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Cervical Cancer Screening Management in Primary Care: A Quality Improvement Project

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EXECUTIVE SUMMARY

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Cervical cancer screening has evolved throughout the years into the current, very effective, algorithms for screening and management. The success of improved early detection of cervical cancer has saved many lives (Lees, Erickson, & Huh, 2016). The addition of human papillomavirus testing and genotyping has allowed for more efficient, and less invasive, management of cervical cancer screening (Cox, 2009). While there are significant advantages to these new guidelines, there are barriers to applying them in practice. The clinical site for the project was identified to be in need of a quality improvement project aimed at creating an improved patient notification, tracking and reminder system as well as improving provider adherence with the evidence-based guidelines. There were 48 total eligible providers that were included in the project.

After identification of the problem, a review of the literature was undertaken to identify an evidence-based strategy for addressing practice gaps. This literature review focused on provider guideline adherence with cervical cancer screening guidelines and patient notification, tracking and reminder systems. Current literature demonstrates a gap in provider guideline adherence nationwide as well as strategies aimed at improving both provider and patient adherence with the reccomendations. These

include use of consistent patient notification processes, implementation of an electronic tracking and reminder system, and provider educational sessions aimed at improving guideline compliance. Donabedian's (2005) quality improvement framework was utilized to divide the literature findings into those interventions that effect outcomes, structure, and process of care in order to form the project plan and methods.

Following this in-depth look at the background and existing literature, the project plan was established. The plan consisted of two phases: the first focusing on creation of project materials and preparation for project implementation, and the second focusing on the roll out of the new process and data collection for project analysis. Two objectives were identified for this project: improve provider adherence to the 2012 American Society of Colposcopy and Cervical Pathology Guidelines and implementation of an electronic patient notification, tracking and reminder system. A plan for data collection and analysis through pre- and post-implementation provider surveys and chart audits was established.

After project implementation, data collection and analysis occurred. Objective One was evaluated in order to determine if the project implementation correlated with an increase in provider guideline adherence. The quality improvement project did find an improvement in guideline adherence in recommending appropriate follow-up for patients following receipt of cervical cancer screening results. For their survey responses on a series of patient vignettes, as well as whether patients were actually screened at an appropriate interval according to the recommendations, the providers were not found to show a statistical improvement following implementation of the project. In evaluating Objective Two, there was found to be moderate compliance on

the part of the providers with the new process in the weeks following project implementation. Nursing participants in the new process were found to be 100% compliant with following the process. No statistical difference was found in provider beliefs regarding the practice's tracking and reminder system pre- and post-intervention. Limitations existed in this study that limit the ability of the researcher to make assumptions based on the findings. Regardless, this project served to address the need for a robust notification tracking and reminder system. This system helps to ensure that patients receive timely, clear, and concise communication regarding their cervical cancer screening results and what these results mean for them. Additionally, they are notified and reminded to follow-up as needed. This is all done in an attempt to continue to drive down cervical cancer rates while also reducing unnecessary, and costly, procedures and testing.

Keywords: cervical cancer screening, guideline adherence, tracking and reminder systems, patient notification of results

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CHAPTER I

INTRODUCTION

Cervical cancer was, at one time, undetectable until it had progressed to the point that survival was unlikely and treatment options were few (Centers for Disease Control and Prevention, 2017). Research on methods of early detection have led to evidence-based guidelines for the screening and management of cervical cancer. While these guidelines and screening options have reduced mortality associated with this type of cancer, they are complex and difficult for providers and practices to adhere to. Chapter I serves to introduce the background and significance of this problem and the purpose of the Doctor of Nursing Practice (DNP) scholarly project.

Background and Significance

Invasive cervical cancer was once the leading cause of cancer-related death in women (Centers for Disease Control and Prevention, 2017). In an effort to find a way to detect cervical cancer early, Dr. George Papanicolaou began researching cervical and vaginal sampling in the 1920s (Lees, Erickson, & Huh, 2016). He developed and established the screening test now known as the Pap test and published his research in 1941 (Lees et al., 2016). As practitioners began adopting the Pap test routinely and annual screening became mainstream, cervical cancer death rates began to fall. During the years of 1950 to 1970, mortality rates dropped an astonishing 3% per year (Lees et al., 2016).

The Pap test began as a method of screening in which a sample of cells is taken from the cervix and placed on a slide for microscopic evaluation (Lees et al., 2016). It has since evolved to what is known today as liquid cervical cytology, in which the sample is placed in a preservative liquid and then is sent for pathology evaluation (Lippincott Procedures, 2017). The cells are observed for any changes that could be precancerous and are evaluated for maturity, morphology, and metabolic activity (Lippincott Procedures, 2017). These results are then sent to the provider noting the presence, if any, of abnormal cells as well as type of cell that is found. The type of abnormal cell noted helps the provider determine which risk category the patient falls into and to determine future follow-up. Despite the success of annual cervical cytology testing, the test itself was found to be a poor predictor of future cervical cancer (Lees et al., 2016). Pap testing has been identified to have a specificity of 98% with a sensitivity of only 51% (Lees et al., 2016). To account for its high false negative rate, annual screening was necessary in order to continue to drive down cervical cancer rates (Lees et al., 2016).

In an effort to identify improved screening practices, scientists began investigating the causes of the dysplastic changes that were occurring in cells, and in 1976 a causative effect between infection with the virus human papillomavirus (HPV) and dysplastic changes in cervical cells was found (Cox, 2009). In 1983, Dr. Harald zur Hausen isolated the high-risk HPV strain, HPV 16 and later HPV 18, which are now known as the strains that account for up to 70% of cases of cervical cancer (Lees et al., 2016). Twelve additional high-risk strains have since been identified, adding up to a total of 14 strains that are tested for in current high-risk HPV testing (Lees et al., 2016).

Once HPV was identified to be the cause of cervical cancer development, the focus shifted to determining what this meant for screening guidelines. In the late 1980s, there were two simultaneous landmark studies done that investigated the role of HPV testing in routine screening (Cox, 2009). Once the Food and Drug Administration approved the first test for HPV, ViraPap, it was used in a trial in conjunction with repeat Pap and colposcopy in patients who had been referred to colposcopy following abnormal Pap results at a student health center (Cox, 2009). Of the 482 patients who had been referred for colposcopy, only 262 (54%) would have required colposcopy using the criteria of either a positive HPV test or abnormal cytology instead of the presence of atypical cells alone (Cox, 2009). For study participants with an abnormal finding of atypical squamous cells of undetermined significance, using HPV testing to determine the need for colposcopy would have further reduced the total procedures necessary to 178 of the original 482 (37%), while still maintaining a clinically low rate of missing cervical intra-epithelial neoplasia (Cox, 2009). At the completion of Cox's study, it was identified that HPV testing could be used in conjunction with Pap testing, referred to as co-testing, to safely determine whether colposcopy is necessary (Cox, 2009).

While HPV has been exclusively linked to cervical cancer, not all HPV infections lead to cancer and many do not need to be treated. Up to 90% of HPV infections will clear spontaneously within one to two years of initial infection (Lees et al., 2016). The HPV infections that persist or that are associated with certain cervical cytology changes now allow providers to use past screening results in conjunction with current results to place patients into risk categories and determine appropriate follow-up based on level of risk (Lees et al., 2016). The current American Society for Colposcopy and Cervical

Pathology (ASCCP) guidelines are based on these factors, among others, and give a thorough, yet complicated, series of follow-up and routine screening recommendations.

The use of co-testing, cervical cytology combined with high-risk HPV testing, was first implemented into the algorithm for the management of atypical squamous cells of undetermined significance (ASC-US) (Cox, 2009). This category of results was the most common abnormal finding from Pap testing and led to a high number of unnecessary colposcopies that resulted in normal findings (Cox, 2009). On the other side of this issue, ASC-US is associated with a higher risk of future development of cervical intraepithelial neoplasia, leaving providers in need of a way to determine which patients with a finding of ASC-US required further evaluation (Cox, 2009). Further research supported using HPV testing to triage ASC-US results into those who required treatment and those who were likely to resolve without intervention (Cox, 2009). In 2012, both the ASCCP as well as the American College of Obstetrics and Gynecologists released guidelines incorporating HPV genotyping into the long-standing solitary Pap testing guidelines and decreased the frequency of screenings for certain low risk groups (Cox, 2009).

> The advantages of these new guidelines were significant: fewer and more targeted screenings without fear of increased numbers of late stage cervical cancer. The savings associated with these new guidelines might not only be in healthcare expenditures, but in the time spent on unnecessary screening in an era where widespread shortages of primary care providers exist. (Boone, Lewis, & Karp, 2016, p. 261)

Emerging research is focusing on the role of high-risk HPV testing alone as primary screening (Lees et al., 2016). In 2014, the United States Food and Drug Administration approved the first HPV genotyping test for primary screening of cervical cancer in women 25 years or older (Baker, 2017). The ASCCP, among other organizations,

released amended guidelines that allowed for the option of HPV genotyping alone for routine screening in certain populations (Baker, 2017). Many countries around the world have already made the move to fully utilize primary HPV testing to screen the population either for all patients or for certain populations based on age and geographical location (Baker, 2017). These include the Netherlands, Denmark, Sweden, and Italy (Baker, 2017). Additionally, the discovery and manufacture of the HPV vaccine that vaccinates against several strains of HPV, including the high-risk HPV 16 and HPV 18, pose further questions about the future of HPV and cervical cancer screening (Lees et al., 2016) (see Appendix A for a Cervical Cancer Screening Timeline).

If properly followed, the guidelines present an evidence-based approach to screening that limits unnecessary procedures while maintaining a low risk of missing invasive cervical cancer. The increased intervals in the guidelines are to allow for the transient nature of HPV infection and reduce the risks of over screening, with the primary risk being unnecessary procedures such as colposcopies (Cox, 2009). A literature review of 16 studies regarding psychological after effects of colposcopy found that there is an increased risk of psychological distress, particularly anxiety, following colposcopy (O'Connor et al., 2015). An additional study done in Ireland found that four out of five respondents reported experiencing at least one negative physical after affect, either bleeding, pain, or discharge, at a four-month questionnaire following colposcopy (O'Connor et al., 2015). Proper adherence to the guidelines reduces the risks associated with unnecessary procedures for patients in addition to reducing the cost, both time and money, for patients and providers (Boone et al., 2016).

In the face of rapidly changing evidence on which to base practice, there have been many changes to screening in primary care. The current set of algorithms, while evidence-based and scientifically shown to improve outcomes, are complicated and rely on a series of information, including prior cervical cytology and genotyping, in order to determine an appropriate follow-up recommendation. In addition to a complex system of determining follow-up care, there are cultural factors that influence a lack of adherence with the guidelines including fear of litigation and management of patient perceptions (Teoh et al., 2015). Finally, the move from an easy to manage system of annual screening to a myriad of follow-up options ranging from several weeks to five years with a variety of follow-up procedures necessary has led to providers, and practices as a whole, struggling to establish a notification, tracking and reminder system that will improve compliance with the recommended follow-up for both providers and patients (Dupuis et al., 2010).

Problem Statement

In a primary care organization, there was a need identified for a quality improvement project regarding cervical cancer screening. The current state was a manual tracking and reminder system for the whole practice and an opportunity for improvement in provider guideline adherence. A quality improvement project was necessary in order to assess the current state of guideline adherence and implement interventions to address any gaps identified as well as to create an improved patient notification, tracking and reminder system following screening. The problem, intervention, comparison outcome question was:

Q For providers in a primary care practice, does implementation of an educational session in conjunction with an electronic patient notification, tracking and reminder system, as compared to the usual care and tracking system in use, increase adherence to the 2012 American Society for Colposcopy and Cervical Pathology cervical cancer screening guidelines?

CHAPTER II

REVIEW OF THE LITERATURE

The literature review was divided into two categories: provider guideline adherence and patient notification, tracking and reminder systems (see Appendix B for the literature review matrix). Databases searched included Cumulative Index of Nursing and Allied Health Literature, Cochrane, Google Scholar, and PubMed databases. Articles found were rated by level of evidence as noted in the literature review table (Melnyk & Fineout-Overholt, 2015). This section is a synthesis of the literature review by category.

Provider Compliance with Recommendations

Search terms for this section of the literature review included guideline adherence and cervical cancer screening guideline adherence. The original search found over 400,000 articles. The modifiers of provider, full text available, and earliest publication date of 2007 were added to narrow the search. Articles that focused on patient compliance components and those that focused on adherence to older versions of the guidelines were excluded. Additionally, research that focused solely on adherence by providers who specialize in gynecology were excluded as the population for this quality improvement study is a primary care practice. Over 100 articles were reviewed in total. Of those, eight were included in the final literature review. A summary of these findings is included below.

In 2013, a cross sectional survey of 124 providers found that overall compliance with the guidelines was poor. Of these, 15 indicated that they were not aware that the

guidelines had changed. Sixty-three providers reported that they always comply with the new guidelines; however, of those only seven were able to correctly answer all of the knowledge-based questions on the survey. This indicates a knowledge and practice gap between what the evidence supports and what is actually happening in practice. Providers who indicated that they were not following the guidelines indicated reasons why. The most commonly cited reasons for disregarding the guidelines included fear of litigation and that their patients were demanding a different interval. The authors summarized: "adherence rates are only moderate within a single health care maintenance organization and are likely even lower in the wider health care community" (Teoh et al., 2015, p. 8).

