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Cervical Cancer Prevention Screening: A Quality Improvement Project to Reduce Variation and Increase Timeliness in Managing and Reporting Abnormal Papanicolaou Smear Results

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MSN, University of Maryland, Baltimore, 2001

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Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Nursing Practice

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Abstract

Cervical cancer is the fifth most common cancer in United States with more than 12,000 women diagnosed each year and more than 4,000 preventable deaths with minorities disproportionally represented. Cervical cancer prevention strategies rarely focus on the management of abnormal screening results. The purpose of this quality improvement project was to standardize the management program for abnormal cervical cancer screening results within an integrated health delivery system serving a large minority community. The Plan-Do-Study-Act model guided a comprehensive program evaluation with process improvement, including the creation of an electronic quality data reporting tool to formalize the work process and a quality control and assurance program with exception reports. The evaluation was completed with data to measure the timeliness of abnormal results outreach and continued clinical management. The data were evaluated over time with run charts. Also, an analysis of the data was done through pre- and post-test comparisons with 2-sample *t* tests to evaluate abnormal cervical cancer screening management before and after the revisions. Although the project did not show a statistically significant difference in the timeliness of outreach and follow-up of abnormal cervical cancer screening results due to the limited data set, the run charts trended positively for timeliness and consistent data reporting with no missed screening reports. Effective cervical cancer screening includes the accurate and timely management of abnormal results to reduce disparities in cervical cancer deaths. This project contributes to positive social change by responding to the Healthy People 2020 goal to reduce the incidence of cervical cancer deaths through a formal process to insure timely intervention for abnormal results in a largely minority community.

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Dedication

This project is dedicated to all health care, government, and community leaders who work diligently to preserve and improve the reproductive health of women all over the world.

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I would like to thank my preceptor, Dr. Sherri Wilson, and my professor and chair, Dr. Patrick Palmieri, for their mentorship and guidance throughout my DNP journey. Without their expertise, dedication, and encouragement over the past year, I would not have progressed this far in my professional growth. I would especially like to acknowledge my family for their endless patience and support as I pursue my goal of obtaining a terminal degree in nursing.

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Section 1: Overview of the Evidence-Based Scholarly Project

Introduction

The risk of cervical cancer is most closely correlated with the presence of the human papilloma virus (HPV) and previous abnormal Papanicolaou (Pap) smears, also called Pap tests (Spence, Goggin, & Franco, 2007). Adhering to recommended cervical cancer screening guidelines with cytology (Pap smear) has been shown to reduce the incidence of invasive cervical cancer (Vaccarella, Lortet-Tieulent, Plummer, Franceschi, & Bray, 2013; Vesco et al., 2011). The U.S. Preventive Services Task Force (USPSTF) identified 15 studies that reported dramatic reductions in the incidence and mortality of invasive cervical cancer (ICC) attributed to the increase in regular cervical cancer screening (Vesco et al., 2011). Since 1955, there has been more than a 60% reduction in the incidence and death rate of cervical cancer (National Institutes of Health [NIH], 2010). Despite the significant decline in cervical cancer deaths over the last 40 years, more than 4,000 annually die in the United States from this treatable disease. According to the Centers for Disease Control and Prevention (CDC), in 2014, 12,109 women were diagnosed with cervical cancer and 4,092 women died from the disease (CDC, 2014).

The incidence of invasive cervical cancer varies with regards to race, ethnicity, and age. Cervical cancers are higher in Black and Hispanic women compared to all other races and ethnicities in the United States (CDC, 2014; Vesco et al., 2011). The overall age-adjusted incidence rate of cervical cancer in the United States is 7.6/100,000 per year. The incidence is highest among Black (9.0/100,000) and Hispanic (9.8/100,000) women, compared to non-Hispanic White women (7.6/100,000; Kaiser Family Foundation, 2015). Diagnosis of cervical cancer also increases with age. From 2004-

2008, one half of total new cervical cancer cases occurred in women 35 to 55 years of age (Vesco et al., 2011). There is a strong link between lack of routine cervical cancer screening and the incidence of invasive cervical cancer as a U.S. Preventive Task Force (USPTF) systematic review of studies done on women diagnosed with ICC shows that more than half reported inadequate screening (Vesco et al., 2011).

The majority of cervical cancer prevention and reduction strategies are focused on increased screening; however, proper management of abnormal results is also a contributing factor to appropriate and timely intervention (Yabroff, Kerner, & Mandelblatt, 2000). Identification of abnormal results, performed well by most accredited healthcare organizations, is only the first step in the screening process. The reduction in invasive cervical cancer is not possible without the next step: appropriate follow-up of these abnormalities (Spence, Goggin, & Franco, 2007).

The organization selected for this project, hereafter referred to as A1 Organization (pseudonym), has a robust, efficient, and effective cervical cancer screening program. Although A1 Organization outperforms most industry screening benchmarks, opportunities exist to enhance their current program – including improving the timely notification of women identified with abnormal Pap smears and identifying barriers to proper follow-up care. Incorporating evidence-based quality performance measures into the quality monitoring process helps organizations to sustain improvement activities, monitor effectiveness, and enable additional quality improvement (Maheshwari & Janseen, 2013; McLaughlin, 2014).

A1 Organization has established guidelines to track abnormal results and ensure timely follow-up; however, the current paper-based process for tracking quality at the

time of this project was not standardized across the organization. Quality reports were completed by hand using a standard form, but monitoring and reporting of quality metrics and performance was inconsistently done throughout the three regional service lines. In addition, this process monitored performance for the general patient population, but did not stratify results based on patient demographics. This prevented the organization from monitoring performance in specific populations in order to identify potential areas for improvement. An identified current practice problem, the need for standardized performance monitoring in A1 Organization's current abnormal Pap smear results coordination program, was addressed by this project.

Problem Statement

The purpose of the project was to assess, standardize, and improve the quality monitoring and management of abnormal Pap smear results. This project was designed to contribute to the prevention of invasive cervical cancer in women seeking services at an integrated health care organization.

Program objectives

The objectives of the program were:

- To standardize monitoring and reporting activities by electronically incorporating current quality metrics for the organization's abnormal Pap smear management program using the electronic health record system.
- To develop a centrally managed electronic quality report of the organization-specific quality metrics for abnormal Pap smear management.
- To explore the possibilities of stratifying performance outcomes based on race, ethnicity, and age for future reporting opportunities.

- To improve timeliness of abnormal Pap smear notification and follow-up for sites performing below quality measure targets through use of electronic monthly and/or quarterly Pap Tracking quality reports.

Defining the Project Question

A good project question should be clearly identified, measurable, and promote evidence-based practice (Terry, 2012). Using the PICOT method to format the improvement questions leads to an appropriate focus for an implementation project. PICOT stands for: patient or population, issue or intervention, comparison, outcome, and time (Elkins, 2010; Fineout-Overholt & Johnston, 2005). The elements of the research problem are therefore described below using the PICOT method:

- P: Problem – Lack of consistent/standardized performance monitoring in the organization's cervical cancer screening surveillance (CCCS) or "Pap Tracking" program.
- Population – OBGYN providers, nurses, and leadership.
- I: Intervention – Implement electronic monitoring of quality metrics for management of abnormal Pap smears.
- C: Comparison – Timeliness of abnormal Pap smear results management prior to electronic quality metric monitoring; Not all sites are meeting their target of reviewing abnormal results within 30 days.
- O: Outcome – Demonstrate consistent performance monitoring of abnormal Pap smear management through region-wide use of standardized monthly and quarterly reports, and; Demonstrate improved performance in timeliness of

abnormal Pap smear management as defined by current evidence-based practices and organization clinical guidelines.

- T: Time – Approximately three months from implementation of electronic quality monitoring.

Based on this identified practice problem, the project question was: Will the implementation of an electronic quality monitoring tool for the CCCS program result in improvements in quality outcomes at the project site?

The Social Significance of Abnormal Pap Smear Management

Cervical cancer deaths have decreased significantly as a result of increased cervical cancer screening rates (CDC, 2014); however, invasive cervical cancer remains the fifth most common cancer in U.S. women and the second most common cancer for women in the world (CDC, 2014; Spence, Goggin, & Franco, 2007). Invasive cervical cancer is preventable, but only with timely screening and follow-up care (Spence, Goggin, & Franco, 2007). Despite improvements in cervical cancer screening, women continue to develop invasive cervical cancer.

There are also significant disparities in cervical cancer rates among certain populations depending on their age, race, and ethnic background. In the United States, African American and Hispanic women continue to have the highest incidence of cervical cancer with the rate being 9.0/100,000 and 9.8/100,000 respectively, compared to 7.3/100,000 for White women (CDC, 2014; Kaiser Family Foundation, 2015). There is also a disparity in death rates from cervical cancer, with African American women having the highest rate at 4.0/100,000, compared to 2.6/100,000 for Hispanic women and 2.1/100,000 for White women (Kaiser Family Foundation, 2015). Invasive cervical

cancer rates vary by age as well, increasing with age and peaking between the ages of 35 and 55 years old (Vesco et al., 2011). Though the United States has reduced the number of deaths from invasive cervical cancer, the disease continues to pose a significant public health issue to vulnerable populations (Vesco et al., 2011).

The Healthy People 2020 (2014) initiative established evidence-based objectives for improving the health of the U.S. people over the next decade. Regarding cervical cancer, national target for reducing cervical cancer deaths to 7.5 new cases of invasive cervical cancer per 100,000 – a 10% improvement over the baseline rate of 8.3 cases per 100,000 (Health People 2020, 2014). Developing programs to improve management of abnormal Pap smear results combined with U.S. national efforts to increase cervical cancer screening will help to achieve the Health People 2020 target and reduce disparities in cervical cancer deaths.

Financial Impact of Cervical Cancer

Although rates of cervical cancer are steadily declining, the disease continues to impose a significant financial burden in the United States. Estimates for the annual economic burden of cervical cancer ranges from $300-400 million to as high as $1.55 billion (Insinga, Dasbach, & Elbasha, 2005; Mariotto, Yabroff, Shao, Feuer, & Brown, 2011). Per person, the estimated four-year cost for cervical cancer is $18,799 (Insinga, Ye, Singhal, & Carides, 2008). In 2010, the estimated aggregated medical costs of cervical cancer treatment during the initial year of diagnosis totaled $492,000,000 (Mariotto et al., 2011). Treatment beyond one year of diagnosis incurred costs of $368,000,000 per year, with an additional $685,000,000 during the last year of life (Mariotto et al., 2011; National Cancer Institute, 2014).

