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Education Combined with Reminder Strategies to Improve Cervical Cancer Screening Rates

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EDUCATION COMBINED WITH REMINDER STRATEGIES TO IMPROVE CERVICAL CANCER SCREENING RATES

by

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DEDICATION

I would like to dedicate this project to my family. To my husband Eric, whose emotional and financial support was essential in my DNP journey and in completing this project. To my sons, Tim and David, for your encouragement and believing in me. Also, to my mom, Faith, for always providing a listening ear for my frustrations, celebrating my successes, and being excited to hear what I am learning. Finally, to my Aunt Charlynn, who is a cervical cancer survivor and inspiration for my project.

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ABSTRACT

Cervical cancer is the second most common cancer among women worldwide and a leading cause of death in some countries (Jayasekara, 2020). Approximately 13,800 cases of cervical cancer were diagnosed in the U.S. last year, and about 4,290 women died (American Cancer Society [ACS], 2020). Regular cervical cancer screening (CCS) reduces morbidity and mortality, but screening rates are low in the U.S. and at the project site (ACS. 2020). The purpose of this evidence-based practice (EBP) project was to increase CCS at a Federally Qualified Health Center (FQHC) with six clinic locations in Northwest Indiana; the primary project site was a clinic in Porter County. Participants included female patients age 24 to 65 due for CCS (N = 475) who received an educational email on CCS, including an appointment reminder. Two weeks after the initial email, patients who had not scheduled an appointment received a second reminder email. Five weeks after the second email, participants who had not completed CCS received a phone call. If participants identified Spanish as their preferred language, emails and phone calls were conducted in Spanish. The emails were also sent to patients at the other five clinics due for CCS. Data on CCS completed were collected from patient charts every two to four weeks for a period of five months. The primary outcome examined was CCS uptake at the primary site, compared with uptake in a comparison group of patients from 2019. Following the interventions, 16.42% of the intervention group completed CCS, while only 11.36% of the comparison group did so; the increase was statistically significant X^2 (1, N = 1109) = 5.96, p < .05. In addition, CCS completions were collected following each intervention; McNemar's test was conducted and found a significant increase in CCS after the second email (X^2 = 25.04, *df* = 1, N = 475, p = .000) and the phone call intervention (X^2 = 36.03, *df* = 1, N = 475, p = .000). Findings from this project will be used to recommend continued annual phone call and email interventions at all six clinics.

Keywords: cervical cancer screening, Papanicolaou smear, uptake, participate, improve, strategies, interventions

CHAPTER 1

INTRODUCTION

Background

Cervical cancer is a major cause of death and illness worldwide. It is the second most common cancer in women worldwide, and in some countries, is a leading cause of death (Jayasekara, 2020). Cervical cancer occurs when cells lining the cervix start to grow out of control. Most cervical cancers originate in the transformation zone, where the endocervix, made of glandular cells, meets the exocervix, which is covered in squamous cells (American Cancer Society [ACS], 2020). Before cervical cancer develops, the cells in the transformation zone typically undergo pre-cancerous changes, which are graded one to three according to the amount of the tissue that appears abnormal. When these pre-cancerous cells are treated early, nearly all cervical cancers can be prevented or treated successfully (ACS, 2020). However, most women with early-stage cervical cancer have no symptoms. In the later stages of cervical cancer, common symptoms include abnormal vaginal bleeding or discharge and pelvic pain (ACS, 2020). But by the time cervical cancer reaches the advanced stages when symptoms first appear, successful treatment is less likely and there is a higher risk of mortality (ACS, 2020). Therefore, regular cervical cancer screening (CCS) is important for early detection and has the potential to save many lives.