An additional survey-based study, conducted in 2014 in Indiana, reflected similar concerns with guideline adherence. The survey used in this study was vignette-based, and findings indicated that providers were compliant with recommendations regarding when to start and stop screening. Non-compliance was found when looking at the recommended intervals for screening of those in the 21- to 65-year age range. In this study, only 18 (16.2%) of the 111 providers who responded appropriately followed the guidelines for all patient vignettes provided. In the 21- to 29-year age range 81% of providers responded with an incorrect screening interval, one that most closely aligned with the 1988 guidelines, out of date by 26 years at the time of this study. No correlation was found between age, gender, years in practice, and number of Pap smears performed per week and compliance with the guidelines. Reasons most commonly cited by providers in this survey for not adhering to the guidelines included concern for lack of follow-up and patient expectations (King, Kasper, Daggy, & Edmonds, 2014).

The largest and most current survey-based study found during the review of the literature was conducted in 2016. Nearly 5,000 surveys were sent in California with 1,268 respondents. Of these providers, 35% reported that they felt the guidelines were not clinically appropriate. Of those who did report finding the guidelines appropriate and that they were using them, only 15.3% were able to accurately recommend screening intervals for all patient scenarios given. This survey found that there were providers who were inappropriately screening women less than 21 years of age, over screening by frequency and use of HPV co-testing in the 21 to 30 age range, continuing co-testing every three years over the age of 30 when the recommendation is every five years, and 33% of providers reported continuing to screen those over the age of 65(Boone et al., 2016).
In 2015, another survey-based study was conducted that aimed to evaluate the reasons behind poor guideline adherence. Concerns offered by survey respondents regarding less frequent screening, as recommended in the guidelines, were given. Thirty six percent of providers who were not following the guidelines named patient concern about the guidelines as their primary reason for not following. Other reasons given were health system quality measures that use different criteria, not agreeing with the guidelines, risk of malpractice, and inadequate time to have a risk versus benefit discussion with their patients regarding screening (Haas et al., 2015).

In addition to research regarding provider adherence to the guidelines and reasons behind the poor adherence, the literature review discovered research regarding interventions to improve adherence. In Temple, Texas, at Baylor, Scott & White, a large primary care practice, a study assessed the impact of implementing both a provider education and embedded point-of-care reminders in an electronic health record (EHR) for

cervical cancer screening guidelines was completed (Langsjoen et al., 2015). The aim of this study was to specifically look at compliance with ordering HPV co-testing for those over the age of 30. The authors found that their intervention had little effect on the practices of providers who specialized in gynecology but that they were already highly compliant with guidelines. For family practice providers, however, "Epic (the EHR) and a training session had minimal impact on compliance with ordering HPV cotesting at the time of a Pap smear except among family practice physicians, who did significantly improve their compliance rate" (Langsjoen et al., 2015, p. 453).

The EHRs have supplied the opportunity for a new approach to increasing adherence with routine screening and care. This approach is in the form of point-of-care reminders for providers (Shojania et al., 2011). These point-of-care reminder systems are designed to help providers determine what their patients are due for during their visits and help to increase the likelihood that proper follow-up and screening are done. In a systematic review of electronic point-of-care reminder systems, it was determined that these reminder systems do show a moderate improvement in adherence to the process being studied (Shojania et al., 2011). While significant variability existed in the outcomes for the studies, a median increase of 4.2% was seen in overall process adherence with the addition of point-of-care reminders in the 28 studies included in the review (Shojania et al., 2011). The ability to utilize electronic reminder systems embedded into the EHR is one strategy that practices have implemented in order to give providers tools to adhere to best practice recommendations, including those surrounding cervical cancer screening.

An additional study supports this finding that the use of the EHR over traditional pen and paper systems has the potential to assist practices in achieving an increased

quality of care. In 2011, a cross-sectional study was done to investigate the impact of implementation of an EHR on quality of care in four different health screenings.

> Physicians using EHRs provided significantly higher rates of recommended care than physicians using paper for four quality measures: hemoglobin A1c testing for patients with diabetes, breast cancer screening, chlamydia screening, and colorectal screening. (Kern, Barron, Dhopeshwarkar, Edwards, & Kaushal, 2012, p. 500)

Per the updated guidelines, those under the age of 21 do not require cervical cancer screening. This is one population within the guidelines that has significantly lower adherence than others (Lozman, Belcher, & Sloand, 2013). A small quality improvement project was done at a pediatric primary care office. The intervention in this study was a 30-minute educational session for all eight providers at the practice on the cervical cancer screening guidelines. Data analysis consisted of pre- and post-intervention chart reviews comparing adherence to the guidelines before and after the education. The number of unnecessary Pap tests done according to chart reviews in the six months prior to the intervention was 29. In the six months following the educational session, only two unnecessary Paps were done. “This small QI [quality improvement] project suggests that tailored educational sessions that allow for discussion may be beneficial in improving provider adherence to CPGs [clinical practice guidelines]” (Lozman et al., 2013, p. 586).

Notification, Tracking and Reminder Systems

The second part of the literature review focused on patient notification, tracking, and reminder systems. The same databases as mentioned above were searched using the terms test results notification, tracking and reminder systems, and patient notification. A substantially lower amount of literature exists in this area. Approximately 50 articles

were reviewed for this section and of those, eight were included in the final literature review.

In addition to difficulty in determining appropriate screening intervals and follow-up, providers and practices are faced with a need for a notification, tracking and reminder system that can manage the intricacies of clinical decision making and need for follow-up care that accompany cervical cancer screening. Patient notification of testing results is an important component of both quality and safety. In 2001, a report was prepared for the Agency for Healthcare Research and Quality (AHRQ) analyzing patient safety factors. One section of this report was in regard to critical results notifications, specifically notification of abnormal cervical cytology results. The study referenced in this section found that use of a form letter to notify patients was shown to decrease the amount of patients with cervical intraepithelial neoplasia lost to follow-up from 23% of patients lost to follow-up in the control group with standard notification practices to 0% lost to follow-up in the group sent the form letter (University of California at San Fransisco (UCSF)—Stanford University Evidence-based Practice Center, 2001). According to this AHRQ report, "One of the most distressing safety issues of the clinical encounter is the failure to follow- up on diagnostic tests, particularly when a patient is not notified of an abnormal result" (University of California at San Fransisco (UCSF)—Stanford University Evidence-based Practice Center, 2001, p. 482). This was the only study the AHRQ was able to find regarding patient notification of abnormal results that met inclusion criteria; however, despite the lack of strong evidence regarding notification systems, it remains necessary for practices to have systems for notification of test results. Additionally, in 2013 a study was done that examined patients' understanding of their cervical cytology

results and recommended follow-up (Slone et al., 2015). According to this study, as many as 35.3% of patients misunderstood their follow-up recommendations as verbally given to them by their provider. The EHR provides valuable tools in the realm of patient notification; however, provider and support staff comfort with the use of the EHR provide a limitation to its usefulness.

> The (electronic medical record) EMR shows great potential to assist health care providers in the areas of result interpretation, patient notification of test results, and documentation of the follow-up plan; however, there must be an understanding of the use. The clinician survey found lack of clinician confidence in using the EMR. Increased familiarity with the functions available for test results reporting in the EMR and increased use of these features could add standardization, efficiency, and confidence in the test results management process. (Sullivan & Smolowitz, 2013, p. 123)

Recommendations for patient notification systems have been discussed; however, an important aspect of follow-up remains to be addressed. Practices and providers need a system to track patients and remind them to follow up at an appropriate interval based on findings of their cervical cancer screening. The American College of Obstetrics and Gynecologists (2012) published a committee opinion entitled, Tracking and Reminder Systems, that speaks to the concerns around failures that can occur in ineffective systems:

> Failure to follow up may cause delayed or missed diagnoses or treatment, which may result in an adverse patient outcome and potential liability for the health care provider. Failure to follow up on laboratory results has been identified as one of the leading causes of lawsuits in the outpatient setting. (p. 1)

Electronic health records open the door to more efficient tracking systems than the pen and paper systems that existed prior to the wide spread use of EHRs. Researchers at the Boston University School of Medicine implemented a quality improvement process in which they embedded a patient tracking system into their EHR (Dupuis et al., 2010). Following implementation of this program, they were able to decrease their mean time to

diagnostic resolution of all abnormal results over a two-year period from 108 days to 86 days (Dupuis et al., 2010). An additional study done at the University of Minnesota implemented a centralized tracking system for cervical cancer screening results. Following implementation of this EHR-based system, the system saw a 63.86% reduction in unnecessary Pap smears done in patients less than 21 years old (Teoh, Fall, Beitelspacher, & Lais, 2012).

Despite the benefits of a patient tracking system embedded into the EHR, use of this tool continues to fail to realize its potential. A 2013 survey-based study found that less than half of the providers surveyed utilized the EHR to determine if patients had completed ordered tests. In this same study, 80% of providers reported that they were either not using the EHR to its full potential or were unsure about their use of the EHR and whether it could be utilized more extensively (Sullivan & Smolowitz, 2013). A reliable system for tracking and managing follow-up recommendations can serve to improve clinical outcomes and reduce liability for healthcare organizations (The American College of Obstetrics and Gynecologists, 2012). Furthermore, a 2016 study found that despite increased adoption of EHRs, system support for cervical cancer screening continued to be inadequate. This study found that only 16.4% of providers surveyed reported having an automated system in place to notify them of patients overdue for cervical cancer screening, and only 17.6% reported having a system in place to track follow-up after receipt of abnormal test results (Schapira et al., 2016).

In addition to an accurate and reliable patient tracking system, practices need a process for reminding patients to follow-up at appropriate intervals. Accurate and timely follow-up reminders have been shown to increase patient compliance with follow-up

recommendations (The American College of Obstetrics and Gynecologists, 2012). A 2017 Kaiser Permanente study used focus groups to assess patient preferences in terms of follow-up reminders for cancer screenings. The researchers found that a personalized reminder letter, sent no more than three months prior to when the patient is due for screening, was preferred by the majority of study participants (Brandzel et al., 2017).

Theoretical Framework

The theoretical framework for this quality improvement project is Donabedian's quality improvement model. This model was created by physician Avedis Donabedian and was first published in 1966 (Donabedian, 2005). Donabedian is widely renowned as the father of quality improvement in medicine as it is known today (Ayanian & Markel, 2016). His work has been used to establish quality indicators for organizations such as the Institute of Medicine and is one of the most frequently cited works in the public health literature over the last 50 years (Dupuis et al., 2010). Donabedian (2005) provided a framework of three lenses through which evaluation of quality can be performed. This framework can be applied to the problem of cervical cancer screening guideline adherence and provider compliance in order to assess the opportunities for improvement and methods to address these.

The first lens that Donabedian (2005) gave to view quality through was the lens of outcomes. Outcomes are a common way of assessing quality of care provided. They are generally concrete, are easy to validate, and can be measured. While Donabedian supported the power of outcomes as one method of assessing quality, he listed several limitations to this measure as well. Among these are the relevancy of chosen outcomes, ability to control other factors that relate to outcomes than the one being observed, and

length of time that needs to transpire before some outcomes can be evaluated. For the purpose of this project, the outcomes of following the evidence-based guidelines for screening are well substantiated and known to decrease mortality as a result of cervical cancer (Lees et al., 2016). Additionally, establishment of patient tracking and reminder systems have shown to increase patient compliance with follow-up recommendations (The American College of Obstetrics and Gynecologists, 2012). Furthermore, the time frames associated with follow-up for cervical cytology restrict the feasibility of evaluating patient follow-up for this project. With widespread agreement on the effect of timely evidence-based screening with appropriate follow-up, patient outcomes will not be evaluated in this project.

The second lens that Donabedian (2005) spoke to was to evaluate the process of how care is provided. On evaluation of process, Donabedian stated: "One is interested not in the power of medical technology to achieve results, but in whether what is known to be 'good' medical care has been applied" (p. 694). This arm of quality evaluation looks at the provider's skill and knowledge, completeness of the physical examination, appropriateness of further evaluation decisions, provision of appropriate preventative care, among other factors (Donabedian, 2005). The process evaluation for this project revealed a need for assessment of the provider's knowledge and practice gaps and an educational strategy aimed at addressing these.

The final lens that Donabedian (2005) gave was the lens of structure. Structure evaluation includes reviewing the administrative, facility, and equipment factors that affect quality. The implementation of the notification, tracking and reminder system is aimed at addressing an identified structural gap. This system will give providers a

convenient system for managing follow-up communication and reminders aimed at increasing patient follow-up compliance and reducing liability of the organization associated with ensuring proper follow-up is provided.

CHAPTER III

METHODS

Project Plan

Following the review of the literature and an analysis of the current state, the project plan was established. The following chapter is a review of the project plan including the project objectives and evaluation plan, resources needed, a timeline, and an analysis of the congruence of the project plan with the organization's objectives. The project plan is divided into two phases. (see Appendix C for an infographic of the project plan).

Phase One

Phase One focused on the preparation for Go Live for the patient notification, tracking and reminder system and gathering of pre-implementation data. A survey was distributed to providers to assess perceived barriers to adherence as well as current knowledge regarding the American Society for Colposcopy and Cervical Pathology (ASCCP) guidelines (see Appendix D for a sample survey). This survey was modified from a survey created jointly by the Agency for Healthcare Research and Quality (AHRQ), National Cancer Institute, and Centers for Disease Control: "National Survey of Primary Care Physicians' Cancer Screening Recommendations and Practices" (National Cancer Institute, 2006). The breast cancer screening questions were removed, and clinical vignettes were updated to reflect changes in the guidelines since the survey's creation in 2006. Additional sections were added in order to evaluate provider demographic

information and the structure and process components not addressed in the survey in its original form. This survey has been modified several times by the named agency to make it applicable to a variety of cancer screenings, thus further information regarding the validity of the tool was not available (National Cancer Institute, 2006). The survey was reviewed by the Doctor of Nursing Practice (DNP) project chair, physician chair on the project committee, and medical director of the practice prior to distribution.