The costs of cervical cancer extend beyond treatment costs. For example, productivity loss due to cervical cancer deaths is estimated to be $1.3 billion per year (Insinga, 2006). If the rate of cervical cancer remains constant, medical care costs are expected to continue rise (National Cancer Institute, 2012). Diagnosing and treating cervical cancer in the early stages is important because this increases the survival rate, decreases morbidity, and significantly reduces costs related to care and lost productivity (Subramanian et al., 2010).

Assumptions and Limitations

With increased cervical cancer screening and HPV vaccination rates, I assumed that improving timeliness of follow-up for abnormal results would further reduce the rate of invasive cervical cancer. While electronic quality monitoring has been shown to improve quality outcomes and reduce timeliness of interventions (Dupuis et al., 2010), the literature for this project did not identify any studies directly linking improved monitoring of abnormal results to reduced rates of invasive cervical cancer. Also, this project did not take into account factors influencing women's adherence to recommended follow-up plan once contact is made for abnormal results. The target population for the project had access to comprehensive cervical cancer screening services as part of their insurance plan. The interventions developed through this project may not be applicable or may be limited if trying to improve the quality of cervical cancer prevention programs in settings where patients have limited access to care or lack of health care insurance (e.g., public health centers, free clinics, or community-based clinics).

Summary

Cervical cancer, though preventable, continues to affect thousands of women in the United States (Vesco et al., 2011). After prevention of HPV infection through vaccination, regular screening and early treatment of abnormal Pap smears are the best ways to prevent cervical cancer and related deaths (Subramanian et al., 2010). Identification of precancerous and cancerous lesions is only the beginning step in the screening process. Nationwide cervical cancer screening efforts will not be successful without adequate triage and appropriate follow-up of abnormal results (Chase, Kalouyan, DiSaia, 2009; Spence, Goggin, & Franco, 2007).

Section 2: Review of Scholarly Evidence

Literature Search Strategy

The initial literature review of the problem consisted of searches using several databases. The databases used were CINAHL, MEDLINE, Pubmed, ProQuest, and ScienceDirect. Key words related to abnormal Pap smear results, abnormal results management, and quality improvement were initially used, but returned only several articles related to the subject. The search was broadened and expanded to include the words "cervical cancer screening" and "quality improvement", which provided more general articles, but these articles had minimal relevance. The majority of the articles dealt with improving cervical cancer screening rates, as opposed to management of abnormal results. In order to find additional reference articles for inclusion, an individual review and reference search for each included article was conducted. In the end, a total of nine articles related to management of abnormal cervical cancer screening results were selected for review (Burack, Gimotty, Simon, Moncrease, & Dews, 2003; Chase, Kalouyan, & DiSaia, 2009; Dupuis et al., 2010; Hermens et al., 2005; Kupets & Paszat, 2010; Leyden et al., 2005; Massad et al., 2013; Spence, Goggin, & Franco, 2007; Yabroff, Kerner, & Mandelblatt**, 2000).**

Cervical Cancer

Cervical cancer is a well understood neoplasm (Vesco et al., 2011); hence, the disease is preventable with early detection and treatment of premalignant cervical changes (Subramanian et al., 2010). The risk of cervical cancer is most closely correlated to the presence of the Human Papilloma Virus (HPV) and abnormal Pap smear results. HPV is responsible for about 91% of cervical cancers (CDC, 2014). Even once

diagnosed, survival rates for cervical cancer are significantly greater if caught before the disease progresses to the uterus or other organs of the body. Because cervical cancer progresses slowly in the initial stages, early identification and treatment of cancerous and precancerous cervical lesions is the key to survival (Moyer, 2012; Vesco et al., 2011).

Abnormal Pap Smear Management

Cervical cytology screening (i.e., Pap smears) is both cost-efficient and sensitive at detecting precancerous and cancerous cervical cells (Vesco et al., 2011). Cytology screening with or without HPV testing is the technique of choice for cervical cancer screening in the United States (Massad et al., 2013; Moyer, 2012; Vesco et al., 2011). The U.S. Preventive Services Task Force (USPSTF) recommends screening for cervical cancer in low-risk women age 21 to 65 years with a Pap smear every three to five years (Vesco et al., 2011). The Healthcare Effectiveness Data and Information Set (HEDIS) are a set of quality performance measures determined by the National Committee for Quality Assurance (NCQA) and are used as an external benchmark for comparison by many health care organizations (NCQA, n.d.). Current HEDIS measures for cervical cancer screening determine the number of eligible women between 21-64 years of age who had documented cervical cytology every three years or every five years for women 30-64 years old with cervical cytology/HPV co-testing (NCQA, n.d.). Many health care organizations in the U.S. establish their guidelines for cervical cancer screening based on current USPSTF recommendations and/or HEDIS measures.

A comprehensive cervical cancer-screening program should not only focus on early diagnosis, but it should incorporate strategies to ensure appropriate follow-up (Hermens et al., 2005). Lack of screening, improper or poor screening technique, and

lack of adequate follow-up all influence the development of invasive cervical cancer in women (Spence, Goggin, & Franco, 2007). The majority of cervical cancer cases are in women who were never screened before (Leyden et al., 2005; Spence, Goggin, & Franco, 2007; Vesco et al., 2011). A small percentage of invasive cervical cancers are a result of a failure in the screening process. A retrospective cohort study of patients from seven U.S. health plans, who were diagnosed with cervical cancer between 1995 and 2000, showed that 32% of these patients had normal Pap smear results preceding their diagnosis of cervical cancer (Leyden et al., 2005). Although a lack of screening is a major risk factor for advanced cervical cancer, an estimated 12% of all invasive cervical cancers in the United States, Canada, Australia, and Europe have been attributed to poor follow-up of abnormal results (Spence, Goggin, & Franco, 2007).

When an abnormal Pap smear is identified, the procedure of choice for diagnosing cervical cancer and precancerous cervical lesions is performing a biopsy of the cervix during a colposcopy. A colposcopy is a medical procedure to examine the tissues of the cervix using special equipment called a colposcope. The colposcope magnifies and illuminates the tissues of the cervix, vagina, and vulva, permitting the user to distinguish abnormal cells from normal cells. Once identified, the abnormal cells are biopsied and sent to pathology for a definitive diagnosis (Chase, Kalouyan, & DiSaia, 2009).

The standards for treatment of clinically diagnosed precancerous lesions or cervical cancer are based on the current American Society for Colposcopy and Cervical Pathology (ASCCP) Consensus Guidelines. Revised in 2012, the ASCCP Consensus Guidelines include evidence-based guidelines for the management of abnormal Pap tests, cervical intraepithelial neoplasia (CIN), and cervical cancer or adenocarcinoma in situ

(AIS; Massad et al., 2013). Based on the guidelines, algorithms have been established to aid health care providers in triaging and managing abnormal cytology results (Chase, Kalouyan, & DiSaia, 2009).

Factors That Contribute to Inadequate Follow-up

Failure rates for follow up of abnormal cervical cancer screening results are as high as 50% (Hermens et al., 2005). Several studies (Kupets & Paszat, 2010; Leyden et al., 2005; Spence, Goggin, & Franco, 2007; Yabroff, Kerner, & Mandelblatt, 2000) attempted to determine contributable factors to inadequate follow-up of abnormal Pap smear results. From these studies, several patient and provider characteristics were identified to be relevant to the inadequate follow-up. The patient-related factors include fear, comorbidities, understanding of their condition, understanding of the importance of follow-up, trust with their provider, and low-income or minority women (Kupets & Paszat, 2010; Spence, Goggin, & Franco, 2007). The provider-related factors include inadequate tracking of results, poor communication to patients, and poor adherence to clinical guidelines (Kupets & Paszat, 2010). Furthermore, in a population-based study (n=43,792) over a 5-year period, Kupets and Paszat (2010) reported approximately 26% of women with abnormal cytology results were not appropriately evaluated for as long as two years after the screening.

Literature Examples for Successful Follow-up

Most studies regarding abnormal Pap smear follow-up are designed to improve patient compliance, as opposed to addressing provider factors (Hermens et al., 2005). Prompt physician communication to patients and automatic patient reminders, similar to what is commonly used to communicate mammogram results to women, increase follow-

up of abnormal cancer screenings (Burack, Gimotty, Simon, Moncrease, & Dews, 2003; Yabroff, Kerner, & Mandelblatt, 2000). For example, a provider-targeted study by Hermens et al. (2005) demonstrated that an automatic management system providing reminders to providers of patients who did not complete an appropriate follow-up was more successful than a system that relied on the provider alone to track patients. Another study found that an electronic health record-based tracking system increased the timeliness of interventions for abnormal Pap test results and decreased the time from diagnosis to resolution of abnormal results (Depuis et al., 2010).

Literature Support for Quality Monitoring

From a quality improvement perspective, research that demonstrates continuous collection and analysis of quality data significantly improves clinical performance and outcomes (Curcin, Woodcock, Poots, Majeed, & Bell, 2014). This is the reason why the Agency for Healthcare Research and Quality (AHRQ) recommends incorporating outcome and performance measurements to improve quality and accountability (Institute of Medicine [IOM], 2001). AHRQ also supports utilizing information technologies to improve access to clinical information (IOM, 2001).

Quality tracking and quality reports can help provide a snapshot organizational performance to leadership, administration, and clinical staff. The information used from quality reports can guide the organization in prioritizing and focusing efforts in order to meet internal and external benchmarks, as well as help improve overall patient care (Wyatt, 2004). Quality dashboards provide metrics for key performance indicators to provide an overview of how well an organization, department, or program is doing. They not only monitor how well an organization is performing, they can be used to help

improve performance setting goals and establishing timelines to meet these goals (Wyatt, 2004). Whereas a balanced scorecard shows past metrics data, a dashboard delivers data more recent data (Frith, Anderson, & Sewell, 2010). This provides access to the most current metric data and can allow leadership to implement changes to address these metrics in a timely manner. Using a quality dashboard can provide quality information that can be utilized to make decisions to improve organizational performance and ultimately enable them to satisfy their goals. Data from quality dashboards can be used by physicians and nursing frontline staff to guide the care that they provide and increase their accountability for improving outcomes, regardless of their organizational roles (Frith, Anderson, & Sewell, 2010).

