to retain employees • Low employee turnover • Offer same day appointments to meet patient needs • Structure built in last two years- advanced infrastructure and technological capability • Many services available in current structure clinic is housed- including imaging, labs, ED, PT/OT- for convenience of patient • Established leadership hierarchy with efficient channels of communication • Many health screenings services available at local clinic • High speed internet access increasing annually in region	• Fully utilizing EHR/portal to promote patient engagement and positive reimbursement MIPS scoring • Decrease redundancy of staff work and streamline healthcare information communication • Increase technology usage in community • Improve patient -provider communication effectiveness • Improve healthcare grading/rating now transparent on website • Reduce manual rescheduling of appointments • Decrease “no show” patient occurrence • Improve patient awareness of services offered by organizations • Increase patient awareness of provider availability and qualifications • Increase use of available services by community • Analyze community need of services locally • Cumbersome website used to identify provider services available • Improve consistency of health screenings being ordered for applicable patient population following guidelines
Weaknesses	**Threats**
• Increased provider/staff workload due to patient calls • Lack of patient portal promotion and awareness • Lack of patient utilization of portal	• Patient lacking interest in technology usage • Culture of community disinterest in technology • Inadequate hardware available for patient to access portal

• Lack of staff knowledge related to portal activation and usage • Low number of accurate patient email addresses on file • Lacking awareness of available phone application of portal • Provider concern of timing of results sent to patient vs provider • No known staff meeting/education provided to staff regarding portal assistance for patients • Staff belief that EHR system is not used to full potential and workflow could be altered to improve communication and/or patient treatment management • Staff training on EHR only focused on essential use and not potential modifiable options that could be of use to differing team members • Lack of specialty providers in local area • Staff reports of health screening not routinely ordered in timely manner • Slow internet connection in identified patient rooms • High use of phone/in-person communication in clinic	• Low-income population having less access/ability to afford stable high-speed connection • Competing health systems EHR perception of ease of use • Patient desire for improved communication regarding health information • Lacking knowledge of team members regarding manipulation of EHR to improve usefulness • Services not offered at this organization that are offered at competing health systems in the region • Losing patient populations to competing organizations due to lack of specialty providers in area • No current tracking of patients that have left clinic • Not enough providers at clinic to meet current demand

Figure 1

Orders Placed Pre and Post Implementation

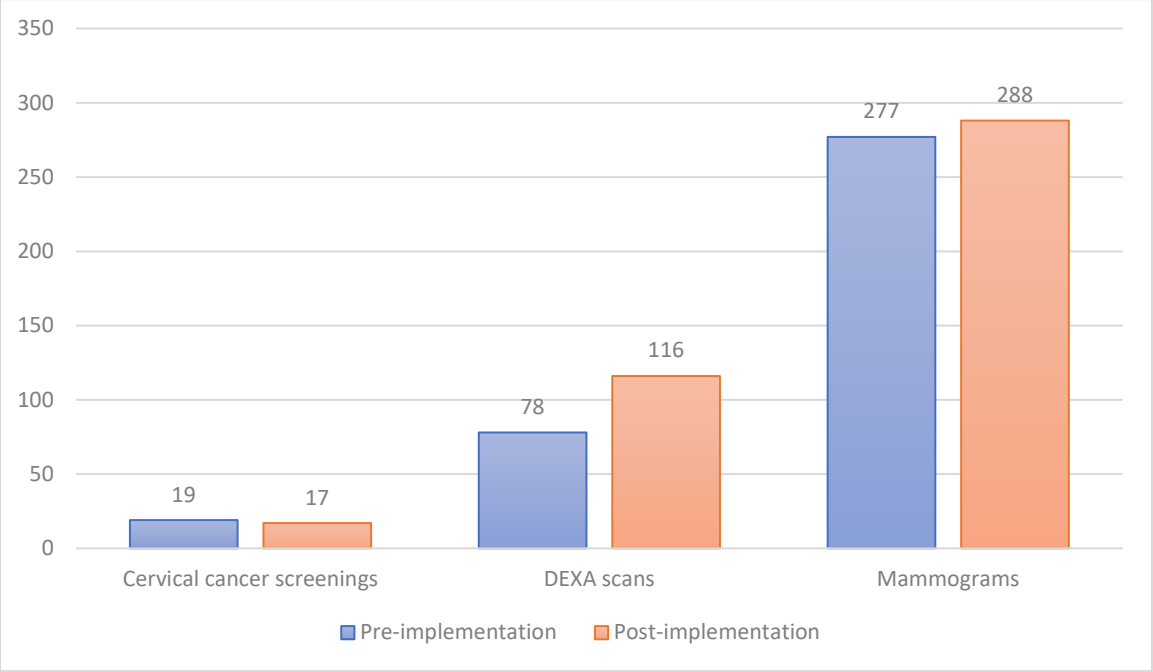


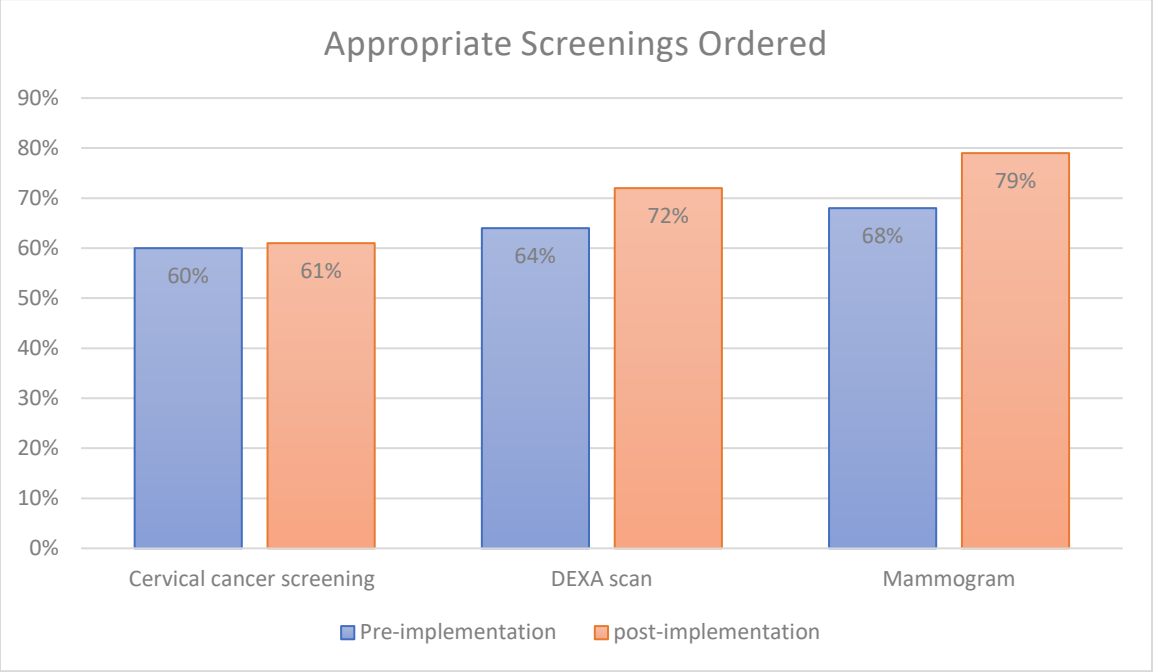
Table 2

Percentage of Appropriate Screening Orders

	Pre-intervention	Post-intervention	P-value
Cervical cancer screening	60%	61%	.1028
DEXA scan	64%	72%	.0038
Mammogram	68%	79%	<.001