The modified survey contained 18 total questions and was divided into three sections. Question types included multiple-choice, select all that apply, Likert scales, and free text. Section A contained demographic data about the respondent. This demographic data included information such as the provider's age, gender, years in practice, credentials, approximate number of patients, percentage of those patients who are female, and average number of patients screened for cervical cancer annually. Questions in this section included four multiple-choice questions and two free text questions. This information was used in aggregate form for data analysis and trending.

Section B focused on evaluation of the process components of this project. Questions were in regard to the provider's current guideline preference, trust in the evidence behind the guidelines, a series of patient vignettes in which the provider indicated what the initial screening and recommended follow-up would be, and a question regarding possible barriers to guideline adherence. One question had a Likert scale response. Three questions were in a multiple-choice format. One question was a select all that apply.

Section C focused on the structure component of the project and included whether the practice had the following processes in place: patient notification of abnormal results,

provider reminders when screening is due, patient reminders when screening is due, and a tracking system to identify patients who have not followed up as recommended. There was also a question regarding whether the provider used any resources to assist in determining follow-up recommendations based on the guidelines. Four of these questions were in a select all that apply format and one question was multiple-choice. Finally, there was a free text section that allowed the provider to add any additional information about cervical cancer screening that they felt was important.

The pre-implementation survey had 12 respondents of the total 48, for a 25% rate. The post-implementation survey had 10 respondents of the total 35 eligible providers, for a response rate of 28.5%. Upon receipt of the survey results, the responses were evaluated to determine the current state of knowledge and compliance barriers at the practice. An evidence-based presentation was then presented giving the history of, and evidence behind, the guidelines as well as methods and resources for addressing any identified barriers to guideline adherence. This presentation was customized based on the survey results in order to best address the barriers to guideline adherence at this practice. The provider educational session aimed to address the process component of this quality improvement project (Donabedian, 2005) (see Appendix E for an outline of the educational session).

Additionally, during this phase of the project, the final planning and creation of training materials for the patient tracking and reminder system was completed that worked to address the structure component of the quality improvement project (Donabedian, 2005). The author worked with the electronic health record (EHR) specialist and the medical director to establish the staff who would maintain the patient

notification, tracking, and reminder system. A group of nurse leaders in the organization was chosen to pilot managing the notification, tracking and reminder system and formed what was referred to as the Pap pool.

These nurse leaders served as advisors during the creation of this process as well. The existing reminder system, as well as the point-of-care reminder system that was available in the EHR, was utilized for this process. Letter templates and templated phrases were created during this phase and were embedded into the EHR for an efficient process of notifying and reminding patients. Training was also provided to the nurses and support staff who managed the Pap pool.

The final process that was created involved the provider indicating the findings and the recommended follow-up and routing this note to the Pap pool in the EHR. The Pap pool nurses who managed the pool then took the result note and notified the patient. All abnormal results notifications occurred verbally by telephone, followed by a form letter sent through either the patient portal or by mail. Literature on patient notifications has identified that patients are more likely to misunderstand follow-up reccomendations when given verbally and that the use of a form letter has been found to increase patient compliance with the recommendations (Slone et al., 2015; University of California at San Fransisco (UCSF)—Stanford University Evidence-based Practice Center, 2001). Patient notification letters were created using plain language definitions of the cervical cancer screening findings as well as the reccomended follow-up and instructions for the patient on how to schedule the appointment or notify the practice if deciding to follow-up elsewhere.

Following notification of the patient, the Pap pool nurse then updated a report in the EHR called the Pap track report. This action updated the point-of-care reminder system embedded into the EHR. The nurse then placed a "tickler," an electronic reminder embedded into the EHR, for the Pap pool that would alert the month that the patient is due to repeat their screening. In the future, when this tickler alerts the Pap pool nurse, the nurs will then check the patient's chart to identify if she hase completed or scheduled a follow-up screening. If she has, the chart is closed out. If she has not, the Pap pool nurse will send the patient a reminder letter to follow-up and set another tickler for a month out. This reminder letter will be sent no more than a month prior to the reccomended follow-up, as this time frame was found in the evidence to be the most effective (Brandzel et al., 2017). A second, and then third and final, reminder letter are then sent using the same process before the chart is closed out.

Phase Two

During this phase, the presentation was presented to practice providers. This presentation included education on the history of the guidelines and evidence supporting their implementation as well as training on the use of the patient tracking and reminder system and available EHR support and tools. (see Appendix E for an outline of the educational session). Additionally, training for the nursing and support staff was completed. Each clinic received the educational session and then began utilizing the new process immediately after completion of this session.

Following implementation of these interventions, patient charts were monitored for guideline adherence using the chart audit form that can be found in Appendix F. The chart audit form was created by the researcher and was divided into two sections. The

first section evaluated guideline adherence, and the second evaluated process adherence with the new notification, tracking and reminder system. The initial pre-implementation survey was again sent to the providers as a posttest to identify any change in perceived barriers and any change to knowledge of proper follow-up and management using the vignette scenarios.

Objectives

For this DNP project, the following objectives were planned: Objective One, improve provider adherence to the 2012 ASCCP guidelines and Objective Two, implement and evaluate an electronic patient notification, tracking and reminder system.

Objective One: Improve Provider Adherence to the 2012 American Society for Colposcopy and Cervical Pathology Guidelines

This objective was evaluated through two different data sources. The first was through analysis of pre- and post-implementation surveys. The survey questions that were used for evaluation of this objective were B1-5 and C3. Descriptive statistics were used including age ranges, provider characteristics, and patient populations seen. These were compared to overall guideline compliance to evaluate for any potential trends. The question with the Likert scale response was evaluated and pre- and post-intervention results were compared to determine impact. The patient scenarios were marked as correct or incorrect based on the 2012 ASCCP recommendations and were expressed as the percent correct and compared pre- and post-intervention. Any selections that met either the recommended or acceptable responses as stated by the ASCCP guidelines were marked as correct. Additionally, if any providers followed the updated 2015 guidelines

regarding primary human papillomavirus (HPV) testing, these were marked as correct as well (ASCCP, 2014). Question B5 regarding perceived barriers was analyzed by percentage of providers who responded indicating each given option as a barrier to implementation and was again compared pre- and post-intervention. Due to limited sample size for the survey, parametric data analysis was not feasible. The Mann Whitney U test was used to account for the small sample size in order to compare pre- and post-intervention changes.

The second source of data was in the form of chart reviews (see Appendix D for sample chart review form). A report was run on all patients who had cervical pathology results during the six months leading up to implementation and following implementation until the end of the data collection period. A representative 20% were reviewed to determine whether the follow-up was congruent with the 2012 ASCCP recommendations. Questions 1 and 2 were expressed in terms of percentage correct out of the charts reviewed and were again compared pre and post intervention. As there was a larger sample size for chart audits, the two-tailed *t*-test was used to evaluate pre- and post-intervention findings.

Objective Two: Implement an Electronic Patient Notification, Tracking and Reminder System

This objective was evaluated using chart audits (see Appendix F) and the survey as well. To evaluate this, the researcher reviewed charts for adherence to the implemented process. In order to assess the impact of this quality improvement project, pre- and post-survey responses were also evaluated that looked at barriers to guideline adherence. Specifically, the survey questions of C1, C-2, C4, and C5 were compared pre-

and post-implementation in order to evaluate effectiveness of the quality improvement project from the provider's perspective. These questions were evaluated in terms of percentage of providers who indicated in the affirmative that there is a process in place for each question. Again, the Mann Whitney U test was used to compare pre- and post-data to account for the low sample size. For the chart audits for this section, there is not comparison data for this as this is a new process that is being evaluated. Data are presented in terms of overall adherence with the process. Questions 3 through 5 are expressed in percentages that are completed correctly in accordance with the new process.

Congruence with Organization Objectives

The study site was a primary care clinic with multiple office locations in northern Colorado that was founded in the 1960s. It is structured as a patient-centered medical home and accepts multiple private insurances as well as Medicare and Medicaid. As a patient-centered medical home, the practice proposes that their care emphasizes improving and maintaining healthy lifestyles through evidence-based care. Objective One, regarding improving provider compliance with the 2012 ASCCP guidelines, aligns closely with this statement. The guidelines are evidence-based and proper management of cervical cancer screening helps patients strive to maintain health. The practice also focuses on the experience of the patient seeking care there and in ensuring consistent and thorough communication occurs. Objective Two, which focuses on the patient notification, tracking and reminder system, aligns well with the practice's strategy of providing peace of mind to patients by ensuring that communication regarding their cervical cancer screening is clear and consistently delivered.

Timeline of Project Phases

The project proposal was approved in early spring 2018. Following successful defense of the proposal and the University of Northern Colorado's Institutional Review Board approval (see Appendix G), the survey was distributed to providers in November 2018. The initial survey was given to providers with a two-week window given for responses. At the completion of the survey cycle, the results were reviewed, and information on evidence-based screening guidelines and available resources was presented to practice providers using the survey results to identify areas of focus for the quality improvement project and educational session. Two weeks following the presentation, the same survey was sent again to providers for post-implementation evaluation purposes.

During this timeframe, training materials were created for providers and nursing staff. Additionally, EHR modifications were made including building dot phrases, letter templates, and creation of an electronic nurse pool entitled the cervical cancer screening pool, referred to in this project as the Pap pool. Following the creation of these materials, training was provided to nursing staff during leadership meetings. Additionally, each clinic received an educational session over the lunch hour for providers. After each office received the provider educational session, the process went live. Following the Go Live at each clinic, chart audits occurred. A 20% representative population of all patients with cervical cytology ordered was audited in order to measure compliance with both the process and the cervical cancer screening guidelines.

Resources

As this project focused on using resources that already existed within the system, the resource need was low. The largest resource was the time to train staff and for their participation in the project. The approximate time for training on the notification, tracking and reminder system was one hour for the nurses at the clinics. The nurse managers also met with the researchers for a total of approximately four hours to discuss creation of the new process. The time expense for providers was a one-hour educational and training session in addition to an estimated 30 minutes to answer both the pre- and post-survey.

Other resources needed were support of stakeholders. These included the practice's medical director, nursing support staff, and the electronic health record specialist. Additionally, there was a limited cost for copying and handouts to be provided to the support staff and providers. Most clinics chose to provide lunch for the provider educational session as well. The final resource needed was the time of the researcher as well as travel back and forth to the clinical sites.

Ethical Considerations

In order to protect study participants, Institutional Review Board approval was obtained prior to beginning any research. The largest ethical consideration with this project was protecting the anonymity of the providers participating in the survey. Survey participation was voluntary, and there were no repercussions for choosing not to participate. An introduction letter (see Appendix H) and consent form were sent with each communication regarding the survey informing participants of the purpose of the project, nature of the survey, and notification that participation was voluntary and could

be withdrawn at any time. The practice medical director distributed the survey link via e-mail. All information provided in the surveys was presented in aggregate form and contained no identifying information for the provider. All data collected from chart audits were free of identifying information for both patients and providers, and no patient information was stored externally outside of the EHR.

Statement of Mutual Agreement

The statement of mutual agreement designates the agreement between the practice and the researcher regarding the project (see Appendix I for the statement of mutual agreement).

CHAPTER IV

RESULTS AND OUTCOMES

Following Phase I and II of the project, data collection was completed in order to evaluate the effectiveness of the project plan related to the objectives identified. There were two sources of data utilized for review: the provider survey and retrospective chart audits. The chapter presents an analysis of the results and outcomes for each project objective.

The pre-implementation survey was sent to the entire practice and had 12 respondents of the total 48 included providers for a response rate of 25%. Two providers partially completed the survey. The partial responses were included in the data presented up through the questions that were completed. The post-implementation survey was sent to a representative group of six of the total nine clinics that had gone live at the time of data collection. The post-implementation survey had 10 respondents of the total 35 included for a response rate of 28.57%. Refer to Table 1 for demographic data of both pre- and post-intervention survey respondents.

Table 1

Survey Respondent Demographic Data

Demographic	Pre-intervention		Post-intervention	
	n	%	*n*	%
Surveys distributed	48	100	35	100
Surveys returned	12	25	10	29
Provider type				
MD/DO	8	67	9	90
PA	4	33	1	10
NP	0	0	0	0
Age				
< 50	4	33	3	30
35-50	4	33	5	50
< 35	4	33	2	20
Gender				
Male	3	25	5	50
Female	9	75	5	50
Years in practice				
< 5	4	33	2	20
5-10	0	0	2	20
10	8	67	6	60

Note. MD/DO = medical doctor/doctor of osteopathic medicine; PA = physician assistant; NP = nurse practitioner.

Additionally, providers were asked about the populations of patients they see including age, gender, and volume of screening they complete annually. For age of the patient, the providers were given the options of under 18, 18 to 39, 40 to 64, and > 65 and asked to estimate the percentage of patients in each age category that they see in practice. A breakdown of the age distribution of patients can be seen in Table 2. For the pre-

intervention responses, on average, 61.5% of patients seen by the providers were female and post-intervention, 58.7% were female. Question 7 was in regard to the frequency that cervical cancer screening was done by provider. Pre-implementation, one provider (8%), indicated doing only one to 10 screenings annually. Two (17%) indicated that they do 11 to 20 screenings annually. The remaining nine (75%) indicated that they do > 20 screenings per year. The post-intervention survey indicated that the providers who responded all completed > 20 screenings per year except one who indicated doing 11 to 20 screenings annually.