Successful programs are both effective and financially viable (Hodges & Videto, 2011). While the current climate of health care is focusing on quality improvement, leadership is still charged with proving some financial benefits from quality-improvement projects. Demonstrating a return of investment on quality initiatives can be a difficult, if not impossible task to accomplish, especially without utilizing methods to measure the financial impact (Coehlo & Vilares, 2010). Conducting a quality-improvement project within an established quality-monitoring program can result in potential financial benefits as well. Studies have shown that quality-improvement projects that focus on improving internal processes can have a positive financial impact through cost reduction (Rust, Moorman, & Dickson, 2002).

Theoretical Framework

Health care organizations should continuously evaluate established processes to achieve the best outcomes possible. Total quality management theory (TQM) describes

"the continual method, techniques and technical of sustaining continuous quality improvement" in order to improve the overall performance of a company (Bon & Mustafa, 2013, p. 518). Grounded in the teachings of William Edwards Deming and Deming's theory of management, TQM provides a framework for continuous performance improvement in all organizational areas and levels. TQM theory proposes a holistic approach to quality improvement that encompasses three principles: Customer focus, continuous improvement, and teamwork (Zehir, Ertosun, Zehir, & Muceldilli, 2012). Use of TQM as a framework for quality improvement has been shown to improve quality performance and support innovation (Bon & Mustafa, 2013; Zehir, Ertosun, Zehir, & Muceldilli, 2012).

Evidence-Based Practice Model

The project was implemented using the PDSA or Shewart cycle model. In today's rapidly changing health care landscape, more quality improvement tools are being used to assist in implementing evidence-based interventions (Siriwardena, 2009). The evidence-based practice PDSA cycle model was used to guide this project. The PDSA model is a quality improvement model that provides a simple, systematic approach to addressing a performance problem (Kelly, 2011). Developed by Walter Shewhart and Edward Deming, this model was designed for use in the industrial field (Taylor et al., 2013). PDSA stands for "Plan", "Do", "Study", and "Act", which are the four cyclical steps of the model. The PDSA model is a useful tool in investigating current processes while implementing evidence-based change in a rapid manner (Siriwardena, 2009). Kelly (2013) advised answering three questions before implementing the PDSA model:

1. What are we trying to accomplish?

2. How will we know that a change is an improvement? and
3. What change can we make that will result in an improvement? (p. 141)

The cycle begins with the Plan phase. During the Plan phase, needs relating to the practice problem will be identified and prioritized, and then used to develop a plan for addressing the problem. During the Do phase, the developed plan will be implemented. The Study or Check phase involves analyzing outcomes and metrics before and after the intervention to determine if there was an effect. If the intervention is proven to be effective, it is incorporated throughout the organization.

Successful use of PDSA cycles allows interventions to be tested on a smaller scale, which "enables rapid assessment and provides flexibility to adapt the change according to feedback to ensure fit-for-purpose solutions are developed" (Taylor et al., 2013, p. 291). This enables changes to be tested, evaluated, and modified - with minimal risks – before implementing system-wide. The PDSA cycle approach has been shown to lead to significant improvement in care (Taylor et al., 2013). The PDSA cycle was therefore chosen to provide a structured framework to rapidly design and implement the proposed performance improvement initiative. The model was also used to continuously evaluate whether the initiative was effective and aligned with the organization's performance objectives.

Summary

In order for programs to run effectively, it is important for organizations to have access to current, real-time data. This allows stakeholders and managers to accurately monitor performance and utilize the data to make decisions to improve performance and

satisfy program objectives and goals (McLaughlin, 2014; Wyatt, 2004). Performance reporting and monitoring allows for increased program transparency, increased accountability of programs, and increased support for maintaining, expanding, or restructuring programs (Inamdar, Kaplan, & Reynolds, 2002). Quality reports can be used to identify the patterns within the program to help identify areas of excellence and diagnose areas that need improvement. Establishing timely tracking/response of abnormal Pap smear results as a routinely monitored performance measure can help organizations to improve their management of adequate follow-up (McLaughlin, 2014).

Section 3: Approach

Overview of Methodology

The site organization, referred to as A1 Organization (pseudonym), has established guidelines and criteria for monitoring performance and quality of their Cervical Cancer Screening Surveillance Program. At the time of this project, the organization performed quality monitoring of the program using a paper-based method. While the organization generates many quality reports using data from the electronic health record (EHR) system, abnormal Pap smear results were tracked using an older tracking system that has limited interoperability and interfacing abilities with the current EHR. This internal tracking system identified and monitored patients with abnormal Pap smear results based on the following diagnoses:

- High Risk Human Papilloma Virus (HPV) Detected;
- Atypical Squamous Cells of Undetermined Significance (ASCUS);
- Low-Grade Squamous Intraepithelial Lesion (LSIL) encompassing HPV, Mild DysplasiaCIN-1;
- High-Grade Squamous Intraepithelial Lesion (HSIL) encompassing moderate and severe dysplasia, Carcinoma in Situ (CIS), Cervical Intraepithelial Neoplasia (CIN) CIN-2, CIN-3;
- Squamous Cell Carcinoma; and
- Glandular Cells encompassing atypical, suspicious for neoplasia, and endocervical adenocarcinoma in situ.

The quality reports were completed by the registered nurses (RN) assigned to program. The organization is broken down into three regions: District of Columbia &

Southern Maryland (DCSM), Northern Virginia (NOVA), and Baltimore (BALT). Each region has one or two nurses who are responsible for tracking abnormal Pap smear results of the patients within those regions only. The responsible Pap Tracking RN uses data generated from the older tracking system and incorporates them into two paper reports.

In this system, the monthly handwritten report contains information regarding the number of unaddressed abnormal Pap smear results called the "Open Items" report. The quarterly report, titled the "Pending Items" reports, provides information abnormal results that were addressed by the clinical team (i.e., contact to the patient was initiated and an appointment was scheduled), but the patient did not receive the appropriate follow-up. The current organization goal at the time of this project was to have 100% of the abnormal Pap smear results addressed by the RN, including the appropriate appointments scheduled within 30 days; and the appropriate follow-up, as determined by the organization's evidence-based guidelines, in less than 90 days.

In this project, the intervention included reviewing and/or redefining established quality metrics, capturing the identified metrics from the organization-specific tracking system, and incorporating metrics into an electronic performance quality report. While leaders monitor the macro-level performance, gaps in care for certain populations are not visible in the aggregate results. As such, options were explored to determine if the report could be stratified by demographics (e.g., race, age, geographic location, etc.) selected by the organization to also monitor micro-level results. Stratifying quality performance data by demographics can identify shortfalls in specific populations, even when overall performance is satisfactory, and clearly present areas for improvement.

The anticipated outcome from the new process was that transparency and feedback offered by the new quality reports would positively impact overall performance and lead to improvements for specific populations. The objectives were to learn how the program served specific populations, identify potential areas for process improvement, and achieve the stated performance goals for abnormal Pap smear management.

The timeframe for the project objectives are listed below:

- Establish electronic monitoring of quality metrics (12 weeks)
  - Evaluate Baseline Quality Improvement Data (7 days)
  - Review/Edit/Confirm Quality Metrics for Pap Tracking Program (14 days)
  - Collaborate with clinical quality team to create an electronic quality report (6 weeks)
  - Investigate options to stratify electronic report by demographics (9 weeks)
- Demonstrate improvement in timeliness of abnormal Pap smear result notification and follow-up (12 weeks)
  - Communicate overview and purpose of new electronic Pap Tracking Quality Report to Service Line (2 weeks)
  - Implement electronic monthly quality reports (12 weeks)
  - Perform chart reviews of site performing under target to identify possible barriers to care coordination and opportunities for improvement (2 weeks)
  - Evaluate outcomes postintervention to demonstrate effectiveness (1 week)

Data Collection

Continuous data collection and concurrent data analysis are critical attributes for a functional quality improvement program (Curcin et al., 2014). Also, systematic processes

to measure and track quality improvement processes can validate the effectiveness or ineffectiveness of interventions as well as the sustainability (Varkey, Reller, & Resar, 2007). The data collected were the quality metrics established by the organization: the number of abnormal results that had not been reviewed after more than 30 and 60 days, and the number of patients during the previous 90 days who were notified, but still had not returned for follow-up.

For this DNP project, data collection was conducted using the developed electronic reports. Human subjects were not used and no identifiable patient information was included in these reports. A simple time-series study design was used to measure the effects pre- and post-implementation of the electronic reports. This quasi-experimental research design was selected because a true experimental design was not feasible in this setting. A simple time-series design involves "the collection of data over an extended period of time and the introduction of an experimental treatment during the data collection process" (Terry, 2012, p. 76). For this project, a single group pretest/posttest design was used. A baseline measurement of quality data was obtained prior to implementation of the program using the current process. Once the electronic report was been created, quality data were measured in the beginning and three months after implementing electronic quality reports. All data were presented in aggregate form only.

One of the limitations of this study design was that there was no random sampling of subjects (i.e., patients with abnormal Pap smears). Another limitation was the lack of a control group to determine if any changes to performance are truly a result of the intervention rather than external factors. The lack of random sampling or a control group increases confounding bias and reduces internal validity (Terry, 2012).

Analysis Method

A two-sample *t* test was used to measure the differences in mean quality outcomes before and after implementing electronic quality reports. A two-sample *t* test analysis "makes inferences about the equality of two population means, based on two sample means" (Polit, 2010, p. 133). Since the data involved comparing performance outcomes of the same group pre- and post-intervention, a dependent groups *t* test was required. Because of the small data sample, run charts were used in addition to *t* tests to show the quality data trends over time.

Summary

The project, while designed to improve patient clinical outcomes, focused on improving clinical staff performance and process improvement. Due to time constraints and limitations of the project setting, a single group comparison, simple time-series study was conducted. The selected study design was limited by threats to internal validity. Run charts were also used to identify any trends in quality data after implementation. In spite of the limitations to the selected study design, my intent was to demonstrate that any significant improvement in quality performance was attributable to the implementation of standardized monitoring using electronic quality reports.

Section 4: Findings

Introduction

While working with leadership within A1 Organization's (pseudonym) maternal-child health service line, the decision was made to develop an evidence-based quality improvement initiative to improve their longstanding program for monitoring abnormal cervical cancer screening results. The purpose of the quality-improvement project was to standardize the program's quality metrics and monitoring, explore capabilities for stratifying the quality data by patient demographics, develop an electronic quality reporting tool to be used throughout the organization, and improve timeliness of follow-up for abnormal cervical cancer screening results.