Risk factors for cervical cancer include high-risk human papillomavirus (HPV) infection, initiation of sexual activity at an early age, multiple sexual partners or one high-risk partner, and chlamydia infection. In addition, smoking, immunodeficiency, long-term oral contraceptive use, having three or more full-term pregnancies, history of teenage pregnancy, low socioeconomic status (SES), and diets low in fruits and vegetables increase a woman's risk for developing cervical cancer. Finally, family history of cervical cancer and history of diethylstilbestrol (DES) use by the patient's mother during pregnancy are also risk factors (ACS, 2020).

Appropriate screening at regular intervals is necessary to prevent cervical cancer morbidity and mortality. The U.S. Preventive Services Task Force (USPSTF, 2018) recommends that women start CCS at age 21 and receive a Papanicolaou (Pap) test every three years until age 29. Women ages 30 to 65 have the option of screening with a Pap test alone every three years, HPV testing alone every five years, or a Pap test plus HPV test (co-testing) every five years (USPSTF, 2018).

Data from the Literature Supporting Need for the Project

Health disparities due to differences in income and race are a problem in the U.S. One of the Healthy People 2020 goals was to address social determinants of health (SDOH) to improve the health of all Americans, especially those in underserved populations (Office of Disease Prevention and Health Promotion [ODPHP], 2020b). Health and Health Care was one of the areas addressed in the objective, including access to health care, regular primary care, and improving health literacy (ODPHP, 2020b). This project provided patient education and CCS reminders at an appropriate reading level, which had the potential to increase health literacy. The health clinic provides access to care for patients experiencing challenges due to SDOH.

The literature supports several types of interventions to increase CCS rates, which promote finding cervical cancer at a pre-cancerous or early stage. In an integrative review of 38 studies, Soares and Silva (2016) reported that education was the intervention most commonly utilized and successfully improved CCS rates. In addition, case managers or community health workers, phone calls, letters, postcards, multiple interventions, and community partnerships were effective to increase CCS uptake (Soares & Silva, 2016). Similarly, Jones et al. (2015) found that community-based and lay or peer education were effective to improve CCS rates among underscreened populations. Also, interventions which were targeted to the specific subgroup or individual were shown to be more effective at increasing rates than more generic interventions (Jones et al., 2015).

CCS rates are lower among women of low SES than those of higher SES. Members of these disadvantaged groups experience many barriers which may make getting screened more challenging. These include personal barriers, such as cultural beliefs, aversion to clinical gynecologic exam, and immigration status (Rees et al., 2018). Structural barriers impeding CCS may include cost, time lost from work to attend appointments, transportation challenges, and trouble navigating the health system (Rees et al., 2018). In addition, contextual factors can facilitate or hinder CCS. Plourde et al. (2016) found that lack of provider recommendation correlated with low CCS rates and that rates were lower among patients of male providers than those with female providers. Organizational-level factors affecting uptake of breast and CCS include flexible appointment times, use of reminders, and a focus on quality improvement (Pluorde et al., 2016).

National Data

According to the ACS (2020), around 13,800 cases of cervical cancer were diagnosed in the U.S. last year, and approximately 4,290 women died. Healthy People 2020 set objectives to improve CCS rates and reduce morbidity and mortality from cervical cancer. In 2008, 84.5%; the Healthy People 2020 goal was for 93% of women in the U.S. between age 21 and 65 to be up to date for CCS (ODPHP, 2020a). However, only 80.4% of women in the U.S. had received CCS according to guidelines in 2019 (ACS, 2020). Another objective was to reduce cervical cancer mortality from 2.4 per 100,000 females to 2.2 deaths per 100,000 females (ODPHP, 2020a). This project had the potential to help with both goals, increasing CCS rates and reducing cervical cancer-related mortality.

State Data

In the state of Indiana, an average of 264 women are diagnosed with cervical cancer every year, and 88 die from it (Indiana State Department of Health [ISDH], 2018). Not only does cervical cancer exact a toll on lives and health, it also has a great financial cost. In Indiana, the cost of medical care, including hospital, office visits and medications, for cervical cancer was

$54,634,601 in 2017 (ISDH, 2018). In addition, disparities by race and SES are a concern with regards to cervical cancer incidence and mortality. In Indiana, cervical cancer incidence in African American women was about 18% higher than in White women between 2002 and 2016, while mortality from cervical cancer was 36% higher for African Americans (ISDH, 2018). Lower income, educational status, and SES are also correlated with higher cervical cancer mortality among Hoosiers.