Table 2

Patient Age Estimation as a Percent of Whole Patient Population

Patient age	Pre-implementation		Post-implementation	
	M (%)	*SD*	*M* (%)	*SD*
< 18	19.17	5.34	19	4.96
18-39	25.42	5.19	28.13	14.38
40-64	30.83	8.37	30.63	10.5
65	22.92	10.30	21.88	12.8

The two survey distributions had similar response rates. Overall demographics were similar as well. The post-intervention survey had a higher percentage of doctors who responded and less Physician Assistants than the pre-intervention. There was also a higher percentage (50%) of provider responses from those who were 35 to 50 years old

versus the pre-intervention survey with an equal distribution in all age categories. Post-intervention, survey respondents were equally divided with 50% being male and 50% being female. The pre-intervention survey had a higher (75%) proportion of male respondents to females (25%). Finally, the distribution for years in practice remained with the highest percentage being > 10 pre- and post- intervention (67% and 60%, respectively). The pre-intervention survey had no respondents in the 5 to 10-year range of years of practice whereas the post-intervention survey had two. For patient populations seen, the post-intervention group was very similar to the pre-intervention group for both patient age and overall percentage of female patients seen.

The second method of data collection, chart audits, was completed on a representative 20% of total charts for patients who had cervical cancer screening completed during the time frame. Pre-implementation audits were collected from June 1, 2018, to December 1, 2018. Post-implementation audits were done following completion of the roll out at a representative six of the total nine clinics in February 2019 through March 11, 2019.

Objective One: Improve Provider Adherence to the 2012 American Society of Colposcopy and Cervical Pathology Guidelines

Provider Survey

For Objective One, questions B1 through B5 and C3 were evaluated.

B1. How effective do you believe the following screening procedures are in reducing cervical cancer mortality in average-risk women? For each of the following options, Pap test alone, human papillomavirus (HPV) genotyping with Pap test, and HPV testing as primary screening (without Pap test), respondents were asked to indicate their

perceived efficacy using the Likert scale options of very effective, somewhat effective, not effective, and effectiveness not known.

Both pre- and post- intervention surveys indicated that providers, on average, felt most confident with Pap testing with HPV co-testing. This is the testing most supported by the guidelines. In the pre-intervention survey, 83.33% of providers indicated that they felt this method of screening was very effective and, following the educational session, 100% of providers chose this option.

The guidelines also give options for primary HPV screening. A brief discussion of the evidence supporting this recommendation was given in the provider educational session. The pre-intervention survey indicated that five providers (41.67%) believe this method of screening to be very effective, three (25%) indicated that they believe it is somewhat effective, two (16.67%) indicated that they believe that it is not effective, and the final two (16.67%) indicated that they did not feel the efficacy of this method of screening was known. Following the educational session, 60% of providers responded that they believe primary HPV testing to be very effective, and 40% responded that they believe it to be somewhat effective. No providers chose the not effective or effectiveness not known options.

B2. In your clinical practice which cervical cancer screening guidelines do you follow? The majority of the providers, eight (66.67%), selected that they were following the American Society of Colposcopy and Cervical Pathology (ASCCP) guidelines, while two (16.67%) indicated that they were following the United States Preventative Task Force Services guidelines. The final two (16.67%) indicated that they were following the American College of Obstetricians and Gynecologists guidelines.

Following the educational session, seven providers (87.5%) indicated that they were following the ASCCP guidelines. One provider (12.5%) indicated following the United States Preventative Task Force Services guidelines. Two did not respond to this question.

B3. Assume that the following asymptomatic female patients present for a routine visit in your office. What would you be most likely to recommend for cervical cancer screening at this visit? Respondents were asked to identify screening procedure and interval. Screening procedure options: Pap, Pap + HPV testing, HPV testing alone, none, and other: (comment). Follow-up interval options: annually, every three years, every five years, none, and other: (comment). See Table 3 for survey findings for this question.

The following scenarios are from the survey:

A. An 18-year-old who had sexual intercourse for the first time one month ago and is presenting for her first gynecologic visit: For this vignette, the correct answers would be none for both the screening procedure and interval, as this patient should not be screened for cervical cancer due to being under the age of 21.

B. An 18-year-old who first had sexual intercourse three years ago and is presenting for her first gynecologic visit: For this vignette, the correct answers would be none for both the screening procedure and interval as well for the same reason listed above.

C. A 21-year-old who has received the entire HPV vaccine series: The correct answers for this vignette are cervical cytology and every three years. Current guidelines do not change screening intervals for patients who have been vaccinated against HPV.

D. A 25-year-old who has no history of abnormal Pap smears: The correct answer for this vignette is also cervical cytology every three years.

E. A 35-year-old who has had three consecutive negative Pap tests performed by you: The correct answer for this vignette is co-testing (Pap and HPV testing) every five years.

F. A 35-year-old whose cervix was removed last year during hysterectomy for symptomatic fibroids: The correct answer for this question would be none for both screening test and interval as this patient has had a hysterectomy with removal of the cervix for a non-cancer related reason.

G. A healthy 66-year-old who has had three consecutive negative Pap tests performed by you; the last was a co-test three years ago which was negative for HPV as well: The correct answer for this vignette is none as screening recommendations are that screening complete at age 65.

H. A healthy 66-year-old who has not had routine screening for cervical cancer since her mid-30s: This question was excluded from data analysis and from the post-intervention survey as it did not contain the necessary option of once for the follow-up interval options.

Table 3

Question B3: Screening Scenarios

Scenario	Pre-implementation			Post-implementation		
	n	Correct	Incorrect	*n*	Correct	Incorrect
A	12	11	1	10	10	0
B	12	11	1	10	10	0
C	12	12[a]	0	10	10	0
D	12	12[a]	0	10	10	0
E	12	10[a]	2	10	10	0
F	11	10	1	10	10	0
G	11	11	0	10	10	0

[a]Some responses did not indicate the interval but did indicate the correct screening method.

B4. You receive the following results on the following patients. What is your follow-up recommendation? Respondents were asked to indicate their recommended follow-up procedure and interval. Procedure options: repeat Pap cytology, reflex HPV testing, Pap + HPV testing, colposcopy, and other: (comment). Interval options: immediate, one year, every three years, and every five years.

The following scenarios are from the survey:

A. A 21-year-old with result of atypical squamous cells of undetermined significance (ASC-US) with no prior screening. The acceptable answers for this vignette are reflex HPV testing immediately or repeat Pap in one year.

B. A 22-year-old with results of low-grade squamous intraepithelial lesion with no prior screening. The acceptable answer for this question was a repeat Pap test in one year. The reflex HPV test is indicated by the guidelines to be acceptable for ASC-US only.

C. A 25-year-old with result of ASC-US with prior negative Pap. There were two acceptable options for this vignette: reflex HPV immediately or repeat Pap cytology in one year.

D. A 31-year-old with result of negative cytology and HPV, prior result low-grade squamous intraepithelial lesion. This question was excluded from data analysis and the post-intervention survey as the vignette did not provide the necessary information to indicate follow-up recommendation.

E. A 35-year-old with negative cytology but positive HPV test: HPV 16 and 18 negative. The correct follow-up for this vignette was co-testing (Pap and HPV) in one year.

F. A 38-year-old with low-grade squamous intraepithelial lesion and negative HPV test. The acceptable options for this vignette are immediate colposcopy or repeat co-testing at one year.

G. A 42-year-old with a result of ASC-US and HPV negative, prior result cytology negative, HPV positive. The correct follow-up for this vignette would be immediate colposcopy.

Table 4

Question B4: Follow-up Scenarios

Scenario	Pre-Implementation			Post-Implementation		
	n	Correct	Incorrect	*n*	Correct	Incorrect
A	11	9	2	10	9	1
B	11	6	5	10	5	5
C	11	8	3	10	8	2
E	10	9	1	10	10	0
F	10	10	0	10	9	1
G	10	0	10	10	3	7

B5. Are you following current screening guidelines on all of your patients? If no, why not? Options: yes, I am following current screening guidelines; no, I do not know the current guidelines; no, I do not think guidelines are based on good data; no, I believe I have a higher-risk population; no, my patients are requesting more frequent screening; no, I am worried about missing high grade dysplasia or cancer in the interim; and no, I am worried about being able to keep track of whether my patients complete follow-up with a longer screening interval.

Prior to the implementation of the project, eight (72.73%) of the providers who responded indicated that they are following the current guidelines. One provider (9.09%) indicated patient preference as their reason for not following the guidelines. One provider indicated other and noted recommending every three-year intervals for co-testing instead

of five but did not indicate why. Following the educational session, nine (90%) of providers indicated that they were following the guidelines. One provider indicated other and were following the guidelines except not recommending co-testing every three years in most women.

C3. Do you use any of the following resources for managing cervical cancer screening in practice? Options given: printed guidelines, website, phone or tablet application, patient handouts, other: (comment), or none of the above.

Prior to the intervention, nine providers (90%) indicated that they were using a resource of some sort in practice. One provider indicated using printed guidelines, two (18.18%) indicated that they use the ASCCP website, and six (54.55%) indicated that they use the phone or tablet application created by the ASCCP. One provider indicated that not using any resources. One provider did not answer this question. Post intervention, all providers indicated that they were using a resource of some sort in clinical practice. Six providers indicated that they were using the ASCCP application. Two providers indicated that they were using the website. One provider indicated using patient handouts. The final provider indicated using patient handouts, printed guidelines, and a reminder system managed by clinic staff.

Chart Audits

For Objective One, chart audits were done comparing guideline compliance pre- and post-intervention. A report was run to identify all clinic patients who had cervical cytology ordered during the above mentioned six months preceding the project implementation and following the educational session at each clinic until the completion of the project in March 2019. For the initial, pre-intervention chart audits, there were a total of 2,121 patients who had cervical cytology performed during the six-month window. Of these, a representative 20% of the charts were audited for a total of 425. Post-intervention, there were a total of 232 charts that met inclusion criteria, resulting in a 20% representative sample of 47 charts that were included in the auditing process. An independent *t*-test was used to compare the pre- and post-intervention findings.

Question one: Did recommended follow-up comply with either the preferred or acceptable options per the 2012 American Society of Colposcopy and Cervical Pathology guidelines? For Question one, the provider's result note in the chart was used for the audit as well as the results of cytology and prior results, if available. The patient's information was input into the ASCCP tablet application, and the appropriate follow-up was identified using all available information recorded in the patient's chart for accuracy. This follow-up was compared to the follow-up indicated by the provider in the result note. The result note is completed by the provider after receiving the results indicating that they received the results, reviewed them, and anything they would like done with the results such as patient notification and follow-up. If the provider used either the preferred or acceptable recommendations from the 2012 ASCCP guidelines or used primary HPV testing as presented in the 2015 updated guidelines by the ASCCP, the recommendation

was considered in alignment with the guidelines. Additionally, if the provider mentioned that the patient was following a different interval due to another health condition, such as immunocompromise, these charts were excluded from the audit. Each chart audited was marked as either a yes, no, or not indicated. A yes indicated that the provider recommended a follow-up interval and procedure that was in alignment with the guidelines as indicated above. A no indicated that the recommended follow-up was not in alignment with the guidelines, either by interval or procedure. A not indicated was used when the provider did not indicate when or how the patient should follow up in their result note. A two-tailed *t*-test was used to evaluate the pre- and post-intervention data for this question. See Table 5 for the findings of Question one of the chart audits.

Table 5

Chart Audits: Question One

Response	Pre-intervention (%)	Post-intervention (%)	Difference (%)	*p* value
Yes	40.71	72.34	31.63	<0.0001
No	25.18	10.64	14.54	0.0264
Not indicated	34.12	17.02	17.10	0.0176

Question two: If available, did screening interval from last screening comply with the 2012 American Society of Colposcopy and Cervical Pathology guidelines?

For Question two, a complete review of the necessary aspects of the chart was completed to gather all historical information electronically available. This included the provider's note, past pathology results, and past result notes. This information was input into the ASCCP tablet application to identify the recommended follow-up based on all information available for the most recent prior available screening result. If the current screening occurred less than 12 months either before or after the recommended follow-up time frame, the chart audit form was recorded with a yes. If the time frame fell outside of the 12-month allowance on either side of the recommended follow-up interval, a no was recorded. A no was also recorded if a different type of testing or procedure was done than what the guidelines recommended. This included use of HPV testing outside of what the guidelines recommend. If the information available was insufficient to identify when the patient was due for re-screening or re-testing, an unknown response was recorded. A two-tailed *t*-test was used to evaluate data for Question two. See Table 6 for the chart audit findings.

Table 6

Chart Audits: Question Two

Response	Pre-intervention (%)	Post-intervention (%)	Difference (%)	*p* value
Yes	39.53	40.43	0.9	0.9048
No	36.47	38.30	1.83	0.8051
Unknown	23.29	21.28	2.01	0.7566

Objective Two: Implement and Evaluate an Electronic Patient Notification, Tracking and Reminder System

Provider Survey

For Objective two, questions of C1, C2, C4, and C5 and were evaluated.

C1. Does your practice have a mechanism to remind you or other members of the care team that a patient is due for cervical cancer screening? Options given: yes, special notation of flag in patient's chart; yes, computer prompt or computer-generated flow sheet; yes, I routinely look it up in the medical record at the time of a visit, yes, other mechanism (specify), and no.

Pre-intervention, 10 providers responded to this question. Of those, six (60%) indicated that there was a provider reminder system in place. No providers selected the option of special notation of flag in the patient's chart. Two (20%) selected computer prompt or computer-generated flow sheet. Four (40%) providers indicated that they utilize a chart review to look up the medical record for each visit. One selected other and

indicated that there is a file system in place. Finally, three providers (30%) indicated that there was no mechanism in place. Two providers did not answer this question.

On the post-intervention survey, all 10 providers indicated that there was a mechanism to remind them that patients are due for screening. Eight providers (80%) indicated that they use a chart review to identify what the patient was due for. Four providers (40%) also indicated that there was an EHR point-of-care reminder of some sort in their response.