Results

As part of the quality improvement initiative, key stakeholders within the Cervical Cancer Surveillance Program (CCSP) resumed regular meetings to review the quality of the program. I worked within the CCSP's Regional Pap Quality Meeting to develop and implement the approved DNP project. In reviewing the organization's process for quality monitoring and reporting, different regions were found to have the same quality metrics. However, each region monitored and reported the data at different intervals using different reporting forms. With conversation and the intention for increased collaboration, the group agreed to continue using the established quality metrics and to unify the reporting to generate monthly quality reports for all regions.

I used the old quality metrics and reports to build a new electronically formatted report to be used by the nurses in the program. For nursing leadership, a report was created to show the data trends for up to one year at a time. The reports were designed to

improve ease of use and reduce errors by providing automatic calculations of percentages and totals. They also automatically displayed the data with certain visual characteristics to show the user immediately which centers did not meet the threshold targets. An added feature to the reports was that they automatically generated charts of the quality metrics once the data were updated. This allowed nurses and leadership to visualize the data trends for the month and over time.

Once the reports were created, they were presented at the Regional Pap Quality Workgroup and approved for use by its members. In order to analyze whether use of the newly implemented electronic reports helped to improve timely outreach and follow-up, I compared the quality data from the first and second quarter of 2016 to the data from the reports generated in 2015. The reports were piloted in one of A1 Organization's three service areas: Baltimore, Northern Virginia, and District of Columbia & Suburban Maryland (DCSM). However, the only available data came from the DCSM service area and were thus utilized for this project.

By comparing the data from the Open Items Report (OIR) on how soon outreach was done on abnormal results, I determined that the average compliance rate for all of the medical centers combined was 98% in 2015. For 2016, this number decreased to 95%, meaning that more medical centers were not meeting their goals and were notifying patients more than 30 days after the results were first available. A second report called the Pending Items Report (PIR) was also used. The PIR shows the number of abnormal results that were addressed by the health care team or PTN, but are still awaiting appropriate follow-up (e.g., colposcopy). Comparing the PIR from 2015 to the first and second quarter of 2016, more medical centers had patients that still had not received the

appropriate follow-up for their abnormal Pap smear results by 30 days after notification than had previously been in 2015. The data analysis did not support the project's hypothesis that implementation of a standardized electronic report tool will improve quality for this program.

Data samples from an aggregate of 12 months were used: six nonconsecutive months in 2015 and six consecutive months in 2016. (This was due in part to the quality reports having not been consistently run in 2015, resulting in only 6 months of data being available.) Using the OIR and PIR data from 2015 and 2016, I conducted a two-sample *t* test to analyze the results. Both *t* tests assumed unequal variances. For the OIR report (Table 1), the mean compliance was 98.4% for 2015 compared to 93.9%. The two-sample *t* test gave a *t*-statistic of 2.024 with 6 degrees of freedom (*df*). Using a significance level (*a*) of 0.05, the *p*-value is .089 and the *t*-value for the data is 2.447. This shows that there was no significant difference between the two data sample means. After performing a *t* test for the PIR report, the results were similar (Table 2). The mean PIR compliance rate was 98.2% in 2015 and 95.1% in 2016. The *t*-test statistic was 6.484 with a *df* of 10. Using an $a = 0.05$ and a *p*-value of 7.04 and the critical value is 2.31. As a result, this also demonstrated no significant difference in the means for the PIR quality data.

Because of the small data sample, run charts (Tables 3-6) were created to show the overall trend in data from the previous year until May 2016. The data trend for 2016 showed that compliance had dropped slightly from the previous year for both the OIR and the PIR. As noted before, the average overall OIR compliance for the region was 93.9% in 2016 compared to 98.4% in 2015. For the PIR, the average compliance for the

region was 98.2% in 2015, but had dropped to 95.1% for the 2016 data. Overall, the results and data analysis did not support the objective of improving the program's quality scores.

Table 1

Data Analysis of Open Items Report (OIR)

OIR Data Analysis *t test*: Two-Sample Assuming Unequal Variances		
Sample Size		12
SEM		1.2429
	2015 Data	*2016 Data*
M	0.984028	0.939583
Variance	0.000297	0.002596
Observations	6	6
Hypothesized *M* Difference	0	
df	6	
t Statistic	2.024003	
P(T<=t) two-tail	0.089403	
t Critical two-tail	2.446912	

Table 2

Data analysis of the Pending Items Report (PIR)

PIR Data Analysis *t* test: Two-Sample Assuming Unequal Variances		
Sample Size		12
SEM		0.51484
	2015 Data	*2016 Data*
M	0.981806	0.951111
Variance	5.96E-05	7.49E-05
Observations	6	6
Hypothesized *M* Difference	0	
df	10	
t Statistic	6.483755	
P(T<=t) two-tail	7.04E-05	
t Critical two-tail	2.228139	

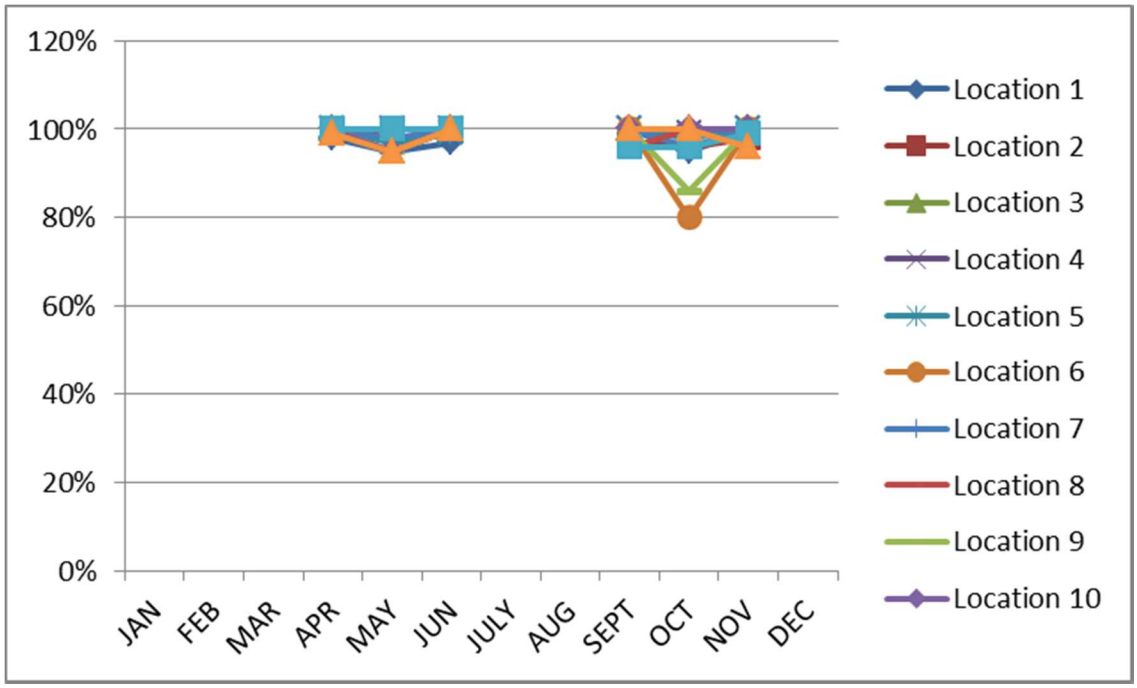


Figure 1. Graph of the data trends for the monthly OIR compliance rate of each medical center that reported in 2015. The OIR is the number of number of abnormal cervical cancer screening results that were addressed (i.e., outreach) within 30 days or less.

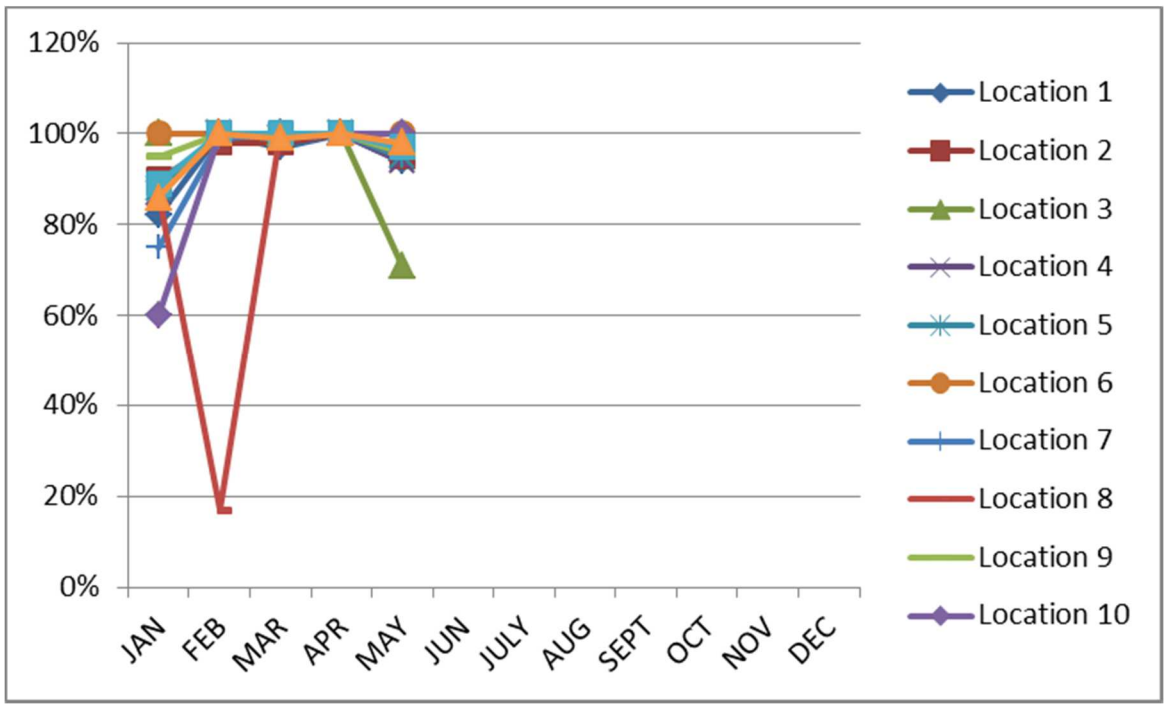


Figure 2. Graph of the data trends for the monthly OIR compliance rate of each medical center that reported from January-June 2016. The OIR is the number of number of abnormal cervical cancer screening results that were addressed (i.e., outreach) within 30 days or less.