In the 3 years between 2015 and 2018, just 68.3% of women in Indiana between 21 and 65 had received CCS (ISDH, 2018). The ISDH Strategic Plan includes a goal to increase this proportion to 93% by 2023. Also, 54% of cervical cancers in Indiana are diagnosed at the late stage, when it is more difficult to treat. Another goal of the Strategic Plan is to reduce the percentage of cervical cancers diagnosed at a late stage to 40% by 2028 (ISDH, 2018).

County Data

Rates of cervical cancer, as well as mortality, are higher for those of low SES, uninsured or underinsured, and racial or ethnic minorities. In Porter County, 92% of the population is white, while African Americans make up 4% of the population and other races combined account for the remaining 4% (U.S. Census Bureau, 2019). In addition, 10.4% of the population is Hispanic or Latino. Also, 8.9% of Porter County residents are living below the poverty level. As for health insurance coverage, 73% of Porter County residents have employer-provided health insurance, 10% direct-purchase insurance, 10% have Medicaid, 4% receive Medicare benefits, and 9% have no health insurance coverage (Towncharts, 2020). These demographics differ significantly from those of the patient population at the primary project site health clinic, located in Porter County.

Data from the Clinical Agency Supporting Need for the Project

The evidence-based practice (EBP) project site is a non-profit Federally Qualified Health Center (FQHC) with six clinics in Northwest Indiana that provides quality healthcare to all (Health Clinic, 2020). The FQHC offers services regardless of insurance status and has income-

based sliding-scale fees for patients with incomes up to 200% of the federal poverty level (FPL). For uninsured women, income-based sliding scale fees for those with incomes less than 200% FPL range from $0 to $50, and any lab tests are included in that fee (Health Clinic, 2020). In addition, the FQHC participates in the Indiana Breast and Cervical Cancer Screening Program, which provides access to free breast and cervical cancer screening and diagnostic tests to qualifying women who are uninsured and underinsured (ISDH, 2020).

The clinic where this project was implemented is located in Porter County. Demographics within the patient population seen at the clinic are 73% white, 15% African American, 2% more than one race, 1% Asian, and the remainder other minorities or did not state their race. Of the patients seen at the clinic, 36% are at 100% or less of the federal poverty level (FPL), and an additional 16% are between 100 and 200% of the FPL. As to insurance status, 25% of the clinic's patients have private health insurance, 49% have Medicaid, 9% Medicare, and 14% are uninsured. This patient population is at high risk for gaps in CCS and increased mortality from cervical cancer due to the larger proportion of low-income individuals and minorities compared with the surrounding community.

The FQHC's value statement includes caring for all people regardless of their finances, culture, or social condition (Health Clinic, 2020). In addition, one of the goals of the clinic is to address income-based inequity. This project is in alignment with these company values. Addressing care gaps is also important to stakeholders. Healthcare providers currently conduct a daily huddle to discuss care gaps for patients who will be seen that day, and seek to address these gaps during the visit, even if the patient is being seen for an unrelated reason (T. Gamblin, personal communication, July 15, 2020). Care gaps include cancer screenings, including CCS, and immunizations. As an FQHC, the project site has benchmarks to meet for these care gaps, which include cervical, breast, and colorectal (CRC) cancer screening. If the benchmarks are met and an increased percentage of their patient population is up to date for CCS, the facility will receive an increase in funding. In addition, Pap testing is currently offered

at all six locations of the FQHC. Gynecologists and Certified Nurse-Midwives do most of the CCS, but the facility is working to involve more family practice physicians and nurse practitioners in performing these screenings to increase uptake.