C2. Does your practice have a mechanism to remind your patients that they are due for cervical cancer screening? Options given: yes, verbal prompt from you or another member of the care team during an office visit, yes, reminder by mail, yes, reminder telephone call, yes, reminder by e-mail, yes, other mechanism (specify), no, and I don't know.

Prior to project implementation, four providers (40%) indicated that there was some form of patient reminder system in place including telephone calls, e-mails, and mailed notification. No providers selected the verbal prompt option. Three providers (30%) indicated no, and one provider (10%) indicated I don't know. Two providers did not answer this question.

Post-implementation, seven providers (70%) indicated that there was a patient reminder system in place. Options chosen included mailed reminders, patient portal message, telephone call, and e-mail, all of which were included in the new reminder process. One provider (10%) indicated that there was not a notification system in place, and two (20%) indicated that they did not know if there was one.

C4. Does your practice have a system to track patients who do not complete follow-up of an abnormal screening result? Options given: yes and no.

For the pre-intervention survey results, six providers (60%) responded yes, two providers (20%) responded no, and two providers (20%) responded I don't know. Two providers did not respond to this question. Following roll out of the new system, nine providers (90%) indicated that there was a tracking system in place, and one provider (10%) indicated that there was not.

C5. Does your practice have a mechanism to inform patients of abnormal results? Options given: yes, letter by mail; yes, telephone call; yes, e-mail message; yes, other method (specify); I don't know; and no.

Prior to the roll out of the new system, all providers indicated that there was a notification system in place and that this notification occurred via a telephone call. One provider indicated that patient's may also receive e-mail notification of results. One provider selected the other option and wrote in that a letter is sent if the patient does not answer their message. Two providers did not respond to this question. Following roll out, all providers again indicated that there was a notification system in place. On this survey, however, more options were chosen for how patients were notified included a telephone call, e-mail, and mailed notification.

Chart Audits

For the chart audits for this section, there is not comparison data for this as this was a new process that is being evaluated. Data were evaluated in terms of overall adherence with the process. Questions three through five were expressed as percentages that are completed correctly in accordance with the new process.

Question one: Was a result note placed and routed to the cervical cancer screening pool?

Question two: Was a tickler placed in the patient's system?

Question three: Was a notification letter sent to the patient?

For all three questions, nursing compliance with the process was found to be 100%. If the provider placed the result note and routed it to the Pap pool, Questions two and three in regard to the tickler and notification system were found to have been done appropriately. For provider compliance with the new process, Question one, 12 of the charts (26%) were done incorrectly and 35 of the charts (74%) were done correctly. For Questions two and three, these percentages remained the same.

CHAPTER V

RECCOMENDATIONS AND IMPLICATIONS FOR PRACTICE

The purpose of this quality improvement project was to improve provider guideline adherence through an educational system implemented alongside an updated, evidence based notification, tracking and reminder system. Following implementation of this project and collection of pre- and post-data, the results were evaluated to determine the impact of the project. The following chapter serves to outline the researcher's recommendations and implications for practice following completion of this project.

Analysis of Findings

Objective One

The quality improvement project included data collection through two sources: provider surveys and chart audits. For Objective One, the data collected were analyzed to identify any trends found in provider practice as well as to identify the effectiveness of the educational session and new cervical cancer screening management process for the clinic in improving provider compliance with the American Society for Colposcopy and Cervical Pathology (ASCCP) guidelines.

The first portion of analysis served to determine if a difference was found in provider compliance by different demographic factors. There was no statistical difference in guideline compliance for identification of appropriate screening scenarios and follow-up found between any of the demographic or practice population questions on the survey

including gender of provider, type of provider, age of provider, years in practice, percentage of female patients seen, age populations seen, or number of screenings performed annually.

The second portion of data analysis for the survey compared pre- and post-intervention findings in the context of Objective One. A shift in provider's attitudes towards cervical cancer screening practices was identified. Providers were 16.67% more likely to indicate that they felt the use of human papillomavirus (HPV) testing in conjunction with Pap testing was very effective in screening for cervical cancer. They were also 18.33% more likely to indicate very effective when referring to primary HPV testing, a method of screening that has strong support in the evidence but has not been adopted widespread in practice as of yet (ASCCP, 2014). Providers were also 20.83% more likely to indicate that they were following the ASCCP guidelines as opposed to other guidelines that exist.

For the pre-intervention survey, 83.33% of providers were able to correctly identify the routine screening recommendations (Survey Question B3) for all patient scenarios given as compared to 100% of providers on the post-intervention survey. A 16.67% improvement was found in providers' abilities to identify the correct screening interval following the intervention. Additionally, Question B4 was used to evaluate the provider's guideline adherence when indicating the suggested follow-up based on the cervical cancer screening findings. Pre-intervention, none of the providers were able to accurately recommend follow-up according to the guidelines for all scenarios. Following the intervention, three providers were able to correctly identify the follow-up for all of the scenarios. This is a difference of 10.84%. The limited sample size of this survey data

means that the Mann-Whitney U value for all data analysis exceeded that of the critical value, meaning the researcher is unable to reject the null hypothesis based on the findings from the research. This limits the ability of the researcher to make assumptions about the statistical accuracy of these results.

The second source of data for the project was the chart reviews. The two questions used in the chart review evaluated this objective according to both how the providers indicated that they would practice as well as how that knowledge translated into practice. Comparison of both sources of data found that this quality improvement project did show a statistically significant improvement in how providers indicated that they would practice and recommended follow-up screening but did not show a statistical difference in how frequently they actually performed that follow-up.

Following the educational session and Go Live of the Pap track process, providers were twice as likely ($p = 0.0176$) to have indicated what the recommended follow-up should be in their result note following receipt of the cervical cancer screening pathology and laboratory results. Additionally, providers were 31.63% ($p < 0.0001$) more likely to not only have indicated when the patient should follow-up, but to have adhered to the ASCCP guidelines in indicating their recommended follow-up.

While these results show a significant improvement in follow-up recommendations made, there was found to be no statistical difference in whether the screening performed by the provider at the current visit complied with the guidelines or not following implementation of the project. Both pre- and post-intervention, over one-third of patients had screening done that was either too early, too late, or an inappropriate test was chosen (36.47% and 38.30%, respectively). Providers were more likely to

recommend that their patients follow up appropriately but were no more likely to actually complete the screening according to the guidelines.

These findings align with research findings in the literature review. Prior to the quality improvement project, 25% of the time the recommended follow-up on the cervical cancer screening result was incorrect. No providers were able to correctly identify the appropriate screening interval and appropriate follow-up for all of the scenarios given as well. This aligns closely with findings in the literature of poor overall guideline adherence. Research utilizing educational sessions for providers as well as use of point-of-care reminders in the electronic health record (EHR) were found to have shown a moderate improvement in guideline adherence (Langsjoen et al., 2015; Lozman et al., 2013). This quality improvement project did not find this to be the case. It was not possible within the scope of this project to evaluate the impact of the reminders that were embedded into the EHR as these point-of-care reminders will not be utilized until the next time the patient is due for screening. Following the educational session, there was found to be a statistically significant improvement in guideline adherence for recommended follow-up following receipt of screening results. While this finding supports that the educational session and new system improved provider compliance with the recommendations, this did not hold true for how the providers practiced before and after the intervention. They were more likely to recommend appropriate follow-up; however, they continued to screen either too early or too late according to the guidelines.

Facilitators. The medical director and quality director served as facilitators for this objective. They assisted the researcher in developing educational materials as well as promoting provider engagement in the new process. Additionally, the office managers at

each clinic assisted in scheduling, setting up, and providing lunch for the educational sessions at each clinic. Another facilitator for this objective included the level of engagement of the providers at the practice. During the educational sessions, many providers expressed excitement and support of the new process as well as with closer adherence to the evidence-based guidelines. Finally, the availability of a robust EHR system, as well as an EHR specialist to assist with the project and report build in order to complete chart audits, were significant facilitators in evaluating objective one.

Barriers. Limitations to the data collection for evaluation of Objective one did exist. The primary limitation is the small sample size for the survey response. This small sample size limits the data analysis that can be done and the inferences that can be made based off of that analysis. In order to prevent identification of providers who completed the survey, survey responses were presented in aggregate form and did not include identifying information. This limited the analysis of the data by making it impossible to compare pre- and post-survey findings of the same provider. Also, there was no way of identifying whether providers who responded on the post-intervention survey had actually attended the educational session.

Additionally, provider comments in the survey indicated a lack of understanding of some of the questions such as references to annual pelvic exams and sexual transmitted disease screening when being asked about cervical cancer screening. Some providers partially answered the screening and follow-up questions by answering what the follow-up should be but not the interval that it should be done in. In these cases, these scenarios were marked as correct if the appropriate testing was identified.

For the chart audits, the primary limitation is the strength of the documentation. The researcher relied on prior pathology, infectious disease, health maintenance, and provider documentation to determine when the appropriate follow-up should be. If the provider was using information not documented in one of these places to determine appropriate screening follow-up, the audit may not accurately reflect the appropriate follow-up interval due to information unknown to the researcher. Additionally, for Question two, the researcher marked the chart as a no if the current screening was done at an incorrect interval regardless of the reason. Different reasons noted included lack of follow-up by the patient, inappropriate screening interval chosen by the provider, change of patient between practices, and patient requests for a different screening interval.

While this project did show an improvement in provider guideline adherence, it cannot be distinguished whether this improvement was a result of the educational session or the implementation of the notification, tracking and reminder system. The use of a smart phrase within the EHR that has pre-populated text and includes a default follow-up based on the guidelines for normal screening results as well as the educational session, both could have resulted in this improvement in follow-up recommendations found.

There are also barriers, or limitations, of the ASCCP guidelines themselves that impact the provider's ability to adhere to the guidelines. These guidelines rely heavily on past results in order to determine an appropriate screening interval. These results may be unavailable or may be given to the provider second hand from the patient without all of the necessary information known in order to make an accurate follow-up recommendation. Additionally, prior cases of failure to follow up can impact the current decision making such as a patient failing to follow up and then being seen in clinic when

they are overdue for repeat screening. Question two, which asks whether the current screening was done at an appropriate interval from the last screening, was marked as no if the screening did not occur at an appropriate interval for any reason. This finding could have been due to patient non-compliance with follow-up recommendations or provider non-compliance with the guidelines and was not specified during data collection. This limits the interpretation of these data.

Objective Two

This objective was more difficult to evaluate statistically than Objective one. The survey questions designed to evaluate provider knowledge of the notification, tracking and reminder system all remained the same or improved following the roll out of the new system. Again, sample size limits the ability to apply this finding to a broader audience. Additionally, more research would need to be done to identify whether knowledge of, and confidence in the practice's tracking and reminder system improves outcomes.

The chart audits were done in order to evaluate compliance with the overall process. Slightly over one-quarter of the charts were not done correctly by the provider according to the process. If a provider missed the educational session, they were given the tip sheet and assisted with setting up their EHR short cuts by the nurse manager following the educational session. Additionally, there was a report built into the nursing process for the Pap pool that caught charts that were done incorrectly and ensured that they didn't fall out of the new system. If a chart was identified that was done incorrectly by the provider, the provider was then contacted and reminded of the new process and the necessity of its use. Therefore, some providers were noted to do the process incorrectly initially and then begin doing it correctly, indicating they had received the education.

Further audits may identify that the provider compliance with the process increases over time.

Facilitators. The primary facilitator for this objective was the practice's robust nursing leadership team. They, in conjunction with the provider champions, assisted in development and design of the tracking and reminder system in order to ensure that it was feasible within the current resources and structure of the practice. Additionally, the support of the EHR specialist was instrumental in designing this process.

Barriers. The primary barrier to this objective was a lack of EHR build support. The practice has an EHR specialist who assisted with report writing, networking, and EHR functionality questions and served as a valuable resource during creation of the project. In order to build a new process into the EHR, however, the support of someone who is able to build functionality in was necessary. Build analysts for the EHR for this practice were shared with another large healthcare organization, which limited their availability to incorporate requested changes and answer questions as they arose, extending the length of the project overall.

Another barrier to this objective was that some providers had already developed their own system for notification, tracking and reminding for cervical cancer and were hesitant to change to the new process. Providers were provided the opportunity to ask questions and given contact information in case they identified any opportunities for improvement with the new process. Additionally, the medical director sent an e-mail in support of the new process to all providers.

The final barrier to implementation of this system was the time and resources necessary to manage the Pap pool. Throughout the design of the system, extensive

discussion occurred regarding who would be best to manage the pool and whether a smaller group of nurses should pilot running it. Ultimately, this was decided to be the most feasible approach, and the nurse managers were identified as the group to run it. Practices looking to implement similar notification, tracking and reminder systems need to look at their current support staff availability and determine whether they have the resources necessary to successfully implement this type of process. For each result sent to the Pap pool, it takes the nurse approximately 10 minutes to complete the notification and enter the patient into the Pap pool system. Additional time will be required as the patient follow-up reminders begin to appear, estimated at 10 minutes per reminder.

Unintended Consequences

An unintended consequence of this project included increased work for nursing staff at the practice. While the new process is streamlined and more efficient than the prior process, the new project involves mailed notification for normal results as well as abnormal results. This was supported as best practice by the evidence but does increase the workload of the nursing staff (Slone et al., 2015). The workload and documentation for providers has not increased with this project, and for some providers may have decreased the amount of time it takes them to follow up on results of cervical cancer screening.

Recommendations

Notification, Tracking and Reminder System

The recommendation of the researcher is that this quality improvement project be continued and possibly expanded. The literature supports the need for an effective patient notification, tracking and reminder system as well as a need for improved support for

provider compliance with the guidelines. Use of features in the EHR such as point-of-care reminders and patient reminders has been shown in other research to increase guideline compliance (Dupuis et al., 2010; Langsjoen et al., 2015; Shojania et al., 2011). While specific system features were not evaluated in this project, the recommendation would be to continue the new process that was developed and expand by possibly collecting longer term data on patient and provider guideline adherence.