Figure 2

Appropriate Screenings Ordered

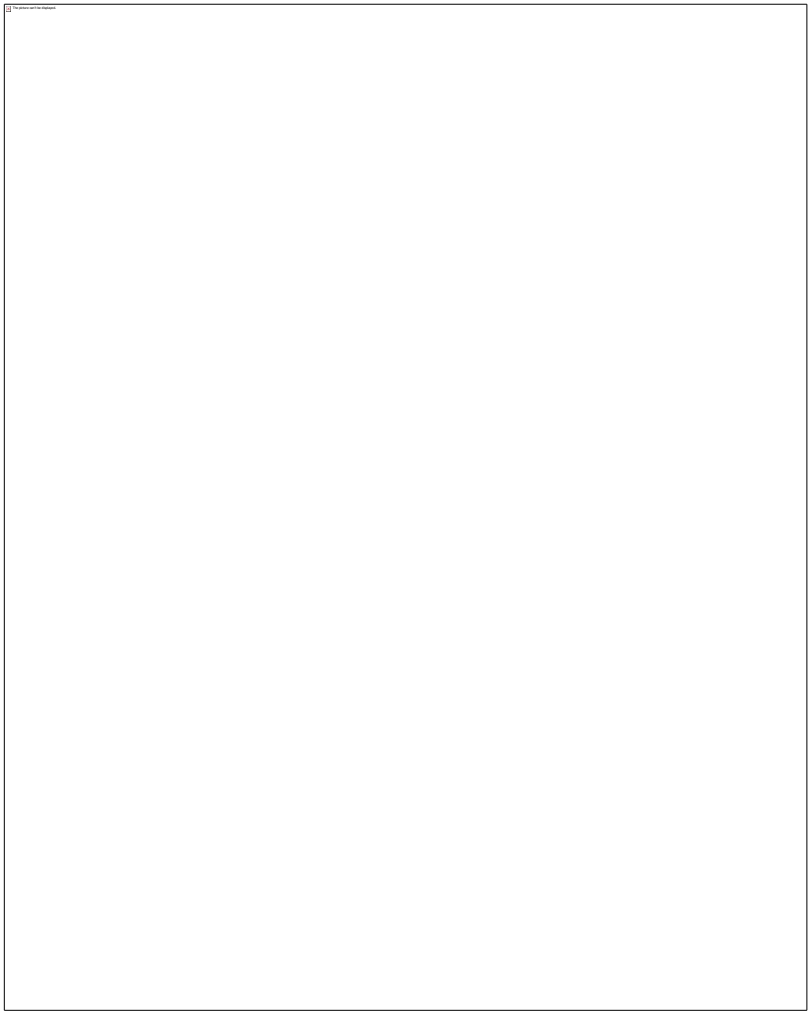


Improving Health Prevention Screening in a Rural Health Clinic

Shawn M. McNally BSN RN

DNP Project Final Defense

April 12, 2023



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- Advisory team and site mentor
- Funding: HRSA grant recipient

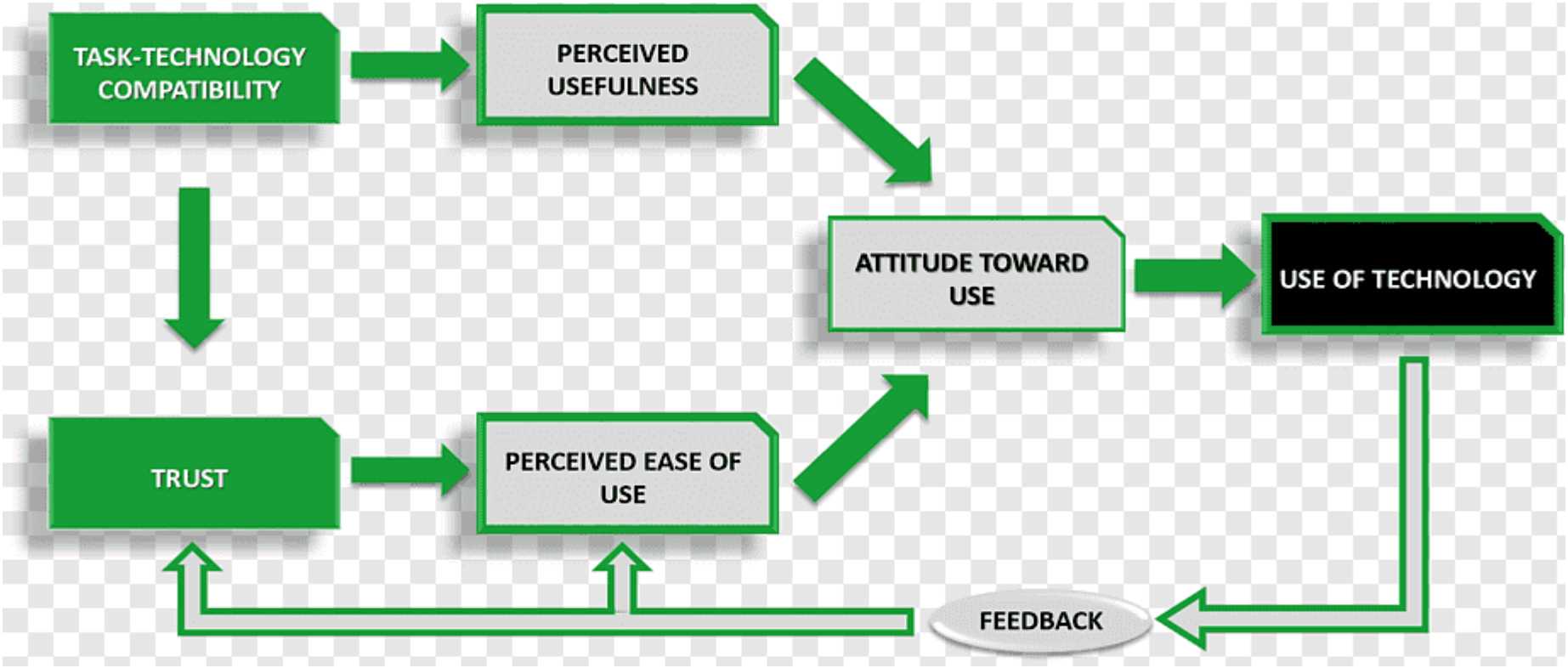
Objectives for Presentation

1. Explore the clinical phenomenon of health prevention screening and its significance.
2. Discuss the organizational assessment and explore pertinent literature review information.
3. Review project design and implementation completed at the site.
4. Examine results of project implementation, plan for dissemination, and strategy for sustainability.

Introduction

- The U.S. Department of Health and Human Services has listed health prevention screenings as high objectives as part of the "Healthy People 2030" initiative (U.S. Department of Health and Human Services, 2020).
- Breast cancer screening, cervical cancer screening and osteoporosis screening are high on the list to be addressed.
- According to current organizational quality metrics, at the proposal of this project the clinic was below the national and organizational benchmarks for these screenings.

Unified Theory of Acceptance and Use of Technology



Current State of the Organization: Setting and Participants/Stakeholders

- Moderately sized rural primary health care clinic in a Midwest state
- Associated with a large, multi-state, healthcare organization
- Service area is identified as underserved with an existing provider shortage (Community Health Team, 2021)
- There is a current health management tracking system in the EHR that is not being fully utilized.
- Ordering of appropriate health prevention screenings is below organizational benchmark of the 90th percentile.
  - Mammogram 65th percentile
  - Pap smear 60th percentile
  - DEXA scan 60th percentile
- Providers are the primary users that interact with health management.

SWOT Analysis

Strengths

- **Engaged leadership**
- **Engaged staff members/providers**
- **Accredited current EHR**
- Affiliated with larger organization with vast resources
- Positive work environment/culture among staff/team members
- **Low employee turnover**
- Offer same day appointments to meet patient needs
- Structure built in last two years- advanced infrastructure and technological capability
- **Many services available in current structure clinic is housed- including imaging, labs, ED, PT/OT- for convenience of patient**
- Established leadership hierarchy with efficient channels of communication
- High speed internet access increasing annually in region

Weaknesses

- Low number of accurate patient email addresses on file
- Provider concern of timing of results sent to patient vs provider
- **Staff belief that EHR system is not used to full potential and workflow could be altered to improve communication and/or patient treatment management**
- Staff training on EHR only focused on essential use and not potential modifiable options that could be of use to differing team members
- **Lack of specialty providers in local area**
- **Staff reports of health screening not routinely ordered in timely manner**
- **Slow internet connection in identified patient rooms**
- High use of phone/in-person communication in clinic
- **National benchmark for health screenings is the 80th percentile and above related to women's health screenings**
- **Ordering of appropriate health prevention screenings is below organizational benchmark of the 90th percentile.**
  - **Mammogram 65th percentile**
  - **Pap smear 60th percentile**
  - **DEXA scan 60th percentile**