Purpose of the Evidence-Based Practice Project

The purpose of this EBP project was to increase CCS rates using Pap and HPV tests for a primarily underserved population. The outcome measured was the number of women who are due for CCS that actually attended an appointment and completed the CCS after receiving the interventions. In particular, the interventions were an educational email followed by email and phone reminders.

PICOT Question

Specifically, this project addressed the following PICOT question: Among (P) women ages 21 to 65 who are patients at an FQHC, will (I) email education and reminder plus phone calls (C) compared with the usual practice increase (O) cervical cancer screening uptake (T) during a period of five months?

Significance of the EBP Project

This project is important because it has great potential to improve screening rates and decrease cervical cancer cases in an at-risk patient population. It can improve patient outcomes by decreasing the proportion of cervical cancers found at an advanced stage and increasing the proportion found at an early, pre-cancerous stage which can be treated successfully. In the vulnerable population at this health clinic, screening uptake is even lower than regional, state, and national rates. Some barriers to CCS among those of low SES and minority populations include lack of knowledge, cost, and lack of access to care (Plourde et al., 2016). This project sought to address these barriers by providing education about cervical cancer and screening tests and promoting screening at an FQHC which provides free and reduced-cost medical care to patients regardless of insurance status. Morbidity and mortality from cervical cancer could be decreased within this vulnerable population and many lives saved.

CHAPTER 2

EBP MODEL AND REVIEW OF LITERATURE

Evidence-based Practice Model

Overview of EBP Model

For this EBP project, the Rosswurm and Larrabee Model for Change to Evidence-Based Practice was utilized to guide its development, implementation, and evaluation. Mary Ann Rosswurm and June Larrabee developed this model to assist practitioners in translating research to practice (Rosswurm & Larrabee, 1999). The model guides practitioners through a six-step process, from assessment to integration of an EBP protocol.

The first step is to assess the need for a change in practice. One must collect internal data and compare them with external data to find a problem in current practice. Then, it is necessary to discuss the problem with stakeholders, who may include patients, healthcare providers, administrators, and quality improvement staff. Finally, one should identify the need for a practice change from the findings (Rosswurm & Larrabee, 1999).

The second step is to link the problem with interventions and their associated outcomes. During this step, the project manager should use standardized classifications to describe the problem, then connect the problem with interventions and outcomes. As a result, choosing the outcome indicators will flow from the process (Rosswurm & Larrabee, 1999).

Synthesizing the best evidence is the third step in the model. After defining the topic and inclusion criteria, a literature search is conducted, followed by critical appraisal and synthesis of the literature selected. Then it can be determined if there is a sufficient pool of evidence to support a practice change. Feasibility of implementing the practice change within the proposed setting also must be evaluated (Rosswurm & Larrabee, 1999).

The fourth step in the model is designing the practice change; this is generally in the form of a protocol, procedure, or standard. It is important to consider the practice environment, available resources, and stakeholder feedback, and ensure patients at the practice site are

similar to those in the evidence base. The change in practice is more likely to be accepted if the outcomes are relevant to the organization. Also, if the change will impact a large organization or hospital, it should first be pilot tested in one or two units or clinics (Rosswurm & Larrabee, 1999).

Implementing and evaluating the change in practice is the fifth step of the EBP model. The pilot study coordinator should be available to the staff and reinforce the practice change. In this step, the data are analyzed for differences before and after the pilot. Based on feedback, data, and recommendations, a decision is made whether to adopt the change, reject it, or adapt it (Rosswurm & Larrabee, 1999).

The final step is to integrate and maintain the change in practice. The change, along with supporting data, is communicated to stakeholders; in-services help communicate and facilitate change. Following the organization's processes facilitates integrating the change into standard of care, while encouraging informal leaders can increase the diffusion of innovation (Rosswurm & Larrabee, 1999).