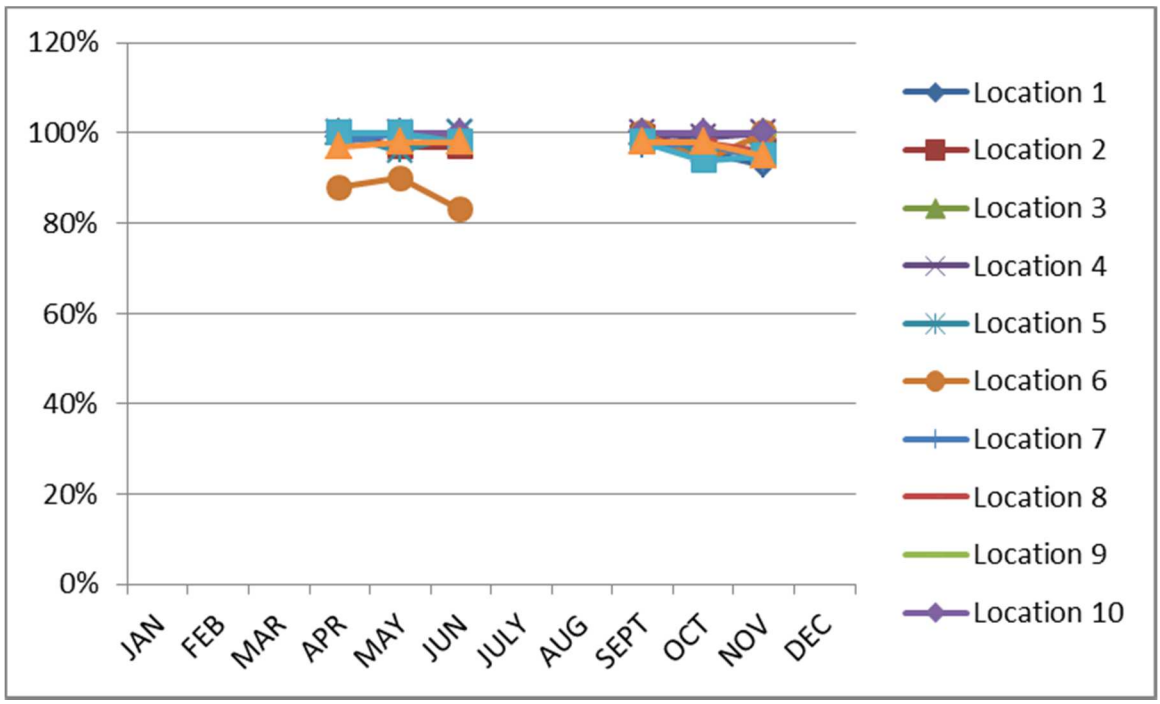


Figure 3. Graph of the data trends for the monthly PIR compliance rate of each medical center that reported in 2015. The PIR is the number of number of abnormal cervical cancer screening results that were addressed (i.e., outreach) by the health care team, but were still awaiting appropriate follow-up (e.g., colposcopy, repeat pap, cryosurgery, etc.).

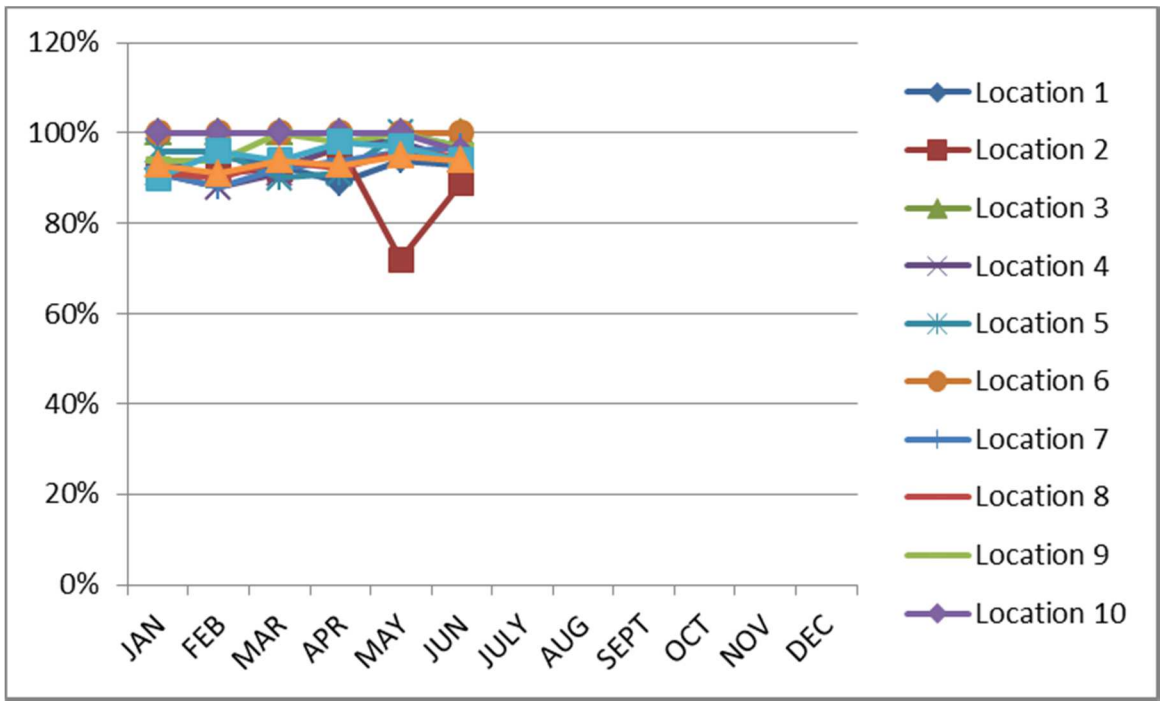


Figure 4. Graph of the data trends for monthly PIR compliance rate of each medical center that reported from January-June 2016. The PIR is the number of number of abnormal cervical cancer screening results that were addressed (i.e., outreach) by the health care team, but were still awaiting appropriate follow-up (e.g., colposcopy, repeat pap, cryosurgery, etc.).

Discussion

Organizational decisions also had an effect on meeting one of the project objectives. A1 Organization decided to phase out the outdated Pap smear results tracking system that they currently use and build a new tracking program within their electronic health record. The tentative go-live date for this new system is sometime in 2017. Currently, the organization is still in the process of developing the new program and working out kinks. Because of the impending plan to retire the presently used, but outdated program, along with uncertainty regarding deployment of the new program and

its capabilities, it was decided by administrative leadership not to explore options for stratifying data by patient demographics until the new system is launched.

Operational activities within the service line created another variable that affected quality data. During the project, the organization launched an upgrade to the lab result reports function of the electronic health record. The upgrade led to a delay in receiving lab results as it required an additional step to order the HPV test. This greatly impacted the PTN's workflow causing an increase in time to outreach and documentation of follow-up. Additionally, because the pilot region was already using a different workflow for pap tracking outreach than the other two regions, their nurses reported more challenges with providing timely outreach after the upgrade which led to a greater impact on their quality outcomes. Although there were several operational and departmental factors involved that had a possible negative effect on project outcomes, the project benefited the organization by creating a useful tool to monitor quality data and by standardizing and facilitating quality improvement activities across the three service areas. My professional opinion is that with more time to monitor and collect data, the project will lead to significant improvement on overall quality metrics.

Strengths and Limitations

This project was deemed a Quality-improvement project by the IRB and received an expedited approval. Though quality meetings and information was shared across the organization, the quality tool was piloted in one service area to allow for faster implementation and evaluation. The electronic reports, while not showing an initial positive effect on quality outcomes, allowed the quality workgroup to review data trends

(short-term and long-term) and quickly identify sites that may need a more detailed investigation to determine possible barriers or areas for improvement.

A limitation noted in this project was inconsistent monitoring conducted by the region selected. As a result, the service area had data missing for several months. Another limitation noted was related to the current monitoring system which did not allow for reports to be run on past data. I was left to complete the analysis with data from only six months of the previous year and compare it to data from the first six months of 2016. Since the 2015 data were incomplete, it was difficult to ascertain the potential impact of the missing data on the project outcomes. Because of time constraints related to the program, the collection and analysis of data was done relatively quickly. In my professional opinion, time was also a limitation in demonstrating a meaningful impact on improving quality metrics after using the reporting tool.

Implications for Practice

Though early results of the project did not support using electronic quality reports to improve quality outcomes, it did help to standardize quality reporting procedures and streamline quality improvement activities for this program. Whereas data collection was inconsistent and incomplete throughout 2015, the selected service area reported timely quality data for the first half of 2016. The PDSA model selected for the project can be applied to other population care management programs (i.e., breast cancer screening) to implement quality-based initiatives. The organization can summarize best practices developed from its quality workgroup and share them with their health care partners in the community. More importantly, the lessons learned from this project can help health

care organizations to increase accountability and meaningful use of health care programs while promoting continual improvement in multiple areas.

Analysis of Self

The planning, development, and implementation of my scholarly DNP project has been a critical introduction to my role as a future DNP nurse. All of my didactic courses and required practicum hours helped to prepare me for some of the challenges of incorporating evidence-based practice in today's dynamic health care setting. Although I have spent the majority of my 18-year nursing experience in various leadership positions, my journey through this program has rewarded me with additional knowledge and skills needed to advance in my career as an advanced practice nurse.

Summary

Cervical cancer, while on a steady decline since implementing routine cervical cancer screening in the United States, still continues to affect thousands of women and results in hundreds of preventable deaths each year (CDC, 2014; Vesco et al., 2011). Screening for cervical cancer, while arguably the most important step in preventing invasive cervical cancer, is not effective alone. Appropriate follow-ups such as colposcopies are needed to address any detected abnormalities and prevent progression to invasive disease (Spence, Goggin, & Franco, 2007). While the target health care organization for this project has long utilized a system to ensure timely notification and intervention for abnormal cervical cancer screening results, the quality and performance of the program was not being consistently monitored across the board.