Opportunities

- **Fully utilizing EHR to promote patient engagement and positive reimbursement MIPS scoring**
- Decrease redundancy of staff work and streamline healthcare information communication
- Improve patient -provider communication effectiveness
- Improve healthcare grading/rating now transparent on website
- **Improve patient awareness of services offered by organizations**
- **Increase use of available services by community**
- **Analyze community need of services locally**
- **Improve consistency of health screenings being ordered for applicable patient population following guidelines**

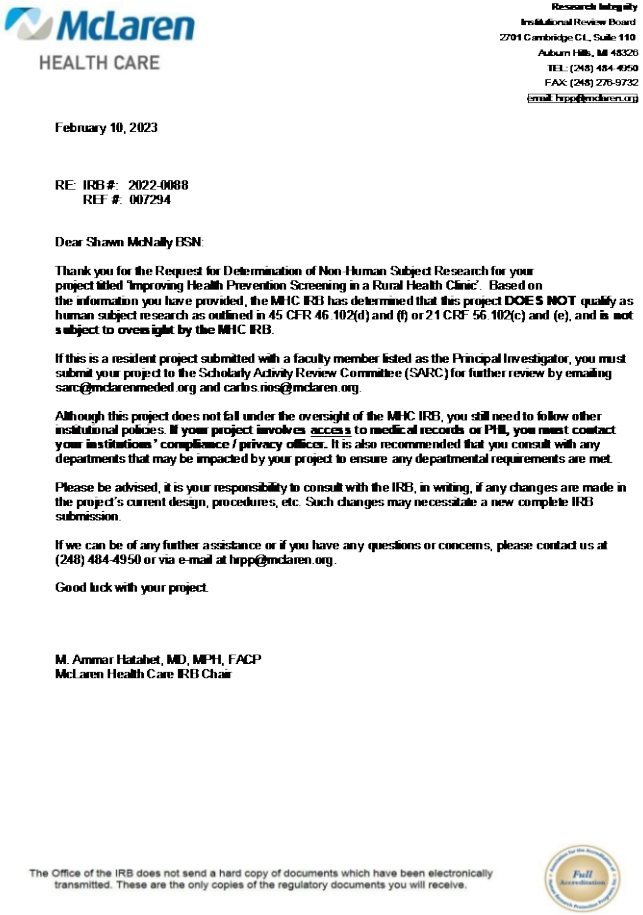
Threats

- Culture of community disinterest in technology
- Patient desire for improved communication regarding health information
- **Lacking knowledge of team members regarding manipulation of EHR to improve usefulness**
- **Services not offered at this organization that are offered at competing health systems in the region**
- Losing patient populations to competing organizations due to lack of specialty providers in area

Clinical Practice Question

- In a primary healthcare setting, does the implementation of clinical reminder increase provider orders of guidelines-based health screenings in eligible patient populations?

IRB Approval



McLaren HEALTH CARE

Research Integrity
Institutional Review Board
2701 Cambridge Ct., Suite 110
Auburn Hills, MI 48326
TEL: (248) 484-4950
FAX: (248) 276-9732
(email: hipp@mclaren.org)

February 10, 2023

RE: IRB #: 2022-0088
REF #: 007294

Dear Shawn McNally BSN:

Thank you for the Request for Determination of Non-Human Subject Research for your project titled "Improving Health Prevention Screening in a Rural Health Clinic". Based on the information you have provided, the MHC IRB has determined that this project **DOES NOT** qualify as human subject research as outlined in 45 CFR 46.102(d) and (f) or 21 CRF 56.102(c) and (e), and is **not** subject to oversight by the MHC IRB.

If this is a resident project submitted with a faculty member listed as the Principal Investigator, you must submit your project to the Scholarly Activity Review Committee (SARC) for further review by emailing sarc@mclarenmeded.org and carlos.nos@mclaren.org.

Although this project does not fall under the oversight of the MHC IRB, you still need to follow other institutional policies. **If your project involves access to medical records or PHI, you must contact your institutions' compliance / privacy officer.** It is also recommended that you consult with any departments that may be impacted by your project to ensure any departmental requirements are met.

Please be advised, it is your responsibility to consult with the IRB, in writing, if any changes are made in the project's current design, procedures, etc. Such changes may necessitate a new complete IRB submission.

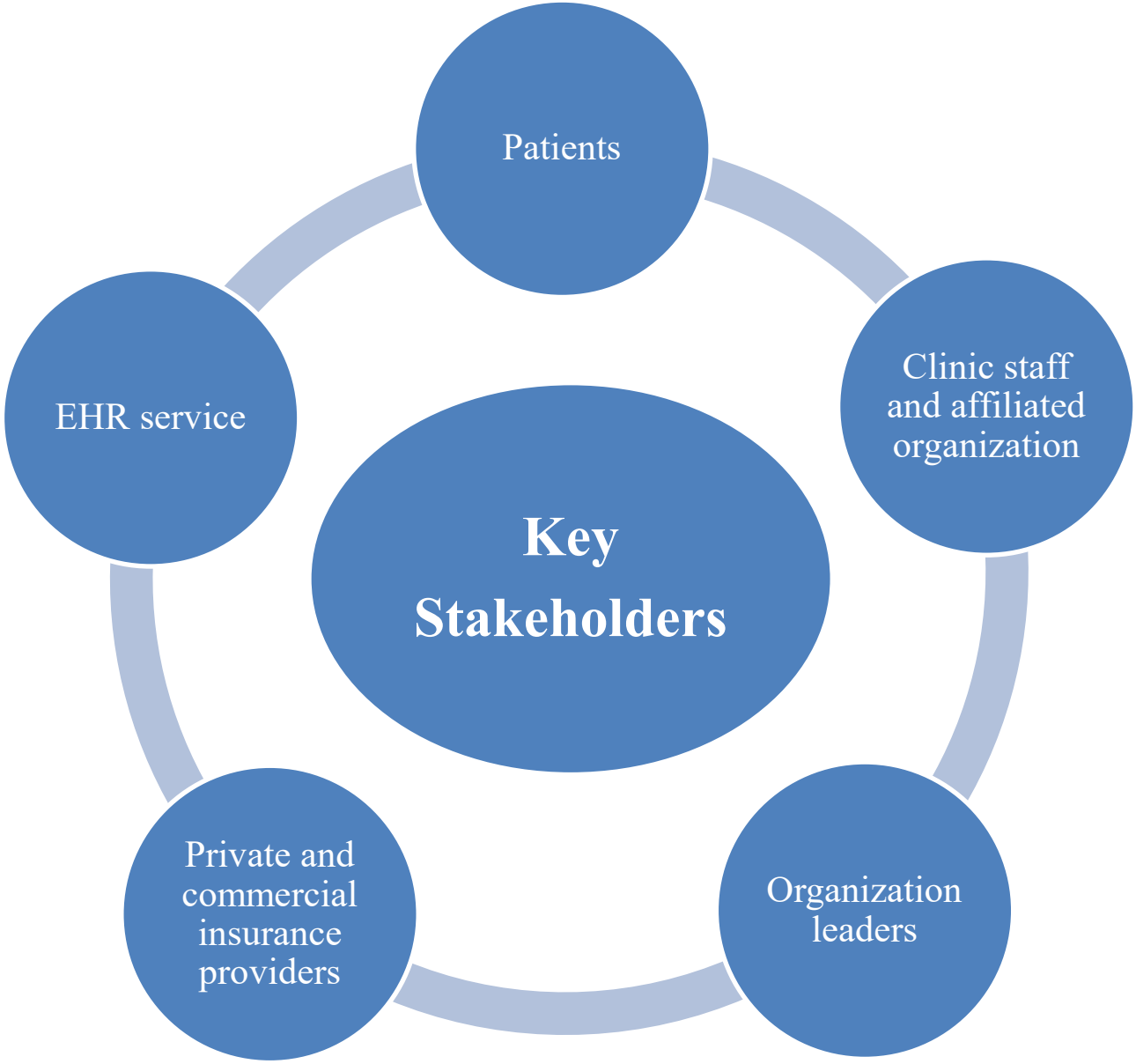
If we can be of any further assistance or if you have any questions or concerns, please contact us at (248) 484-4950 or via e-mail at hipp@mclaren.org.