In discussion with nursing leadership and several providers, there seems to be a benefit to using a select nurse pool to manage quality improvement initiatives in areas such as cervical cancer screening. As the practice continues to grow, and with the focus of reimbursement focusing on quality of care indicators, there may be room in the future to expand the role of this nurse pool to include other screenings and quality measures. This would be done as a collaboration between providers and nursing, and the process designed for this project could be used as a template with modifications made for the specific initiative being managed.

Provider Education Session

From the research findings, it is unclear whether the educational session was effective and should be continued or replicated at other practices. Increased provider guideline adherence provides an evidence-based approach to care and decreases the number of unnecessary procedures that are done, reducing cost of both time and money and lessening the risk of psychological distress to the patient from having the procedure done (Cox, 2009; O'Connor et al., 2015). Further research on effective educational strategies and methods to improve provider guideline compliance would be beneficial.

Congruence with Organization Objectives

Continuing this new system aligns with the practice's strategic model as a patient centered medical home by providing a consistent, evidence-based approach to cervical cancer screening and communication with both providers and patients. It allows for notification of patients to occur in a manner that has been demonstrated in the review of the literature to improve patient understanding of the follow-up recommendations and increases compliance with those reccomendations. Additionally, the tracking and reminder system gives the practice a well-designed tool for managing these complicated guidelines.

Project Outcomes within the Theoretical Framework

Use of the Donabedian framework for quality improvement was found to be particularly useful for this project. The three components of Donabedian's theory are outcomes, structure, and process (Donabedian, 2005). For the scope of this project, patient outcomes were not evaluated. Extensive research already exists regarding the outcomes of use of the screening guidelines (Cox, 2009). The process component of this project focused on the provider knowledge and behaviors. There was not found to be a substantial change in this component of the quality improvement model. The final component, structure, is where this project was most impactful through implementation of the notificaiton tracking and reminder system. Implementation of an electronic process, such as this, serves to improve the structural aspects of how care is provided at a practice.

Implications for Future Research

The second chart audit looked at whether the current screening was done at a correct interval from the prior screening. In collecting this data, cases of follow-up that did not comply with the guidelines were not delineated by fallouts due to provider or patient non-compliance, so future research would be beneficial to evaluate only those fallouts that occurred due to provider non-compliance. Additionally, there are many reasons for the inaccurate follow-up. The provider may have been acting on a prior result note that indicated an improper screening interval when deciding whether to screen the patient or not at the current visit. They may also be screening more or less frequently due to patient request.

Further research should be done to identify whether the identification of the correct follow-up interval, the first question for chart audits, would lead to longer term improvements in this second item being audited in the future. As the patient visits for future annual examinations and visits, the provider will see the prior result note with the correct recommendation and may be more likely to start completing the screening at an appropriate interval. For the scope of this project, charts were only audited to identify whether or not the recommendation or screening fell within the guidelines. It would be beneficial for additional research to be done to identify if there are specific screening findings or specific populations that are more likely to have an inappropriate follow-up done to assist in determining where best to focus future quality improvement initiatives.

Finally, the educational session was created based on a history of cervical cancer screening, a review of evidence supporting the guidelines, and the risks of poor guideline adherence. Further research could be done to identify which components of an

educational session are more likely to improve guideline adherence. Additionally, presenting this educational session separately from the roll out of the new system may have improved the efficacy of the educational session. Discussion about the new process may have distracted providers during the educational session.

Ongoing Evaluation

Ongoing evaluation that will need to be continued outside of the scope of this project will be monitoring provider and nurse compliance with the notification, tracking and reminder system that was designed and implemented. The use of the report that the nurses will be compiling will serve to monitor provider compliance with the process. As the process continues to be used, there will likely be identified areas of improvement for ease of use or efficiency. The nurse educator, who was instrumental in providing insight into the process design and assisting with the roll out, will continue to manage the Pap pool and assist with any modifications to the process as necessary. There may be a need to expand the number of nurses who manage the Pap pool. The nurse educator, along with the nurse managers, will expand the pool and provide additional training as necessary in order to keep the workload at a manageable level.

Application to Other Settings

This project is very applicable to other primary care practices as well as other medical disciplines such as gynecology practices. The notification, tracking and reminder system, as well as the educational session, could be replicated and implemented within the framework of additional medical care settings. The chart review and survey process could also be replicated to identify both process and structure gaps in the management of cervical cancer screening as well as other types of screenings or medical management of

certain conditions. Additionally, there exists a plethora of guidelines within healthcare. These guidelines have been created by experts in the field and are based off of evidence available regarding the most effective screening and treatment strategies. The findings of this project could be used to help identify and create further research and interventions aimed at improving compliance with other guidelines in practice.

Reflections

Through completion of this project, the researcher learned valuable lessons regarding creation and implementation of quality improvement initiatives. This included developing a project idea, completing an extensive review of the literature to determine the evidence-based intervention that will be used, developing a data collection plan, engaging stakeholders, process implementation, and analyzing results.

In regard to creating a research project and plan, the data collection portion provided the greatest learning opportunity for the researcher. The survey, while a modified version of a validated national survey, required the student to anticipate the information that would be needed to effectively evaluate the objectives identified. The student learned that surveys, while easy to build and distribute to a large number of participants, can be complicated to develop. Questions and options need to be worded in a way that the risk of an incorrect interpretation of any of them does not invalidate the results. Additionally, analyzing and interpreting the data also presented a great learning opportunity for the student who, prior to this project, had limited experience with this portion of project planning and implementation.

Finally, as a student preparing to enter practice, the most influential learning that occurred was direct observation of and conversations with numerous providers about the

use of guidelines in clinical practice. The consistent use of evidence-based guidelines gives providers the tools to provide high quality care to their patients and decreases liability on the part of the provider. There are numerous evidence-based guidelines and the research is constantly changing. As a provider, it is important to stay abreast of changes to guidelines and new research as it comes out in order to provide the highest quality care to patients. The use of resources and tools that are provided, such as the ASCCP application that the student recommended providers use, give the providers additional support and resources allowing them to practice efficiently and effectively. The student has observed and participated in care but has not directly provided unsupervised independent care in practice. Learning to develop and implement a process for which the student did not have extensive prior experience in presented some challenges. The guidance of the research committee as well as nursing and support staff at the practice were instrumental in the successful implementation of this project.

The student's current role as a nurse is in nursing leadership. This involves the analysis of problems and implementation of projects and interventions to address these. This experience served the student well in creating this project; however, key differences between implementation of a project at the nursing and provider levels were highlighted. The providers at this practice are passionate about, and take a lot of pride in, caring for their community and patients well. Medicine is both a science and an art and each provider has used their experiences to refine their craft. This project addressed the science of patient care; however, the art of it lies in conversations with patients, risk versus benefit discussions, and shared decision making that takes into consideration that not all patients fit perfectly into algorithms and guidelines. This, the art of advanced

practice nursing, is what is learned through experience and what the student will strive to hone after completion of this project and entry into practice.

Essentials of Doctoral Education for Advanced Nursing Practice

The American Association of College of Nursing (2006) delineated eight competencies that they deem essential components of a Doctor of Nursing Practice (DNP) degree. These components are found throughout DNP programs curricula as well as throughout the course of completion of the DNP Scholarly project as the final requirement of the degree. The following section outlines the eight DNP essentials in the context of the completion of this quality improvement project.

The Essentials I through III focus on the preparation of the student to practice in an evidence-based manner, identify and implement processes to improve quality of care, and pursue the development of new research. Through the development of the project plan, the student was able to integrate of these essentials into practice. The American Association of Colleges of Nursing (2006) stated the student will, "Use science-based theories and concepts to . . . describe the actions and advanced strategies to enhance, alleviate, and ameliorate health and health care delivery phenomena as appropriate" (p. 9). This was achieved through identification of the need to evaluate provider guideline adherence as well as the need for an improved notification, tracking and reminder system. Partnering with key end users in the organization, such as the nurse managers, allowed the student to exercise leadership and project management skills. Completion of the review of the literature and evaluation of the current state of practice, indicate the student's ability to fully analyze an identified problem, complete a gap analysis, design a

project aimed at improving quality of care, and collect outcomes data to evaluate the effectiveness of the project.

Essential IV focuses on the use of health information technology to assist in driving quality care. The EHR was a large component of this project, and the student gained a lot of experience in the benefits and limitations to the use of the EHR for quality improvement. Essential IV states that "Demonstrate the conceptual ability and technical skills to develop and execute an evaluation plan involving data extraction from practice information systems and databases" (American Association of Colleges of Nursing, 2006, p. 13). Through the creation of the chart audit report and completion of chart audits, the student was able to demonstrate this Essential component. Additionally, implementation of the new process into the EHR allowed the student to become more familiar with EHR functionality and ability to improve efficiency, quality, and safety when used to its fullest potential (Sullivan & Smolowitz, 2013).

Essentials V, VI, and VIII focus on the student's ability to demonstrate interprofessional collaboaration, advocacy in health care policy, and advanced practice nursing. Throughout this project, the student was involved with many people in many positions and roles throughout the practice. Initially, the student met with the nurse who was managing the current system to evaluate what was in place and what gaps had already been identified. Following the review of the literature, the student met with provider leadership and nursing leadership several times to discuss the literature review findings and suggested project plan. The office managers were involved in assisting with scheduling the educatioanl sessions at each office. Additionally, the student met with the EHR specialist multiple times to evaluate and create EHR functionality. Implementation

of this project required input and collaboration from multiple members of the healthcare team in order to create a robust, evidence-based process to serve the practice's clients. This new process required a new workflow for providers and nurses, changing the policy of the way care is provided at the practice. Finally, analysis of the quality improvement data findings and synthesization of this information into practice implications became the culmination of the experience for the student. The DNP student was able to complete this project from start to finish, effectively learning and demonstrating competency in practicing nursing at an advanced level.

The final essential described is Essential VII, regarding clinical prevention and population health. These two components of healthcare are essential if the healthcare community is to continue to drive forward improved overall health and quality of life. Prevention, and focus of improved health on populations within the community, is the cornerstones of primary care practice. This project incorporated both prevention and population health considerations through the focus on guideline adherence.

The development and completion of this project allowed the DNP student to not only observe, but to be integrally involved in, what it means to continue to strive for both process and quality improvement in practice. The DNP degree is the terminal degree for nursing (American Association of Colleges of Nursing, 2006). "They [practice-focused doctoral programs] focus heavily on practice that is innovative and evidence-based, reflecting the application of credible research findings" (American Association of Colleges of Nursing, 2006, p. 3). Through completion of this project the student was able to gain experience in how to drive this type of care, innovative and evidence-based, and

was allowed the opportunity to successfully demonstrate competency of all Essential elements of the DNP.

Conclusion

Despite limitations to this study, such as sample size that limit assumptions that can be made on the data, the new process served to address the need for implementation of a more efficient and sustainable notification, tracking and reminder system. This system is important in ensuring that patients receive proper screening for cervical cancer that achieves a balance between early identification of potential neoplasm and unnecessary testing or procedures done. It is also extremely important for organizations to have processes in place to notify, track, and remind their patients to follow up on any abnormal findings in order to continue to drive down mortality associated with cervical cancer.

Following implementation of this quality improvement project, providers were much more likely to correctly recommend follow-up to their patients after receiving their cervical cancer screening results. This improvement, however, did not necessarily correlate with practice as they were not any more likely to actually screen their patients at an appropriate interval post-intervention. Additionally, the survey findings indicated a slight improvement in provider guideline adherence on a series of patient scenarios. The small sample size limits the ability of these findings to be relied on for replication, however, does indicate that in this population there was a slight improvement.

Additionally, the Pap pool was found to be an effective tool for notification, tracking and reminder systems as they were 100% compliant in chart audits following Go Live of the new process. Provider compliance was not as consistent; however,

consistency is expected to improve as they become more familiar with the new system. Practices looking to improve provider guideline adherence and their structural approach to management of cervical cancer screening should consider implementation of a similar process.

Following this project from initiation to completion gave the researcher valuable insight into the Essential elements that are expected to exist in all DNP curricula. While all eight elements were found throughout this project, particularly implementation of evidence-based practice and quality improvement were highlighted. Donabedian (2005) stated, “One is interested not in the power of medical technology to achieve results, but in whether what is now known to be ‘good’ medical care has been applied” (p. 694). Good medical care is that which, to the best of the provider’s ability, is based off of what current evidence supports as best practice for improving quality of care provided and overall health outcomes for patients.