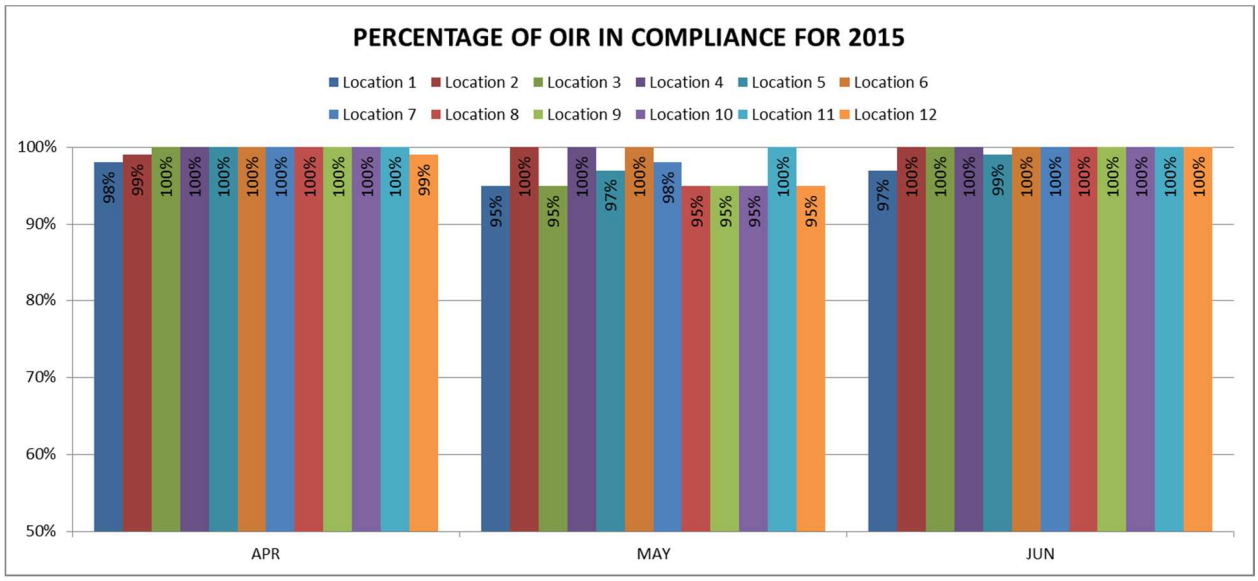
The purpose of this project was to standardize the program's quality metrics and monitoring, explore capabilities for stratifying the quality data by patient demographics,

develop an electronic quality reporting tool to be used throughout the organization, and improve timeliness of follow-up for abnormal cervical cancer screening results. However, project implementation was constrained by time and other major initiatives within the organization. In addition, the project design did not permit the data segregation based on patient demographics which might have demonstrate improvement in the quality scores for specific segments.

The project also moved the quality monitoring practices to be standardized throughout the program and helped to improve compliance with nursing quality protocols. Furthermore, the program led to the development of an electronic quality reporting tool to be utilized in all regions. This tool was centrally managed and can be easily shared within the program, distributed across the service line, and disseminated out to executive leadership. Overall, this quality-improvement project can be used as a model with other population care-based programs to establish and evaluate quality metrics and monitoring procedures to be employed as a way to promote continuous quality improvement in any health care setting.

Appendix: Example of Quality Reporting Tool

Month	Location 1	Location 2	Location 3	Location 4	Location 5	Location 6	Location 7	Location 8	Location 9	Location 10	Location 11	Location 12	2015 Quality Data Trends Total
JAN													
FEB													
MAR													
APR	98%	99%	100%	100%	100%	100%	100%	100%	100%	100%	100%	99%	100%
MAY	95%	100%	95%	100%	97%	100%	98%	95%	95%	95%	100%	95%	97%
JUN	97%	100%	100%	100%	99%	100%	100%	100%	100%	100%	100%	100%	100%
JULY													
AUG													
SEPT	100%	97%	100%	100%	100%	100%	100%	96%	100%	100%	96%	100%	99%
OCT	95%	96%	100%	99%	98%	80%	96%	100%	86%	100%	96%	100%	96%
NOV	100%	98%	100%	100%	100%	100%	100%	100%	100%	100%	99%	96%	99%
DEC													
Overall Compliance													**98%**
***Red Highlight = Action plan required.**													



Section 5: Scholarly Product-Manuscript Submission Draft

Cervical Cancer Prevention Screening: A Quality Improvement Project to Reduce Variation and Increase Timeliness in Managing and Reporting Abnormal Papanicolaou Smear Results

Abstract

Background: Cervical cancer deaths have decreased significantly as a result of increased cervical cancer screening rates (CDC, 2014); however, cervical cancer is the fifth most common cancer in the U.S. and the second most common cancer for women in the world (CDC, 2014; Spence, Goggin, & Franco, 2007). The majority of cervical cancer prevention and reduction strategies are focused on increased screening; In addition to screening, proper management of abnormal results is a key factor to appropriate and timely intervention (Yabroff, Kerner, & Mandelblatt, 2000).

Purpose: The purpose of this scholarly project was to assess, standardize, and improve the quality monitoring and management of abnormal cervical cancer screening results within an integrated health care organization.

Goals: To standardize quality monitoring and reporting activities for the organization's abnormal Pap smear management program.

Project Design: Quality Improvement Initiative

Findings & Conclusions: Though the project was not able to meet several of its objectives explored, it did standardize the quality monitoring process for the organization and generated an electronic quality reporting tool. This tool is currently being used in the Cervical Cancer Screening program to monitor performance and disseminate quality metrics throughout the organization.

Implications for Positive Social Change: Developing programs to improve management of abnormal Pap smear results combined with national efforts to increase cervical cancer screening can reduce disparities in cervical cancer deaths and achieve the Healthy People 2020 target for reducing the incidence of cervical cancer.

Key Words

Cervical Cancer; Cervical Cancer Screening; Pap Test; Pap Smear; Quality; Quality Monitoring; Quality Improvement

Introduction

Adhering to recommended cervical cancer screening guidelines with cytology (i.e. Pap smear or Pap test) has been shown to reduce the incidence of invasive cervical cancer (Vaccarella, Lortet-Tieulent, Plummer, Franceschi, & Bray, 2013; Vesco et al., 2011). Since 1955, there has been more than a 60% reduction in the incidence and death rate of cervical cancer (National Institutes of Health [NIH], 2010). Despite the significant decline in cervical cancer deaths over the last 40 years, more than 4,000 U.S. residents die annually from this treatable disease. According to the Centers for Disease Control and Prevention (CDC), in 2014, 12,109 women were diagnosed with cervical cancer and 4,092 women have died from the disease (CDC, 2014).

The majority of cervical cancer prevention and reduction strategies are focused on increased screening; however, proper management of abnormal results is also a contributing factor to appropriate and timely intervention (Yabroff, Kerner, & Mandelblatt, 2000). Identification of abnormal results, performed well by most accredited healthcare organizations, is only the first step in the screening process. The reduction in

invasive cervical cancer is not possible without the next step: the appropriate follow-up of these abnormalities (Spence, Goggin, & Franco, 2007).

Background

To satisfy requirements for my doctor of nursing practice (DNP) degree, I chose to design and implement a quality-improvement project within a large integrated health care organization. The purpose of the project was to assess, standardize, and improve the quality monitoring and management of abnormal Pap smear results. The organization selected for this project, hereafter referred to as A1 Organization (pseudonym), has a robust, efficient, and effective cervical cancer screening program. Although the organization outperforms most industry screening benchmarks, opportunities exist to enhance their current program – including improving the timely notification of women identified with abnormal Pap smears and identifying barriers to proper follow-up care. Incorporating evidence-based quality performance measures into the quality monitoring process helps organizations to sustain improvement activities, monitor effectiveness, and enable additional quality improvement (Maheshwari & Janseen, 2013; McLaughlin, 2014).

A1 Organization has established guidelines to track abnormal results and ensure timely follow-up; however, the current paper-based process for tracking quality was not standardized across the organization at the start of this project. Quality reports were completed by hand using a standard form, but monitoring and reporting of quality metrics and performance was inconsistently done throughout the three regional service lines. In addition, the current process monitored performance for the general patient population, but did not stratify results based on patient demographics. This prevented the

organization from monitoring performance in specific populations in order to identify potential areas for improvement. An identified current practice problem, the need for standardized performance monitoring in the site organization's current abnormal Pap smear results coordination program, was addressed by this project.

The objectives of the program were:

- To standardize monitoring and reporting activities by electronically incorporating current quality metrics for the organization's abnormal Pap smear management program using the electronic health record system
- To develop a centrally managed electronic quality report of the organization-specific quality metrics for abnormal Pap smear management
- To explore the possibilities of stratifying performance outcomes based on race, ethnicity, and age for future reporting opportunities
- To improve timeliness of abnormal Pap smear notification and follow-up for sites performing below quality measure targets through use of electronic monthly and/or quarterly Pap Tracking quality reports

In order for programs to run effectively, it is important for organizations to have access to current, real-time data. This allows stakeholders and managers to accurately monitor performance and utilize the data to make decisions to improve performance and satisfy program objective and goals (McLaughlin, 2014; Wyatt, 2004). Performance reporting and monitoring allows for increased program transparency, increased accountability of programs, and increased support for maintaining, expanding, or restructuring programs (Inamdar, Kaplan, & Reynolds, 2002). Quality reports can be used to identify the patterns within the program to help identify areas of excellence and

diagnose areas that need improvement. Establishing timely tracking/response of abnormal Pap smear results as a routinely monitored performance measure can help organizations to improve their management of adequate follow-up (McLaughlin, 2014).

Theoretical Framework

Health care organizations should continuously evaluate established processes to achieve the best outcomes possible. Total quality management theory (TQM) describes "the continual method, techniques and technical of sustaining continuous quality improvement" in order to improve the overall performance of a company (Bon & Mustafa, 2013, p. 518). Grounded in the teachings of William Edwards Deming and Deming's theory of management, TQM provides a framework for continuous performance improvement in all organizational areas and levels. TQM theory proposes a holistic approach to quality improvement that encompasses three principles: Customer focus, continuous improvement, and teamwork (Zehir, Ertosun, Zehir, & Muceldilli, 2012). Use of TQM as a framework for quality improvement has been shown to improve quality performance and support innovation (Bon & Mustafa, 2013; Zehir, Ertosun, Zehir, & Muceldilli, 2012).