Good luck with your project.

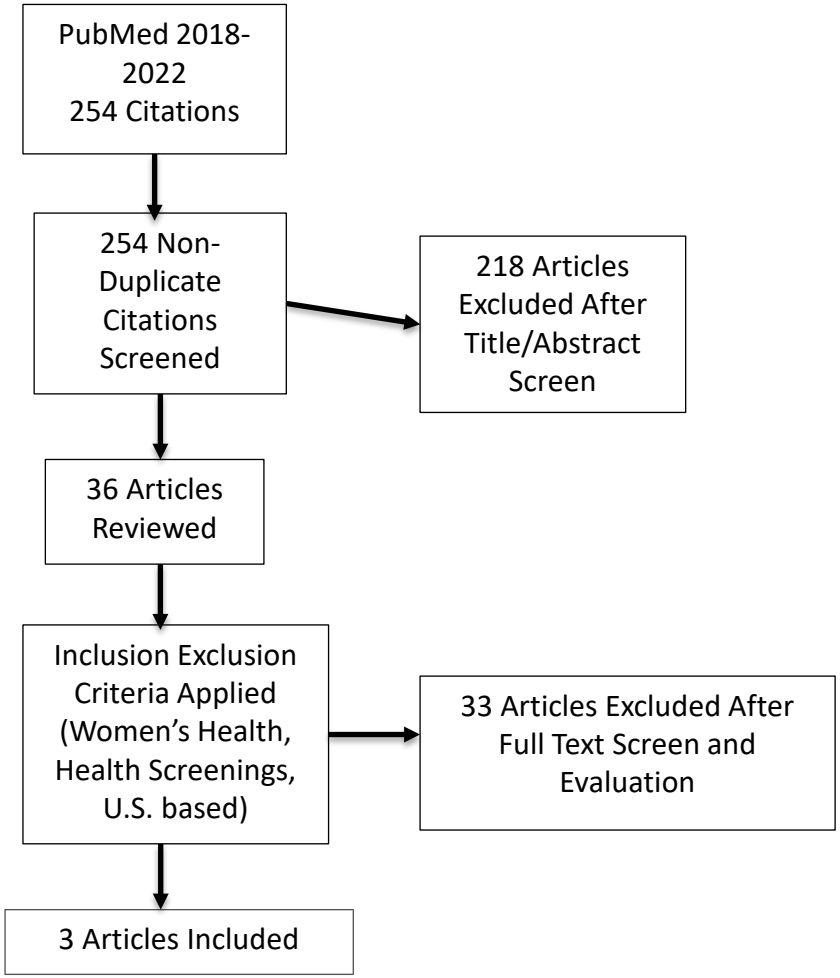
M. Ammar Hatahet, MD, MPH, FACP
McLaren Health Care IRB Chair

The Office of the IRB does not send a hard copy of documents which have been electronically transmitted. These are the only copies of the regulatory documents you will receive.

Full Accreditation


Patients
Clinic staff and affiliated organization
Organization leaders
Private and commercial insurance providers
EHR service
Key Stakeholders

PRISMA Figure: Phenomenon of Health Screenings among Women



Synthesis of Results: Phenomenon of Health Screenings among Women

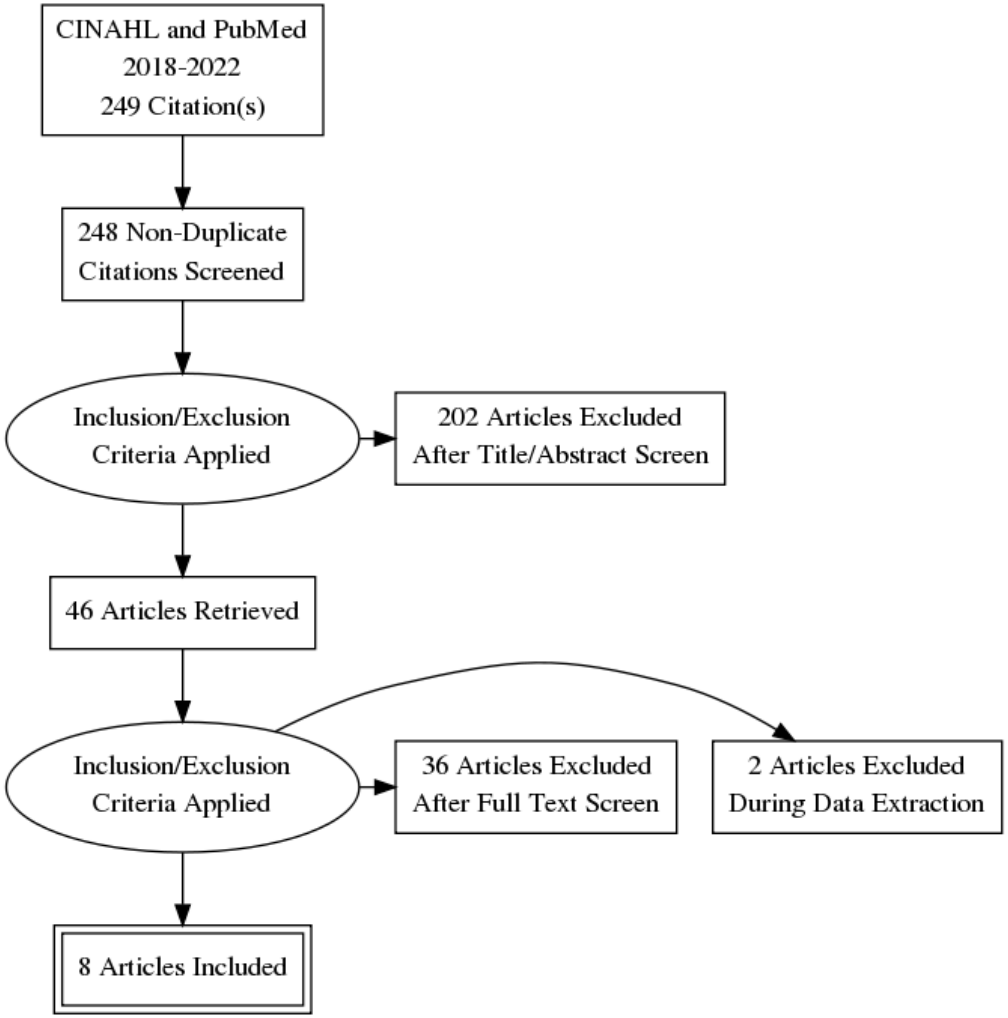
	Source 1	Source 2	Source 3
Theme 1 Earlier screening based on guidelines is associated with reduced mortality and morbidity	(U.S. Preventive Services Task Force, 2018)	(Han et al., 2018)	(Seely & Alhassan, 2018)
Theme 2 Mortality has seen a trending decline since guideline recommendations began	(U.S. Preventive Services Task Force, 2018)	(Seely & Alhassan, 2018)	
Theme 3 Women viewed as a vulnerable population requiring specific attention to screenings	(Han et al., 2018)	(Seely & Alhassan, 2018)	

Available Knowledge of Intervention

- Purpose of Review
  - Explore existing literature regarding use of clinical decision support systems (CDSS) in the primary care setting
  - Inform interventions that will be introduced in the clinic
  - Identify strategies for implementing such systems

PICO: In a primary healthcare setting, does the implementation of clinical prompting increase provider ordering of guidelines-based health screenings in eligible patient populations?