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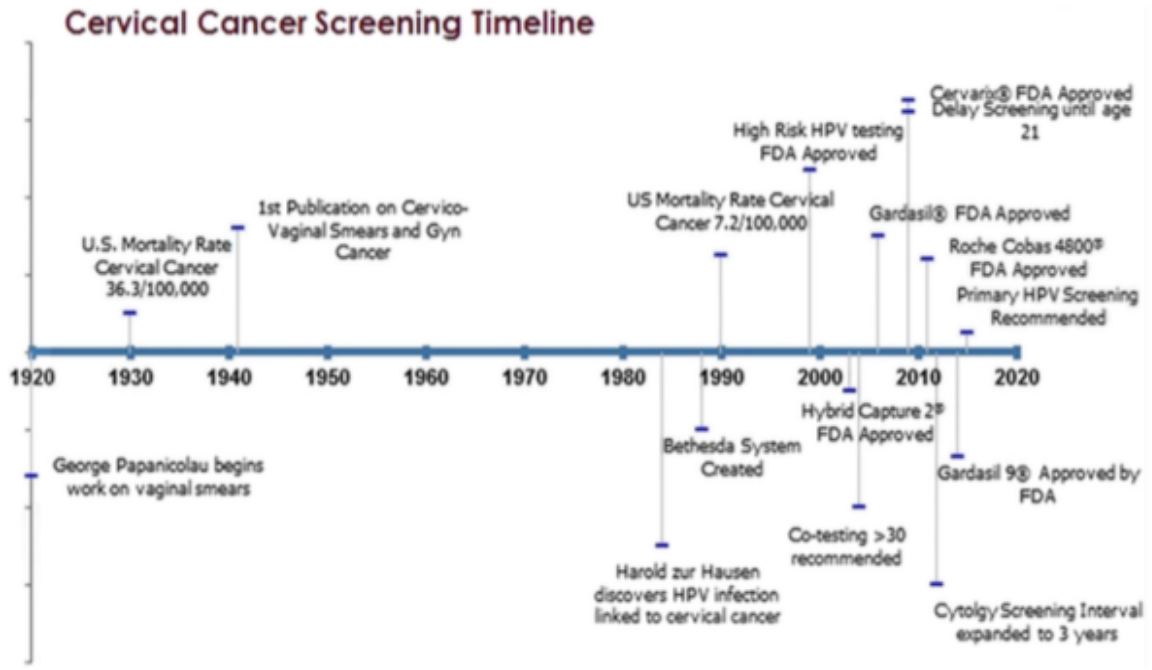
APPENDIX A

CERVICAL CANCER SCREENING TIMELINE

FIGURE
Cervical cancer screening timeline



Note. From "Cervical Cancer Screening: Evidence Behind the Guidelines," by B. F. Lees, B. K. Erickson, and W. K. Huh, 2016, April, *American Journal of Obstetrics & Gynecology*, p. 439.

APPENDIX B

LITERATURE REVIEW MATRIX

Table 7

Literature Review Matrix

Article title	Authors	Year of publication	Type and level of evidence	Notes/ Findings
Adherence to the 2012 National Cervical Cancer Screening Guidelines: A Pilot Study	Teoh, D. G., Marriott, A. E., Vogel, R. I,, Marriott, R. T., Lais, C. W., Downs Jr., L. S., Kulasingam, S. L.	2015	Cross sectional survey/ Level VI	Survey of providers to determine knowledge of updated (3 years prior) cervical screening guidelines; Efforts should focus on improved provider and patient education, and methods that facilitate adherence to the guidelines such as electronic health record order sets.
Current Practice Patterns in Cervical Cancer Screening in Indiana	King, N. R., Kasper, K. M., Daggy, J. K., Edmonds, B. E.	2014	Survey/ Level VI	Vignette based survey. Most providers report following 2012 guidelines, however, many continue to screen more frequently than indicated.
Discontent and Confusion: Primary Care Providers' Opinions and Understanding of Current Cervical Cancer Screening Recommendations	Boone, E., Lewis, L., Karp, M.	2016	Survey/ Level VI	Assessed provider's perceptions of updated guidelines. Findings: Distrust and confusion exist, leading to lack of compliance with guidelines and unnecessary screening and testing.
Does a 30-min Quality Improvement Clinical Practice Meeting Reviewing The Recommended Papanicolau Test Guidelines for Adolescents Improve Provider Adherence to Guidelines in a Pediatric Primary Care Office?	Lozman, R. L., Belcher, A., Sloand, E.	2011	Quality Improvement Project/ Level IV	Provided an educational session at peds primary care office. After, saw significant decrease in unnecessary Paps and overall increased guideline compliance.
Electronic Health Records and Ambulatory Quality of Care	Kern, L. M., Barron, Y., Dhopeshwarkar, R. V., Edwards, A., Kaushal, R.	2012	Cross Sectional Study/ Level IV	Observes the effects of EHR implementation on screening practices across several screening modalities
Improving Compliance with Cervical Cancer Screening Guidelines.	Langsjoen, J., Goodell, C., Castro, E., Thomas, J., Kuehl, T., Wehbe-Janek, H., Hinskey, M.	2015	Quality Improvement Pilot/ Level IV	Implemented point of care reminders in EPIC and an educational session for providers. Greatest improvement with HPV co-testing was noted in family practice.
Provider Attitudes and Screening Practices Following Changes in Breast and Cervical Cancer Screening Guidelines	Haas, J, S., Sprague, B. L., Klabunde, C. N., Tosteson, A. N., Chen, J. S., Bitton, A., Beaber, E. F., Onega, T., Kim, J. J., MacLean, C. D., Harris, K., Yamartino, P., Howe, K., Pearson, L., Feldman, S., Brawarsky, P., Schapira, M. M.	2015	Survey/ Level VI	Self-reported attitudes of providers via survey were assessed. Top reported barriers included patient perceptions, provider's disagreement with guidelines, performance based measures that conflict with guidelines, concern about liability, lack of time to discuss less frequent screening with patients.

Table 7 (continued)

Article title	Authors	Year of publication	Type and level of evidence	Notes/ Findings
The Effects of On-Screen, Point of Care Computer Reminders on Processes and Outcomes of Care	Shojania, K.G., Jennings, A., Mayhew, A., Ramsay, C.R., Eccles, M.P., Grimshaw, J.	2011	Literature Review Level V	Literature review of studies looking at the impact of point of care reminders on provider behavior. Small to modest improvements were found utilizing point of care reminders.
Cancer Screening Reminders: Addressing the Spectrum of Patient Preferences	Brandzel, S. D.; Aiello Bowles, E. J.,Weineke, A.,; Bradford, S. C., Kimbel, K., Gao, H., Diana S.M.	2017	Focus Group/ Level VI	Assessed patient reminder preferences. Findings: Patients preferred personalized reminders and individually (not summary report annually) no more than three months prior to due for repeat screening.
Inadequate Systems to Support Breast and Cervical Cancer Screening in Primary Care Practice	Schapira, M. M., Sprague, B. L., Klabunde, C. N., Tosteson, A. N., Bitton, A., Chen, J. S., Beaber, E. F., Onega, T., MacLean, C. D., Harris, K., Howe, K., Pearson, L., Feldman, S., Brawarsky, P., Haas, J. S.	2015	Survey / Level VI	Focused on PCMH. Found that a lack of system support for screening for breast and cervical cancer exists. Looked specifically at clinical decision support, comparative performance reports, lack of an automated report system for patients overdue for screening, and lack of report of patients due for follow up.
Inconsistencies Between Medical Records and Patient-Reported Recommendations for Follow-Up After Abnormal Pap Tests	Slone, S., White, C. W., Shelton, B., Van Meter, E.; DeSimone, C. D., Schoenberg, N., Dignan, M.	2013	Survey / Level VI	Survey of patients understanding of follow up recommendations compared with actual recommendations Results: The most misunderstood directions were those that required gynecology follow-up or were more severe. Limitations- Done in rural Appalachia
Pap Hub: A System to Improve Compliance with Pap Smear Screening Guidelines in a Large Healthcare System	Teoh, D. G., Fall, L. A., Beitelspacher, E. A., Lais, C. W.	2014	Quality Improvement Project/ Level VI	Implemented a centralized pap hub that monitored results and sent notification and reminders. Nurses triaged normal results and provider did any abnormals.
Patient Notification of Test Results in a Primary Care Setting	Sullivan, C., Smolowitz, J.	2013	Retrospective Review/ Level VI	Notification of both normal and abnormal test results should occur. Study found variation in methods used to notify patients and follow-up.
Tracking Abnormal Cervical Cancer Screening: Evaluation of an EMR Based Intervention	Dupuis, E. A., White, H. F., Newman, D., Sobieraj, J. E., Gokhale, M., & Freund, K. M.	2010	Pretest/ posttest/Level IV	Created a report that was generated monthly showing patients who had not followed up. Significantly decreased the average time to diagnostic resolution.

Table 7 (continued)

Article title	Authors	Year of publication	Type and level of evidence	Notes/ Findings
Tracking and Reminder Systems	The American College of Obstetrics and Gynecologists	2012	Committee Opinion/ Level VII	Committee opinion on the need for, and reasons behind, an effective tracking and reminder system
Making Healthcare Safer: A critical analysis of patient safety practices	University of California at San Francisco (UCSF)–Stanford University	2001	Literature Review/ Level V	A report prepared for the AHRQ on safety practices. Section on critical results communication and follow up.

Note. This table demonstrates articles included in the literature review regarding provider adherence to guidelines and patient notification, tracking and reminder systems.

APPENDIX C

PROJECT PLAN INFOGRAPHIC

APPENDIX D

CERVICAL CANCER SCREENING SURVEY

Cervical Cancer Screening Survey

Thank you for taking the time to take this survey. This survey was designed to collect data for a quality improvement project and was adapted from the AHRQ and CDC's "National Survey of Primary Care Physicians' Cancer Screening Recommendations and Practices". Results are confidential and will be aggregated with other providers' responses. Participation is voluntary but greatly appreciated.

Survey Instructions:

- Several questions are multiple choice.
- Please mark the box of the corresponding answer that best fits your current clinical practice.
- Assume all patients are otherwise healthy individuals with no history of immunocompromise or increased risk unless specified in the scenario.

Part A: Provider Demographics

A1. Degree (SELECT ONE)

- ☐ MD/ DO
- ☐ PA
- ☐ NP

A2. Age in years (SELECT ONE)

- ☐ Less than 35
- ☐ 35-50
- ☐ >50

A3. Sex (SELECT ONE)

- ☐ Female
- ☐ Male

A4. Years in practice (SELECT ONE)

- ☐ < 5
- ☐ 5-10
- ☐ > 10 years

A5. Approximately what percentage of your patients in your main primary care practice is: (YOUR BEST ESTIMATE IS FINE)

a. Under 18_____%
b. 18-39 _____%
c. 40-64_____%
d. 65+ years_____%

A6. Approximately what percentage of your patients in your main primary care practice is female? (YOUR BEST ESTIMATE IS FINE)

a. Female _____%

A7. During a typical year, for how many asymptomatic, average-risk female patients do you personally order or perform cervical cancer screening with Pap testing and/ or HPV testing? (SELECT ONE)

- ☐ 1-10
- ☐ 11-20
- ☐ > 20

Part B: Process

B1. How effective do you believe the following screening procedures are in reducing cervical cancer mortality in average-risk women?

	Very Effective	**Somewhat Effective**	**Not Effective**	**Effectiveness Not-known**
Pap test (liquid based cytology, e.g., Thin Prep® or SurePath®)	○	○	○	○
HPV DNA test with Pap test	○	○	○	○
HPV Testing as primary screening (without simultaneous Pap test)	○	○	○	○

B2. In your clinical practice which cervical cancer screening guidelines do you follow?

- ☐ American Society of Colposcopy and Cervical Pathology (ASCCP)
- ☐ United States Preventative Taskforce Services (USPTS)
- ☐ American College of Obstetricians and Gynecologists (ACOG)
- ☐ Other:_____

B3. Assume that the following female patients present for a routine visit in your office. What would you be most likely to recommend for cervical cancer screening at this visit?

Patient Scenario	**Procedure**	**Interval**
18-year-old who had sexual intercourse for the first time 1 month ago and is presenting for her first gynecologic visit	☐ Pap ☐ Pap + HPV testing ☐ HPV Testing alone ☐ None ☐ Other:_____	☐ Annually ☐ Every three years ☐ Every five years ☐ None ☐ Other:_____
18-year-old who first had sexual intercourse 3 years ago and is presenting for her first gynecologic visit	☐ Pap ☐ Pap + HPV testing ☐ HPV Testing alone ☐ None ☐ Other:_____	☐ Annual ☐ Every three years ☐ Every five years ☐ None ☐ Other:_____

21-year-old who has received the entire HPV vaccine series	☐ Pap ☐ Pap + HPV testing ☐ HPV Testing alone ☐ None ☐ Other:_____ _____	☐ Annual ☐ Every three years ☐ Every five years ☐ None ☐ Other:_____ _____
25-year-old who has no history of abnormal Pap smears	☐ Pap ☐ Pap + HPV testing ☐ HPV Testing alone ☐ None ☐ Other:_____ _____	☐ Annual ☐ Every three years ☐ Every five years ☐ None ☐ Other:_____ _____
35-year-old who has had 3 consecutive negative Pap tests performed by you	☐ Pap ☐ Pap + HPV testing ☐ HPV Testing alone ☐ None ☐ Other:_____ _____	☐ Annual ☐ Every three years ☐ Every five years ☐ None ☐ Other:_____ _____
35-year-old whose cervix was removed last year during hysterectomy for symptomatic fibroids	☐ Pap ☐ Pap + HPV testing ☐ HPV Testing alone ☐ None ☐ Other:_____ _____	☐ Annual ☐ Every three years ☐ Every five years ☐ None ☐ Other:_____ _____

Healthy 66-year-old who has had 3 consecutive negative Pap tests performed by you. The last was a co-test three years ago which was negative for HPV as well.	☐ Pap ☐ Pap + HPV testing ☐ HPV Testing alone ☐ None ☐ Other:_____	☐ Annual ☐ Every three years ☐ Every five years ☐ None ☐ Other:_____
Healthy 66-year-old who has not had routine screening for cervical cancer since her mid- 30's	☐ Pap ☐ Pap + HPV testing ☐ HPV Testing alone ☐ None ☐ Other:_____	☐ Annual ☐ Every three years ☐ Every five years ☐ None ☐ Other:_____

B4. You receive the following results on the following patients. What is your follow-up recommendation?