Evidence-Based Practice Model

The project was implemented using the PDSA or Shewart cycle model. In today's rapidly changing health care landscape, more quality improvement tools are being used to assist in implementing evidence-based interventions (Siriwardena, 2009). The evidence-based practice model, PDSA cycle, was used to guide this project. The PDSA model is a quality improvement model that provides a simple, systematic approach to addressing a performance problem (Kelly, 2011). Developed by Walter Shewhart and Edward

Deming, the PDSA model has been used in the industrial field (Taylor et al., 2013). PDSA stands for “Plan”, “Do”, “Study”, and “Act”, which are the four cyclical steps of the model. The PDSA model is a useful tool in investigating current processes while implementing evidence-based change in a rapid manner (Siriwardena, 2009). Kelly (2013) advised answering three questions before implementing the PDSA model:

1. What are we trying to accomplish?
2. How will we know that a change is an improvement? and
3. What change can we make that will result in an improvement? (p. 141)

Methods

In this project, the intervention includes reviewing and/or redefining established quality metrics, capturing the identified metrics from the organization-specific tracking system, and incorporating metrics into an electronic performance quality report. While leaders monitor the macro-level performance, gaps in care for certain populations may not be visible in the aggregate results. As such, options were explored to determine if the report can be stratified by demographics (e.g., race, age, geographic location, etc.) selected by the organization to also monitor micro-level results. Stratifying quality performance data by demographics can identify shortfalls in specific populations, even when overall performance is satisfactory, and clearly present areas for improvement.

The anticipated outcome from the new process was that the transparency and feedback offered by the new quality reports would positively impact overall performance and lead to improvements for specific populations. The goals were to learn how the program serves specific populations, identify potential areas for process improvement, and achieve the stated performance goals for abnormal Pap smear management.

The timeline for the project objectives are listed below:

- Establish electronic monitoring of quality metrics (12 weeks)
  - Evaluate Baseline Quality Improvement Data (7 days)
  - Review/Edit/Confirm Quality Metrics for Pap Tracking Program (14 days)
  - Collaborate with clinical quality team to create an electronic quality report (6 weeks)
  - Investigate options to stratify electronic report by demographics (9 weeks)
- Demonstrate improvement in timeliness of abnormal Pap smear result notification and follow-up (12 weeks)
  - Communicate overview and purpose of new electronic Pap Tracking Quality Report to Service Line (2 weeks)
  - Implement electronic monthly quality reports (12 weeks)
  - Perform chart reviews of site performing under target to identify possible barriers to care coordination and opportunities for improvement (2 weeks)
  - Evaluate outcomes post-intervention to demonstrate effectiveness (1 week)

Data Collection

Continuous data collection and concurrent data analysis are critical attributes for a functional quality improvement program (Curcin et al., 2014). Also, systematic processes to measure and track quality improvement processes can validate the effectiveness or ineffectiveness of interventions as well as the sustainability (Varkey, Reller, & Resar, 2007). The data collected for this project were the quality metrics established by the organization:

1. The number of abnormal results that had not been reviewed after more than 30 and 60 days.
2. The number of patients during the previous 90 days who were notified, but still had not returned for follow-up.

For this DNP project, data collection was conducted using the developed electronic reports. Human subjects were not be used and no identifiable patient information was included in these reports. A simple time-series study design was used to measure and effects pre- and post-implementation of the electronic reports. This quasi-experimental research design was selected because a true experimental design would not be feasible in this setting. A simple time-series design involves "the collection of data over an extended period of time and the introduction of an experimental treatment during the data collection process" (Terry, 2012, p. 76).

For this project, a single group pretest/posttest design was used. A baseline measurement of quality data was obtained prior to implementation of the program using the current process. Once the electronic report was created, quality data were measured in the beginning and three months after implementing electronic quality reports. All data were presented in aggregate form only.

Analysis Method

A two-sample *t* test was used to measure the differences in mean quality outcomes before and after implementing electronic quality reports. A two-sample *t* test analysis "makes inferences about the equality of two population means, based on two sample means" (Polit, 2010, p. 133). Since the data involved comparing performance outcomes of the same group pre- and post-intervention, a dependent groups *t* test was

required. Because of time restraints related to project implementation, run charts were used in addition to *t* tests to show the quality data trends over time.

Results

As part of the quality improvement initiative, key stakeholders within the Cervical Cancer Surveillance Program (CCSP) resumed regular meetings to review the quality of the program. I worked within the CCSP's Regional Pap Quality Meeting to develop and implement the approved DNP project. In reviewing A1 Organization's process for quality monitoring and reporting, I discovered that the different regions within the organization were using the same quality metrics. However, each region was monitoring and reporting data at different intervals. The group agreed to continue using the established quality metrics and came to a consensus to generate quality data reports monthly for all regions.

I used the old quality metrics and reports to build a new electronically formatted report to be used by the nurses in the program. For nursing leadership, a report was created to show the data trends for up to one year at a time. The reports were designed to improve ease of use and reduce errors by providing automatic calculations of percentages and totals. They also automatically displayed the data with certain visual characteristics to show the user immediately which centers did not met the threshold targets. An added feature to the reports was that they automatically generated charts of the quality metrics once the data were updated. This allowed for the nurses and leadership to visualize the data trends for the month and over time.

Once the reports were created, they were presented at the Regional Pap Quality and approved for use by its members. In order to analyze whether use of the newly implemented electronic reports helped to improve timely outreach and follow-up, I

compared the quality data from the first and second quarter of 2016 to the data from the reports generated in 2015. The reports were piloted in one of the three regions, so only data from this region was used.

In comparing the data from the Open Items Report (OIR), the report of how soon outreach was done on abnormal results, in 2015, the average compliance rate for all of the medical centers combined was 98%. For 2016, this number decreased to 95%, meaning that more medical centers were not meeting their goals and were notifying patients more than 30 days after the results were first available. Comparing the Pending Items Report (PIR) from 2015 to the first and second quarters of 2016, more medical centers had patients that still had not received the appropriate follow-up for their abnormal Pap smear results by 30 days after notification than had previously been in 2015. The data analysis did not support the project's hypothesis that implementation of a standardized electronic report tool will improve quality for this program.

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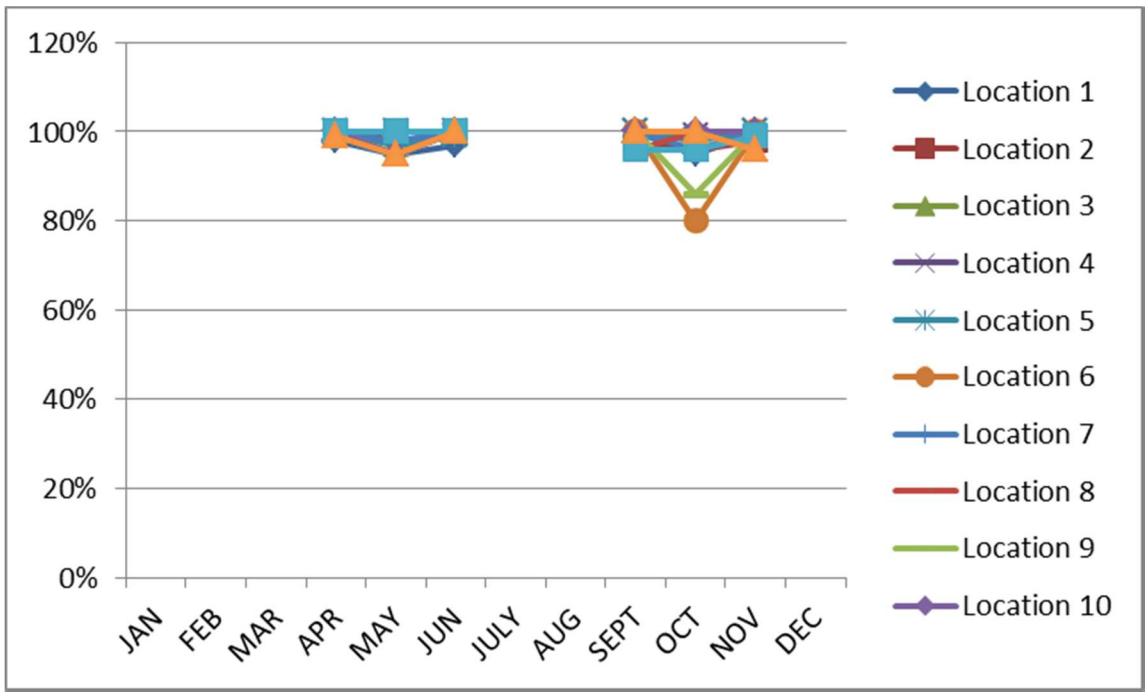

Figure 1. Graph of the data trends for the monthly OIR compliance rate of each medical center that reported in 2015. The OIR is the number of number of abnormal cervical cancer screening results that were addressed (i.e., outreach) within 30 days or less.

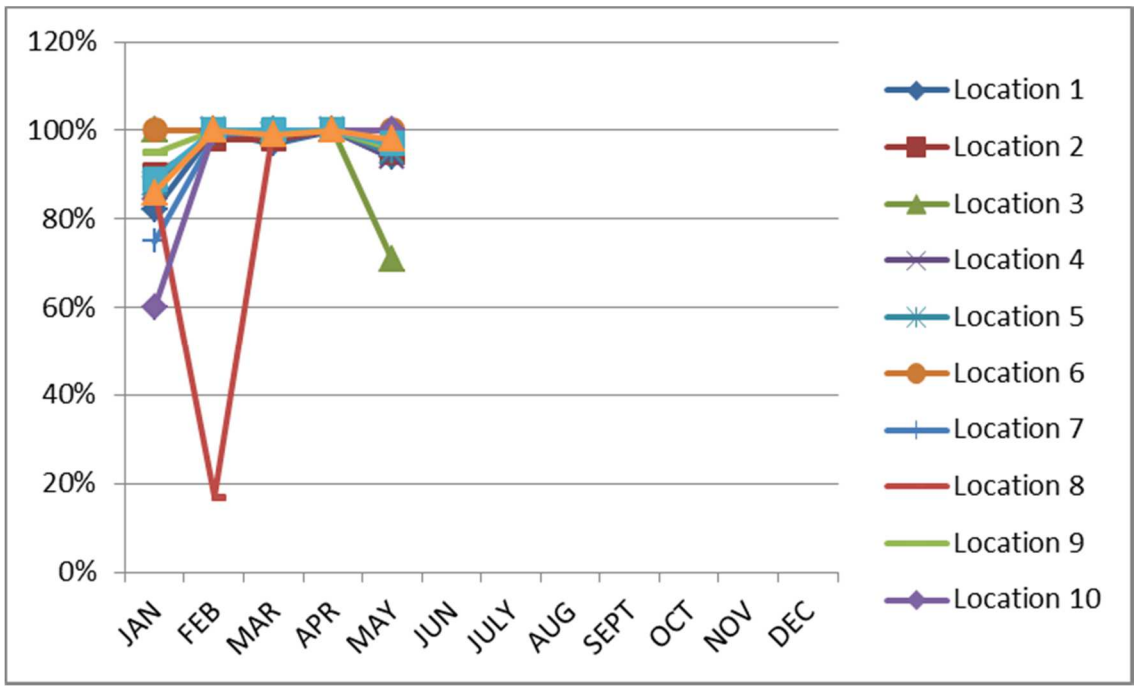

Figure 2. Graph of the data trends for the monthly OIR compliance rate of each medical center that reported from January-June 2016. The OIR is the number of number of abnormal cervical cancer screening results that were addressed (i.e., outreach) within 30 days or less.