PRISMA Figure: Intervention



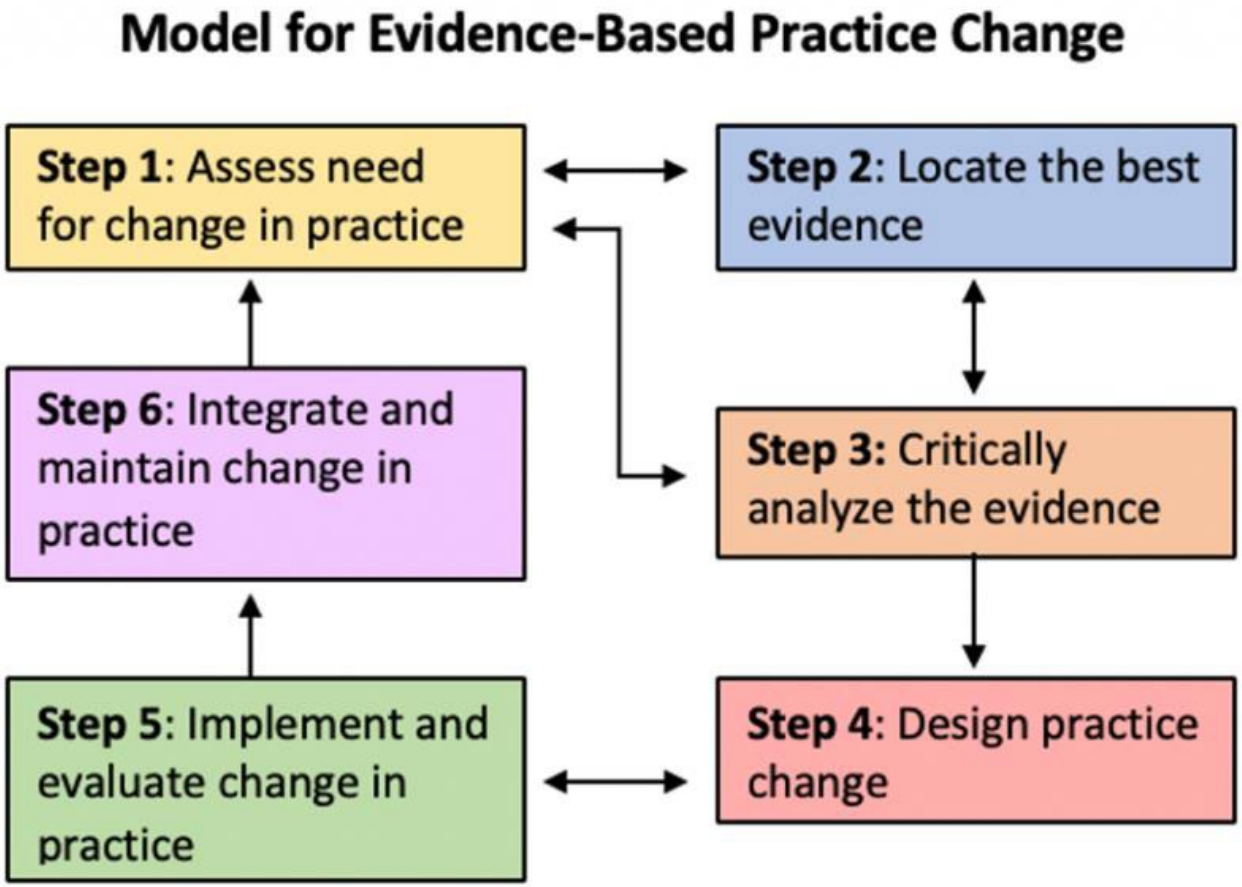
Synthesis of Results: Intervention

	Source 1	Source 2	Source 3	Source 4	Source 5
Theme 1 Substantial outcomes with the implementation of an active clinical prompting intervention	Chepelev et al. (2021)	Chernoby et al. (2020)	Parkhurst et al. (2020)	Li et al. (2022)	Cohen et al. (2020)
Theme 2 Clinical alert to impact a low number or singular outcome variable	Parkhurst et al. (2020	Wu et al. (2021)	May et al. (2021)	Cohen et al. (2020)	
Theme 3 Prompting not necessarily a permanent part of the workflow	Wu et al. (2021)	Wolfgang et al. (2022)	Cohen et al. (2020)		

Evidence for Project

- Clinical prompting has been shown in reviewed literature to be effective in implementing change.
- Using prompting to focus on fewer outcome variables has been shown to improve effectiveness.
- Tailoring interventions to individual site workflow should be completed to reduce interruption and staff resistance.
- The instituted clinical prompts may not be permanent and should regularly be evaluated for necessity.

Kurt Lewin's Model of Change



(Schaffer et al., 2012)

PROJECT PLAN

Project Purpose and Objectives

Project purpose: To increase amount of appropriate health screenings ordered at the primary health clinic toward achieving the organizational goal of 90th percentile.

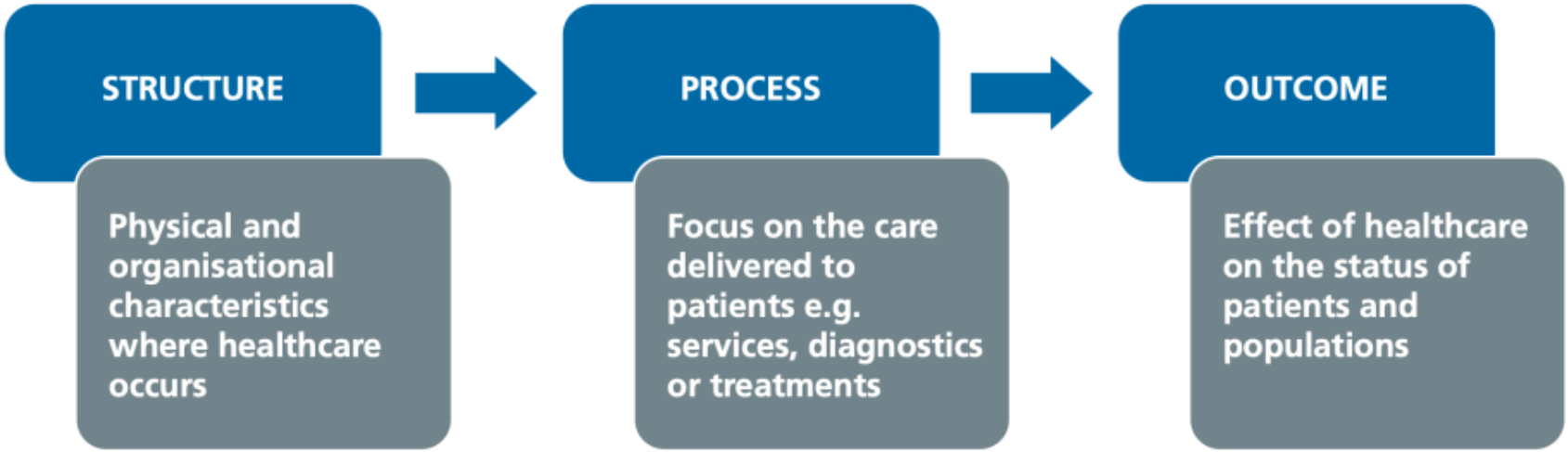
Objectives:

1. Assess current quality data and how it aligns with organization benchmarks by October 30, 2022.
2. Develop a communication and marketing plan of the project and disseminate to stakeholders by November 22, 2022.
3. Discuss health prevention screening value and intended intervention at staff meeting on November 23, 2022.
4. Begin clinical prompt reminder on February 17th, 2023, with agreement of clinic leadership.
5. Collect provider ordering data four weeks post implementation.
6. Compare statistical data pre and post by March 31, 2023, and examine effectiveness of strategy.
7. Disseminate project quality results and sustainability plan by April 28, 2023.