Patient	Follow-up Testing	Interval
21-year-old with result of ASC-US with no prior screening	☐ Repeat Pap cytology ☐ Reflex HPV testing ☐ Pap + HPV testing ☐ Colposcopy ☐ Other:_____ _____	☐ Immediate ☐ One year ☐ Every three years ☐ Every five years ☐ Other:_____ _____
22-year-old with results of LSIL with no prior screening	☐ Repeat Pap cytology ☐ Reflex HPV testing ☐ Pap + HPV testing ☐ Colposcopy ☐ Other:_____ _____	☐ Immediate ☐ One year ☐ Every three years ☐ Every five years ☐ Other:_____ _____
25-year-old with result of ASC-US with prior negative Pap	☐ Repeat Pap cytology ☐ Reflex HPV testing ☐ Pap + HPV testing ☐ Colposcopy ☐ Other:_____ _____	☐ Immediate ☐ One year ☐ Every three years ☐ Every five years ☐ Other:_____ _____
31-year-old with result of negative cytology and HPV, prior result LSIL	☐ Repeat Pap cytology ☐ Reflex HPV testing ☐ Pap + HPV testing ☐ Colposcopy ☐ Other:_____ _____	☐ Immediate ☐ One year ☐ Every three years ☐ Every five years ☐ Other:_____ _____
31-year-old with result of negative	☐ Repeat Pap cytology ☐ Reflex HPV testing ☐ Pap + HPV testing	☐ Immediate ☐ One year ☐ Every three years

cytology and HPV, prior result LSIL	☐ Colposcopy ☐ Other:_____ _____	☐ Every five years ☐ Other:_____ _____
35-year-old with negative cytology but positive HPV test: HPV 16 and 18 negative **38-year-old with LSIL and negative HPV test**	☐ Repeat Pap cytology ☐ Reflex HPV testing ☐ Pap + HPV testing ☐ Colposcopy ☐ Other:_____ _____	☐ Immediate ☐ One year ☐ Every three years ☐ Every five years ☐ Other:_____ _____
42-year-old with a result of ASC-US and HPV negative, prior result cytology negative, HPV positive	☐ Repeat Pap cytology ☐ Reflex HPV testing ☐ Pap + HPV testing ☐ Colposcopy ☐ Other:_____ _____	☐ Immediate ☐ One year ☐ Every three years ☐ Every five years ☐ Other:_____ _____

B5. Are you following current screening guidelines on all of your patients? If no, why not? (SELECT ALL THAT APPLY)

- ☐ I am following current screening guidelines
- ☐ I do not know the current guidelines
- ☐ I do not think guidelines are based on good data
- ☐ I believe I have a higher-risk population
- ☐ My patients are requesting more frequent screening
- ☐ I am worried about missing high grade dysplasia or cancer in the interim
- ☐ I am worried about being able to keep track of whether my patients complete follow-up with a longer screening interval
- ☐ Other:

_____

_____

Part C. Structure

C1. Does your practice have a mechanism to remind you or other members of the care team that a patient is due for breast or cervical cancer screening? (SELECT ALL THAT APPLY)

- ☐ Yes, special notation or flag in patient's chart
- ☐ Yes, computer prompt or computer-generated flow sheet
- ☐ Yes, I routinely look it up in the medical record at the time of a visit
- ☐ Yes, other mechanism (specify): _____
- ☐ No
- ☐ Don't Know

C2. Does your practice have a mechanism to remind your patients that they are due for cervical cancer screening? (SELECT ALL THAT APPLY)

- ☐ Yes, verbal prompt from you or another member of the care team during an office visit
- ☐ Yes, reminder by Mail
- ☐ Yes, reminder telephone call
- ☐ Yes, reminder by e-mail
- ☐ Yes, other mechanism (specify): _____
- ☐ No
- ☐ Don't Know

C3. Do you use any of the following resources for managing cervical cancer screening in practice? (SELECT ALL THAT APPLY)

- ☐ Printed Guidelines
- ☐ Website
- ☐ Phone or tablet application
- ☐ Patient Handouts
- ☐ Other:_____
- ☐ None of the above

C4. Does your practice have a system to track patients who do not complete follow-up of an abnormal screening result? (SELECT ONE)

- ☐ Yes
- ☐ No
- ☐ Not Sure

C5. Does your practice have a mechanism to inform patients of abnormal results? (SELECT ALL THAT APPLY)

- ☐ Yes, letter by US Mail
- ☐ Yes, telephone call
- ☐ Yes, email message
- ☐ Yes, other method: _____
- ☐ Don't know
- ☐ No

Is there anything else you would like to mention about breast or cervical cancer screening in your practice or in general?

Note: Survey adapted from the AHRQ and CDC's "National Survey of Primary Care Physicians' Cancer Screening Recommendations and Practices

APPENDIX E

PROVIDER EDUCATIONAL SESSION OUTLINE

Provider Educational Session Outline

Part 1: Educational Session (20 minutes)

1) Cervical Cancer Screening History
    a. Cervical Cytology
    b. HPV Genotyping
    c. 2012 ASCCP Guidelines
2) Risks of Over Screening
3) Findings from literature review regarding guideline adherence
    a. Guideline Compliance
    b. Use of the EHR
    c. Notification
    d. Tracking and Reminder Systems
4) Review of practice survey findings
5) Guideline Resources

Part 2: Training on New System (20 minutes)

1) Review of structure of new system and expectations
2) Review and assist with setting up quick actions for routing result notes to the Pap pool

Note: Outline of the information presented during the provider educational sessions.

APPENDIX F

CHART AUDITS FOR CERVICAL CANCER SCREENING

Chart Audits for Cervical Cancer Screening

All patient records will be kept confidential and will not leave the property of the practice. No patient identifiers will be recorded or used nor will date of service. Individual testing results and diagnosis will not be included. Internal Review Board review and approval will be obtained as necessary per university and facility guidelines. The student is current with, and will remain throughout the duration of the project, Confidentiality Training. The student will retain all information extracted from the chart reviews in a secure site within AFM's electronic network. No information will be transferred to a thumb drive or other external storage, and no paper information will leave AFM offices. The information presented in the capstone project paper will not include any patient health information that could potentially identify a patient.

Adherence (pre and post data)

1) Did recommended follow-up comply with either the preferred or acceptable options per the 2012 ASCCP Guidelines? (Use of the updated 2015 guidelines for primary HPV screening alone will be accepted as well)
    a. Yes
    b. No
2) If available, did screening interval from last screening comply with the 2012 ASCCP Guidelines? (Use of the updated 2015 guidelines for primary HPV screening alone will be accepted as well)
    a. Yes
    b. No

Process (post data)

3) Was a result note placed and routed to the PAP pool?
4) Was a tickler placed in the patient's system?
5) Was a notification letter sent to the patient?

Note: Chart audit form for project evaluation.

APPENDIX G

INSTITUTIONAL REVIEW BOARD APPROVAL

UNIVERSITY OF
NORTHERN COLORADO

Institutional Review Board

DATE:	July 10, 2018
TO:	Amanda Miller, DNP-S
FROM:	University of Northern Colorado (UNCO) IRB
PROJECT TITLE:	[1221617-1] Cervical Cancer Screening in Primary Care: A Quality Improvement Project
SUBMISSION TYPE:	New Project
ACTION:	APPROVED
APPROVAL DATE:	June 26, 2018
EXPIRATION DATE:	June 26, 2022
REVIEW TYPE:	Exempt Review

Thank you for your submission of New Project materials for this project. The University of Northern Colorado (UNCO) IRB has APPROVED your submission. All research must be conducted in accordance with this approved submission.

This submission has received Exempt Review based on applicable federal regulations.

Please remember that informed consent is a process beginning with a description of the project and insurance of participant understanding. Informed consent must continue throughout the project via a dialogue between the researcher and research participant. Federal regulations require that each participant receives a copy of the consent document.

Please note that any revision to previously approved materials must be approved by this committee prior to initiation. Please use the appropriate revision forms for this procedure.

All UNANTICIPATED PROBLEMS involving risks to subjects or others and SERIOUS and UNEXPECTED adverse events must be reported promptly to this office.

All NON-COMPLIANCE issues or COMPLAINTS regarding this project must be reported promptly to this office.

Based on the risks, this project requires continuing review by this committee on an annual basis. Please use the appropriate forms for this procedure. Your documentation for continuing review must be received with sufficient time for review and continued approval before the expiration date of June 26, 2022.

Please note that all research records must be retained for a minimum of three years after the completion of the project.

If you have any questions, please contact Sherry May at 970-351-1910 or Sherry.May@unco.edu. Please include your project title and reference number in all correspondence with this committee.

Amanda -

Thank you for your thorough and clear IRB application. The protocols and materials in your application are verified/approved exempt and you may begin participant recruitment and collection of data.

Best wishes with your capstone research and don't hesitate to contact me with any IRB-related questions or concerns.

Sincerely,

Dr. Megan Stellino, UNC IRB Co-Chair

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within University of Northern Colorado (UNCO) IRB's records.

APPENDIX H

INTRODUCTION LETTER

Dear Provider,

My name is Amanda Miller DNP-S, BSN, RN. I am a Family Nurse Practitioner student at the University of Northern Colorado, pursuing a Doctor of Nursing Practice (DNP) degree. I have been working with Dr. Stephens and Dr. Klingner to conduct a quality improvement project on the management of cervical cancer screening in primary care.

Participation in this DNP project involves completing confidential online surveys. The surveys will be **confidential** and **unidentifiable** to protect your privacy. The survey will take approximately 20-30 minutes to complete and will consist of multiple choice, select all that apply, and one free text question. You will have two weeks to complete the survey. Part of my project involves implementation of an electronic patient notification, tracking and reminder system for cervical cancer screening. Following implementation of this process and an optional educational session, a repeat survey will be sent following the same process as the first.

Responses from this survey will remain **confidential** and will be used solely for the purpose of this study. Participation in the study is **voluntary** and you may withdraw participation at any time without penalty. Participants who complete the survey will be entered into a drawing for one of five $10 gift cards. This drawing will be completed following both the pre and post implementation surveys. Once you complete the survey, please notify your office manager to place your name on the list for the gift card drawing. There are no foreseeable risks that have been identified in the participation of this quality improvement project. Submission of this survey means that you are consenting to the participation in this project.

This quality improvement project has been reviewed by the University of Northern Colorado Institutional Review Board and has been deemed acceptable in meeting the requirements intended to protect the rights and wellbeing of its participants.

Survey link: https://unco.co1.qualtrics.com/jfe/form/SV_1X4hEktdDPVnWFn

Should you have any questions or concerns please contact Amanda Miller at huff1824@bears.unco.edu or the Research advisor Dr. Jeanette McNeill at Jeanette.mcneill@unco.edu.

Thank you for your time and consideration.

Respectfully,

Amanda Miller, DNP Candidate

APPENDIX I

STATEMENT OF MUTUAL AGREEMENT

Statement of Mutual Agreement

Statement of Mutual Agreement

University of Northern Colorado Doctor of Nursing Practice Capstone Project

Amanda Miller

January 6, 2018

The purpose of the "Statement of Mutual Agreement" is to describe the shared view between Associates in Family Medicine and Amanda Miller, DNP Candidate from University of Northern Colorado, concerning her proposed capstone project.

Proposed Project Title: Papanicolaou Testing Guideline Adherence in Primary Care: A Quality Improvement Project

Brief Description of Proposed Project: This project will be a quality improvement project that has a two-phase approach. The first phase will include a survey of providers to determine current knowledge of guidelines and perceived barriers to adherence to the guidelines. Concurrently, during Phase I, an electronic notification, tracking and reminder system will be established, and training will be provided for nursing and support staff. Phase II will occur following this training and analysis of the provider survey results. In Phase II, an educational session will be presented addressing knowledge gaps and barriers to guideline adherence as well as provider training for the new tracking and reminder system. After completion of the educational session, the new tracking and reminder system will "Go Live". Once the system has been implemented, the same survey will be repeated and compared to prior results to determine improvements in knowledge and a decrease in perceived barriers. Additionally, a

chart review of patients who receive cervical cytology and HPV genotyping will measure adherence to the guidelines for patients whose results return during the study period.

Goal of Capstone Project: The goal of this project is to address both process and structural barriers to adherence with the 2012 ASCCP guidelines in an attempt to increase overall guideline compliance.

Proposed On-site Activities: A pre and post survey of providers, educational session for providers, chart reviews, training of providers, nursing, and support staff will occur on-site during this project.

Confidentiality of Patient Records: All patient records will be kept confidential and will not leave the property of Associates in Family Medicine. No patient identifiers will be recorded or used nor will date of service. Testing results and diagnosis will not be included. Internal Review Board review and approval will be obtained as necessary per university and facility guidelines. The student is current with, and will remain throughout the duration of the project, AFM Confidentiality Training. The student will retain all information extracted from the chart reviews in a secure site within AFM's electronic network. No information will be transferred to a thumb drive or other external storage, and no paper information will leave AFM offices. The information presented in the capstone project paper will not include any patient health information that could potentially identify a patient.

Reference to agency: The agency will be referred to only by type of agency and region and not by name in the capstone project and any professional publications.

The designated Capstone Community/Agency member will agree to participate in the review and approval of the proposal and presentation of the final version of the project. She will attend (on campus or remotely) the meetings for both.

The DNP Capstone project will include a final report, an abstract, potential publication or oral presentation of the report. No personal identifiers will be included and all data will be reported in aggregate form. The author welcomes any comments or suggestions from the Agency but reserves the right to publish findings and analysis according to professional standards and principles of academic freedom. For any work of a scholarly nature, the Author agrees to follow the Agency preferences in how it is to not be named in the work.

Note: Memorandum of understanding between the student and the clinical site for the DNP project.

Laura L Miller, DNP-S 8/25/18

Signature of DNP Student Date

Signature of Agency Member Date

[illegible] DrPH, RN 8/27/18

Signature of DNP Capstone Chair Date

Note: Memorandum of understanding between the student and the clinical site for the DNP project.