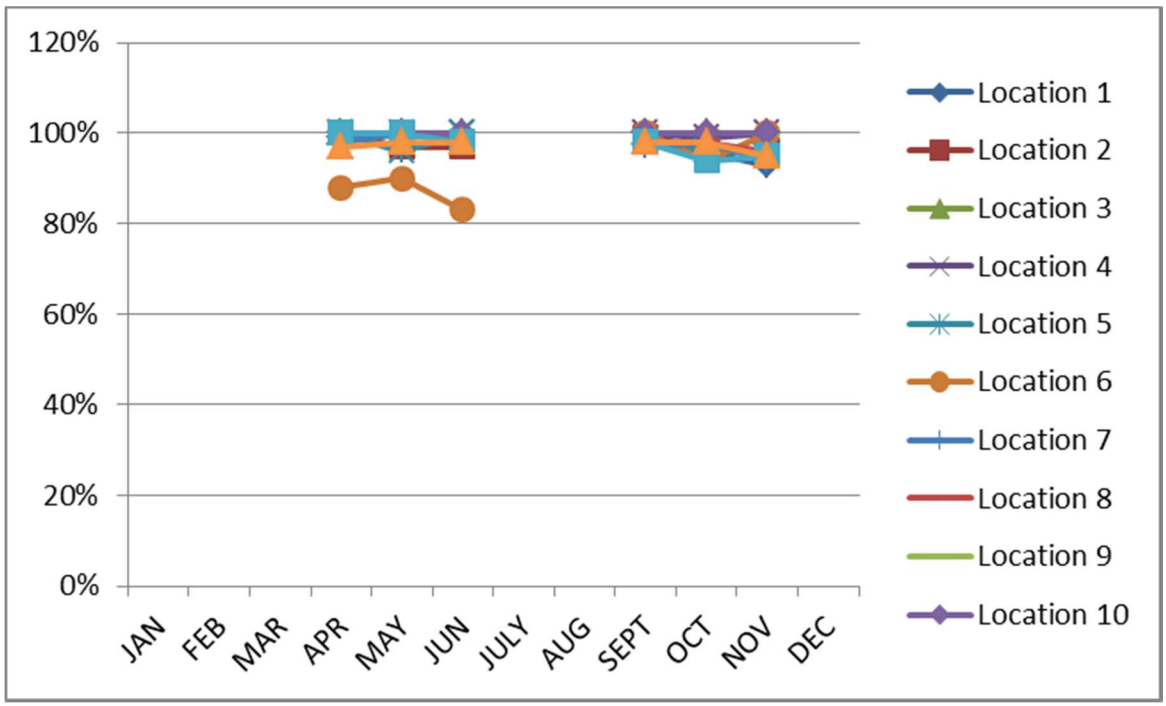

Figure 3. Graph of the data trends for the monthly PIR compliance rate of each medical center that reported in 2015. The PIR is the number of number of abnormal cervical cancer screening results that were addressed (i.e., outreach) by the health care team, but were still awaiting appropriate follow-up (e.g., colposcopy, repeat pap, cryosurgery, etc.).

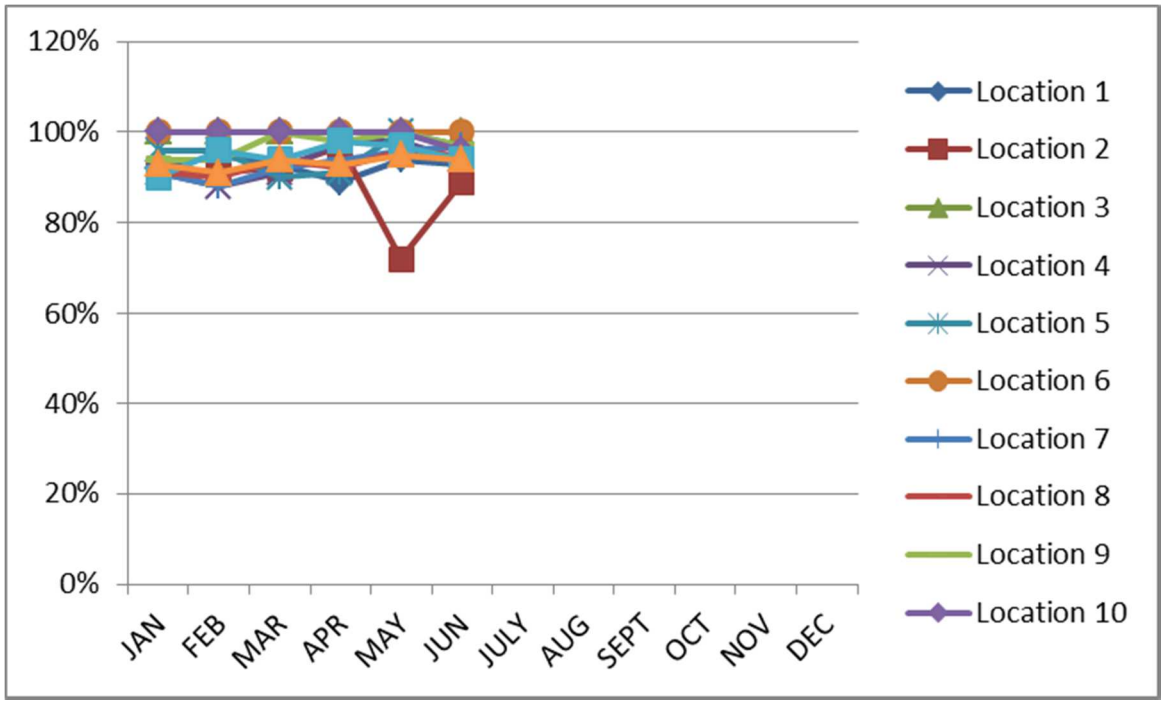

Figure 4. Graph of the data trends for monthly PIR compliance rate of each medical center that reported from January-June 2016. The PIR is the number of number of abnormal cervical cancer screening results that were addressed (i.e., outreach) by the health care team, but were still awaiting appropriate follow-up (e.g., colposcopy, repeat pap, cryosurgery, etc.).

Discussion

Organizational decisions also had a negative effect on meeting one of the project objectives. A1 Organization decided to phase out the outdated Pap smear results tracking system that they currently use and build a new tracking program within their electronic health record. The tentative go-live date for this new system is sometime in 2017. Currently, the organization is still in the process of developing the new program and working out kinks. Because of the impending plan to retire the presently used, but outdated program, along with uncertainty regarding deployment of the new program and

its capabilities, administrative leadership decided not to explore options for stratifying data by patient demographics until the new system is launched.

Operational activities within the service line created another variable that affected quality data. During the project, the organization launched an upgrade to the lab result reports function of the electronic health record. The upgrade led to a delay in receiving lab results, as this required an additional step to order the HPV test. This greatly impacted the PTN's workflow causing an increase in time to outreach and documentation of follow-up. Additionally, because the pilot region was already using a different workflow for pap tracking outreach than the other two regions, their nurses reported more challenges with providing timely outreach after the upgrade, which led to a greater impact on their quality outcomes. Although there were several operational and departmental factors involved that had a possible negative effect on project outcomes, the project benefited the organization by creating a useful tool to monitor quality data and by standardizing and facilitating quality improvement activities across the three service areas. It is my professional opinion that with more time to monitor and collect data, the project will lead to significant improvement on overall quality metrics.

Strengths and Limitations of the Project

This project was deemed a quality-improvement project by the site organization IRB and received an expedited approval. Although the quality meetings were reestablished and the information was shared across the organization, the quality tool was piloted in one service area to allow for faster implementation and evaluation. The electronic reports, while not showing an initial positive effect on quality outcomes, allowed the quality workgroup to review data trends (short-term and long-term) and

quickly identify sites that may need a more detailed investigation to determine possible barriers or areas for improvement.

A limitation noted in this project was inconsistent monitoring conducted by the region selected. As a result, the service area had data missing for several months. Another limitation noted was related to the current monitoring system, which did not allow for reports to be run on past data. I was left to complete the analysis with data from only six months of the previous year and compare it to data from the first six months of 2016. Since the 2015 data were incomplete, it was difficult to ascertain the potential impact of the missing data on the project outcomes. Because of time constraints related to the IRB approval, the collection and analysis of data was done relatively quickly. In my professional opinion, time was a significant limitation in demonstrating a meaningful impact on improving quality metrics after implementation of the reporting tool.

Conclusion

Cervical cancer, while on a steady decline since implementing routine cervical cancer screening in the United States, continues to affect thousands of women and results in hundreds of preventable deaths each year (CDC, 2014; Vesco et al., 2011)). Screening for cervical cancer, while arguably the most important step in preventing invasive cervical cancer, is not effective alone. Appropriate follow-ups, such as colposcopies, are needed to address any detected abnormalities and prevent progression to invasive disease (Spence, Goggin, & Franco, 2007). While the target health care organization for this project has long utilized a system to ensure timely notification and intervention for abnormal cervical cancer screening results, the quality and performance of the program was not being consistently monitored across the board.

The purpose of this project was to standardize the program's quality metrics and monitoring, explore capabilities for stratifying the quality data by patient demographics, develop an electronic quality reporting tool to be used throughout the organization, and improve timeliness of follow-up for abnormal cervical cancer screening results. Implementation of the project was limited by time constraints and major program changes within the organization. Although the project was not able to explore the possibility of separating data based on patient demographics and did not demonstrate an improvement in the quality scores, it resulted in standardized quality monitoring practices throughout the program and helped to improve compliance with nursing quality protocols.

The project also created an electronic quality-reporting tool to be utilized in all regions. This tool will be centrally managed and can be easily shared within the program, distributed across the service line, and disseminated out to executive leadership. Overall, this type of quality-improvement project can be used as a model with other population care-based programs to establish and evaluate quality metrics and monitoring procedures to be employed as a way to promote continuous quality improvement in any health care setting.

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