Project Design

- Quality improvement project conducted in a clinic serving a rural population in a critical access region.
- In compliance with the HRSA ANEW grant, the objective is to use components of the existing EHR system to improve health prevention screening in the rural health clinic.
- Participants:
  - Clinical staff
    - Front desk/reception, clinical providers (MD, DO, NP)
  - Organization staff members currently collecting metric data from clinic
  - Medical assistants/LPN
  - Clinic manager and director
  - DNP student

Implementation Framework Model



Donabedian model

(Berwick, 2016)

Project Intervention

- Identification of applicable health screenings needed for patient using EHR health maintenance application
- Transfer of this information to the provider patient list that is available in electronic and paper format and is currently being utilized in both formats
- Provider uses patient list during patient encounters to assess needed health screenings

Implementation Strategies & Elements

Implementation Strategy	Implementation tool/product.	Objective alignment.
1. Conduct Local Needs Assessment	Organizational Assessment. SWOT analysis Completed staff and leadership interviews	Done prior to objective 1
2. Assess Readiness for Change and Identify Barriers and Facilitators	Organizational Assessment Staff interviews	Done prior to objective 1
3. Shadow Other Experts	Spend time with other clinical providers at clinic	Objective 1
4. Assess current data trend and applicable benchmarks	Observe current auditing tool and gather knowledge of current benchmarks and organization goals	Objective 1
5. Develop Educational Material	Collaborate with clinic leadership and site mentor to develop educational flyer	Objective 2
6. Distribute Educational Material	Post educational flyer in clinic and distribute via email	Objective 2

Implementation Strategies & Elements

Implementation Strategy	Implementation tool/product.	Objective alignment.
7. Incentivize Staff	Present quality standards at staff meeting	Objective 3
8. Incentivize Stakeholders	Present quality standards and revenue cycle information at staff meeting	Objective 3
9. Remind Clinicians	Implement clinical reminder intervention	Objective 4
10. Purposely Reexamine the Implementation	Interview key staff members/clinicians and obtain feedback	Objective 6
11. Audit and Provide Feedback	Composite metric data and present to stakeholders with discussion	Objective 7

Evaluation & Measures

Topic	Concept	How Measured	When Measured	Who Measures	Theory/Strategy
Patient outcomes	Increased number of health screening orders received (total)	Persivia/EHR audit	Pre (60 days prior to intervention) and post (60 days after intervention)	Student	Outcome- Donabedian model
	Increased number of screenings ordered according to guideline recommendations and frequency	EHR audit/Persivia	Pre (60 days prior to intervention) and post (60 days after intervention)	Student	Outcome- Donabedian model
System Outcomes	Increased number of health screening orders entered in EHR by providers	Persivia report audit	Post implementation	Student	Process- Donabedian model
	Use of clinical reminder on patient list	Persivia report audit and EHR audit	Post implementation	Student	Use of technology- UTAUT
	Appropriate health screenings placed on daily patient list for each provider	Random patient list audit/provider interviews	Post implementation	Student/office manager	Implement change in practice- Kurt Lewin Model
Policy Outcome	Modification of provider patient list creation to include health screenings due for each patient	Patient list audit	Post implementation	Student/office leadership	Maintaining change in practice- Kurt Lewin model

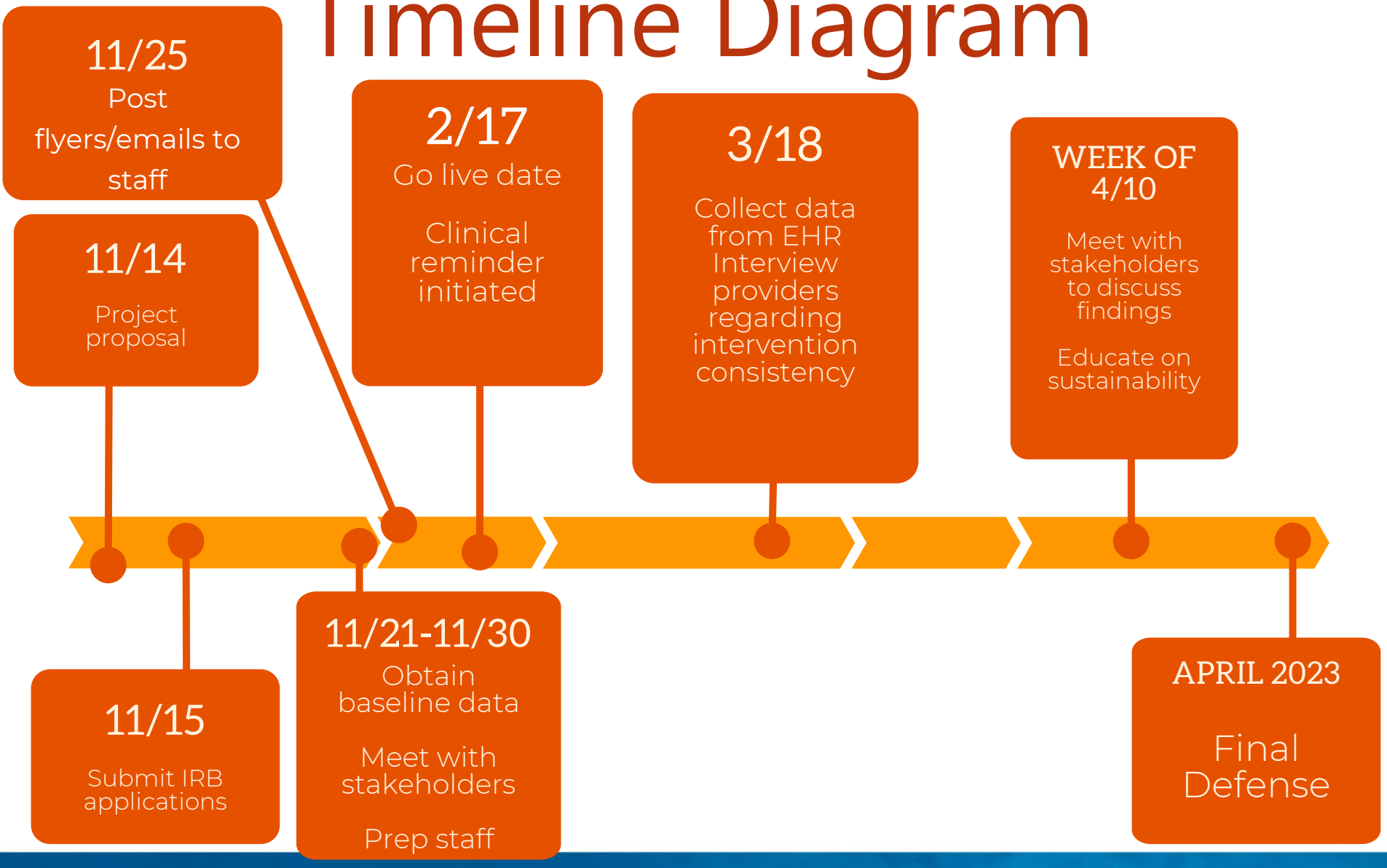
Analysis Plan

Measure	Analysis
Health screening orders placed in EHR (mammogram, pap smear, DEXA scan)	Exploratory data analysis t-test analysis pre and post
Number of screening orders placed compared to number that could have been placed appropriately (mammogram, pap smear, DEXA scan)	2 sample paired t-test
Number of patient lists with appropriate intervention modification present	Descriptive statistics- percentage of patient lists present with intervention

Budget & Resources Highlights

- DNP student is a profound time contributor to the project
- Front desk personnel time expense may be most significant to organization.
- Average CMS reimbursement for identified screenings was used to calculate potential revenue increase from screening completion (CMS, 2022).
- An increase of 11% in mammography orders was seen as compared to the projected 10 %.
- No increase in pap smear ordering was seen as compared to the projected 10%.
- With the increase, the clinic could see a $39,831 increase in revenue from screening completion based on current average payer mix with majority of reimbursement sourced from CMS.
- DEXA scans were not included in this revenue analysis since they are not offered as a service at the organization in this region.
- **The net operating budget plan may result in additional revenue of $38,823 in the first fiscal year.**

Timeline Diagram



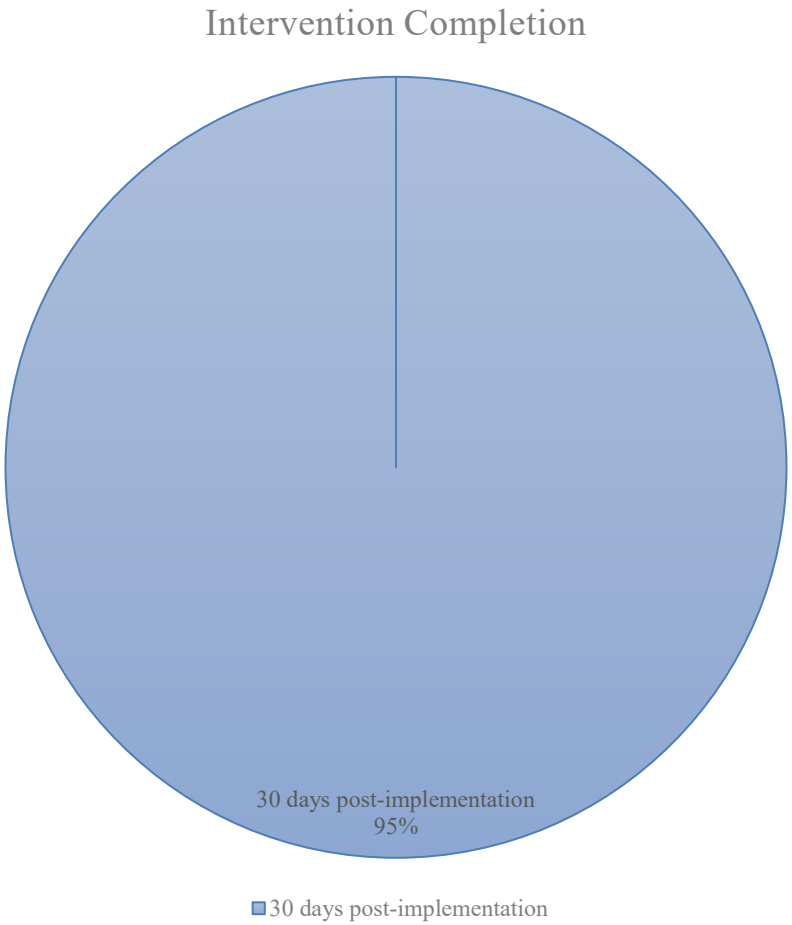
Results: Participant Characteristics

Female patients

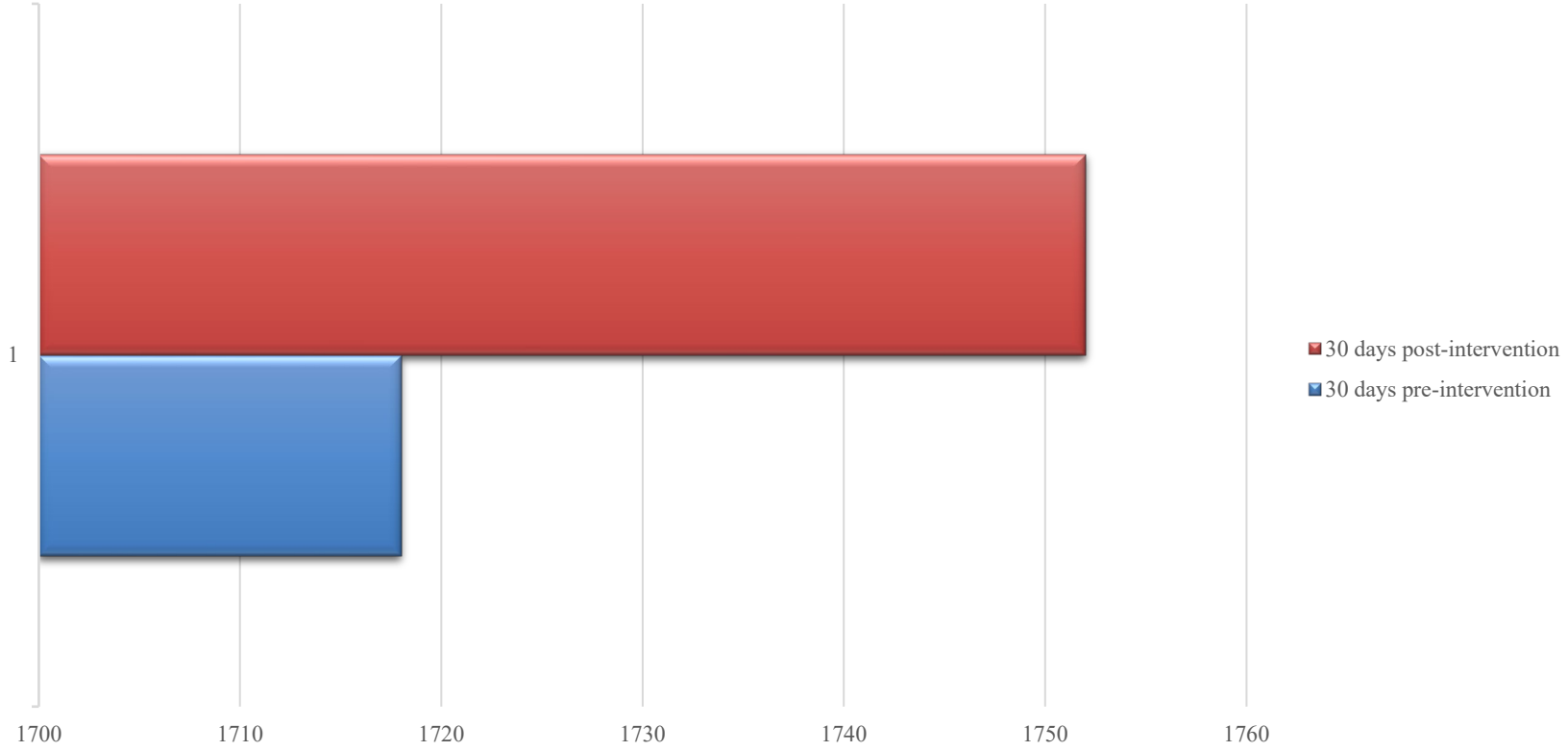
21 years of age and older

Eligible for health prevention screening

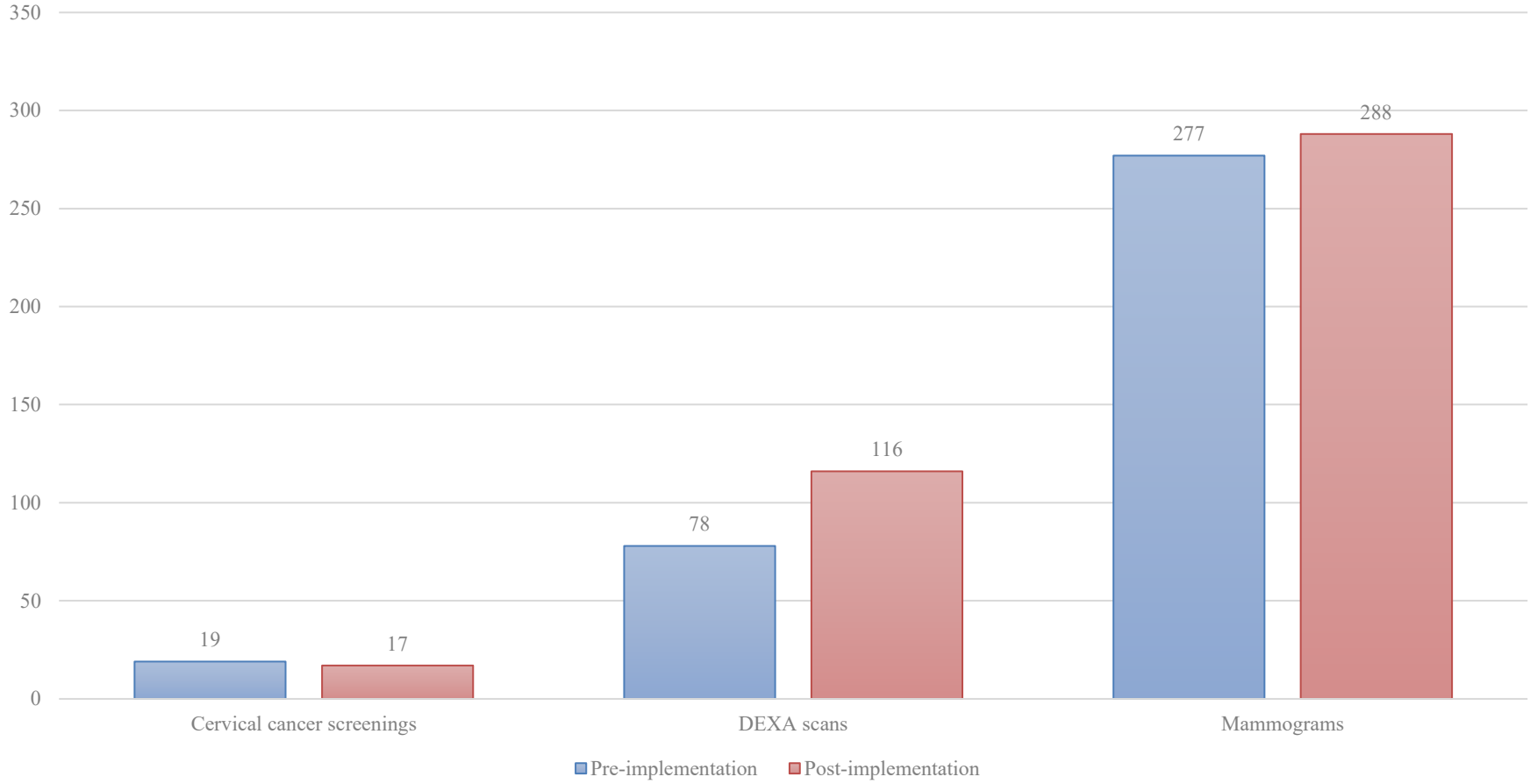
Results: Intervention Fidelity



Results: Patients Seen in Clinic



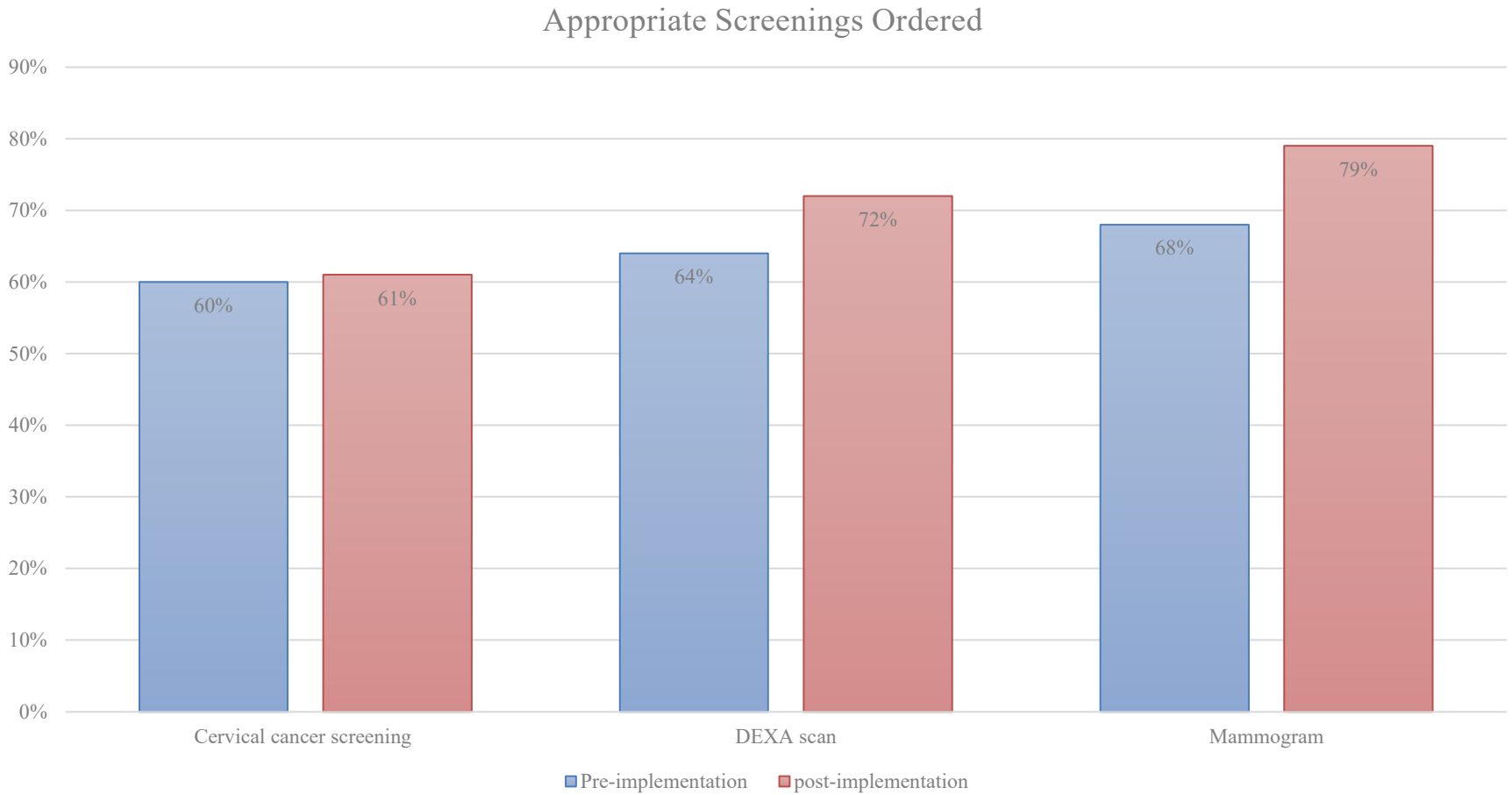
Results: Screenings Ordered Pre/Post Implementation



Results: Percentage of Appropriate Screenings Ordered

	Pre-intervention	Post-intervention	P-value
Cervical cancer screening	60%	61%	.1028
DEXA scan	64%	72%	.0038
Mammogram	68%	79%	<.001

Results: Percentage of Appropriate Screenings Ordered



Discussion: Evaluation of Implementation Strategies

- Readiness for change by stakeholders identified
- Stakeholders incentivized
- Education needed for new staff members
- Feedback provided from stakeholders
- Donabedian model followed as framework from implementation

Discussion: Process Change

Process change was most related to literature reviewed regarding passive prompting

Performed better than other passive prompting QI projects

Feedback from stakeholders

Discussion: Limitations

DIFFICULTY IN SMALLER OR PRIVATE PRIMARY CARE CLINIC

RELIANT ON EXACT ORDER PLACEMENT

INCLUDED SCREENINGS PERFORMED WITHIN ORGANIZATION

Implications for Practice

- 2/3 measured outcomes increased post-implementation
- Increased awareness of health prevention screenings in clinic
- Difficult to abstract outside data
- EHR changes may alter workflow
- Requires extra training of new staff

Conclusions

Routine health prevention screening assessment increased at clinic

Increased ordering of breast cancer and osteoporosis screening

Literature would suggest this leads to increased screening completion

Generalized to other screening types and settings

Sustainability Plan

Dissemination

- Presented to organization leadership
- Material made available for staff meetings
- Scholar Works
- JAANP publication

DNP Essentials Reflection

DNP Essential (American Association of Colleges of Nursing, 2006)	Reflection
I. Scientific Underpinnings for Practice	• Literature review • Analysis of current evidence-based information
II. Organizational and Systems Leadership for Quality Improvement and Systems Thinking	• Collaboration with site mentor and organization leadership • Change to clinic workflow and education of staff • Amend appropriate policies to reflect intervention change • Gained knowledge regarding healthcare structure and challenges
III. Clinical Scholarship and Analytical Methods for Evidence-Based Practice	• Identify evidence-based interventions • Use framework theory for implementation and evaluation • Analyze data using appropriate statistical methods • Journal selection and preparation of manuscript for consideration of publishing

DNP Essentials Reflection

DNP Essential (American Association of Colleges of Nursing, 2006)	Reflection
IV. Information Systems/Technology and Patient Care Technology for the Improvement and Transformation of Health Care	• Chart auditing • Data extraction from EHR • Use of quality monitoring program • Use of EHR dashboard to monitor and present data
V. Health Care Policy for Advocacy in Health Care	• Engagement of organization leadership to change current policy and reflect workflow change • Explored current national/global healthcare challenges and future goals
VI. Interprofessional Collaboration for Improving Patient and Population Health Outcomes	• Designing, proposing, and implementing project at organization • PDSA cycle during implementation • Pre and post intervention data collection

DNP Essentials Reflection

DNP Essential (American Association of Colleges of Nursing, 2006)	Reflection
VII. Clinical Prevention and Population Health for Improving the Nation's Health	• Primary aim of project to improve health screening ordered for patients • Aligns with goals of "population health" and other governing agencies • Extensive research completed to expand knowledge of health prevention and patient benefits
VIII. Advanced Nursing Practice	• Patient-provider shared decision making on health screenings • Assessment of health screening need as health prevention goals for patient • Increasing health prevention in vulnerable populations and learning of potential benefit to communities

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