Application of EBP Model to DNP Project

The Rosswurm and Larrabee Model for Change to EBP fits well with this DNP project, best practice interventions to increase CCS rates. First, the project manager assessed the need for a practice change. The Quality Director brought up clinical problems currently seen in the FQHC where the project would be completed. She stated that the clinic's CCS rates were lower than the benchmark and much lower than the national goal. Data were collected regarding the facility's current interventions aimed to increase uptake and current screening rates. The need to improve CCS rates was identified from these findings.

For step two, the problem of low screening rates was linked to possible interventions of education and reminders. The desired outcome was improving CCS rates, so CCS completions were decided upon as the outcome indicator. This is a benchmark and improving it will increase funding to the FQHC.

For the third step, the literature search focused on interventions to increase CCS uptake. Several databases were searched, and quantitative research was appraised and synthesized. Sufficient systematic reviews and other high-level, high-quality data were found which supported education and reminder interventions (Braun et al., 2015; Chan & So, 2015; Jayasekara, 2020; Rees et al., 2018; Thompson et al., 2016). Feasibility, benefits, and risks of evidence-based interventions at the project site were assessed. Email was selected as a cost-effective method to provide education and reminders to the patient population.

For the fourth step, information and feedback were solicited from the Medical Director and Quality Improvement staff, key stakeholders in designing the practice change. The proposal was also sent to the clinic's Board of Directors and presented to the managers at their weekly meeting. Feasibility and sustainability of the interventions were considered along with the best evidence. Consideration was given to similarity between populations in the literature and the patient population at the practice site. Some of the literature addressed screening rates and interventions specifically with minority women and those of low SES, similar to the practice site population (Chan & So, 2015; Duffy et al., 2017; Dunn et al., 2017; Rees et al., 2018; Thompson et al., 2016). A pilot test was planned at one clinic site for the phone intervention.

The fifth step, implementation and evaluation of the practice change, was conducted during the fall and spring semesters. Due to facility restrictions in place for the Coronavirus Disease 2019 (COVID-19) pandemic, the project manager was unable to meet with clinical staff to keep them updated on the project and outcomes. However, the project manager did send out emails to the appointment scheduling staff and healthcare providers with periodic updates, providing her contact information and encouraging feedback. Data were collected before the interventions, and continued to be collected after the interventions. At the conclusion of the project, the data was presented to key stakeholders and a decision made on whether to continue the intervention as a practice change, to adapt it, or to reject the change.

The sixth and final step is integrating and maintaining the practice change. If the change were adopted, the Quality Improvement Coordinator will be able to continue the email interventions. The case managers or other staff members could continue the phone intervention if this is decided upon.

Strengths and Limitations of EBP Model for DNP Project

The Rosswurm and Larrabee Model has many strengths for this DNP project. There is a large body of evidence regarding interventions to increase CCS uptake. However, the project site still had lower uptake rates than its target, and much lower than national goals. In this case, the Rosswurm and Larrabee Model could help bridge the research-to-practice gap, which its authors stated was the purpose in its development. The steps in the model provided a good guide for this project. Assessment of the need for change based on internal and external data was an important part of supporting the need for this EBP change. Also, a careful literature search with appraisal and synthesis of the evidence was very important for this topic, to narrow down and choose the best interventions for the situation and setting. As an FQHC, the project site may have limited financial resources, so feasibility, including cost-effectiveness, was an important consideration. In designing the practice change, it was necessary to consider the demographics of the patient population at the project site and include evidence that examined low SES and minority populations.

However, the model also has some limitations at this project site. Using standardized classifications for the problem and interventions is not a helpful strategy in this instance. Diagnostic codes do not really apply to screening rates, nor classification codes to education and reminder interventions. In addition, the final step of integration and maintaining the change will happen after the EBP project is completed. Therefore, the project manager will no longer be at the site to help promote the change and encourage others to maintain it.

Literature Search

Sources Examined for Relevant Evidence

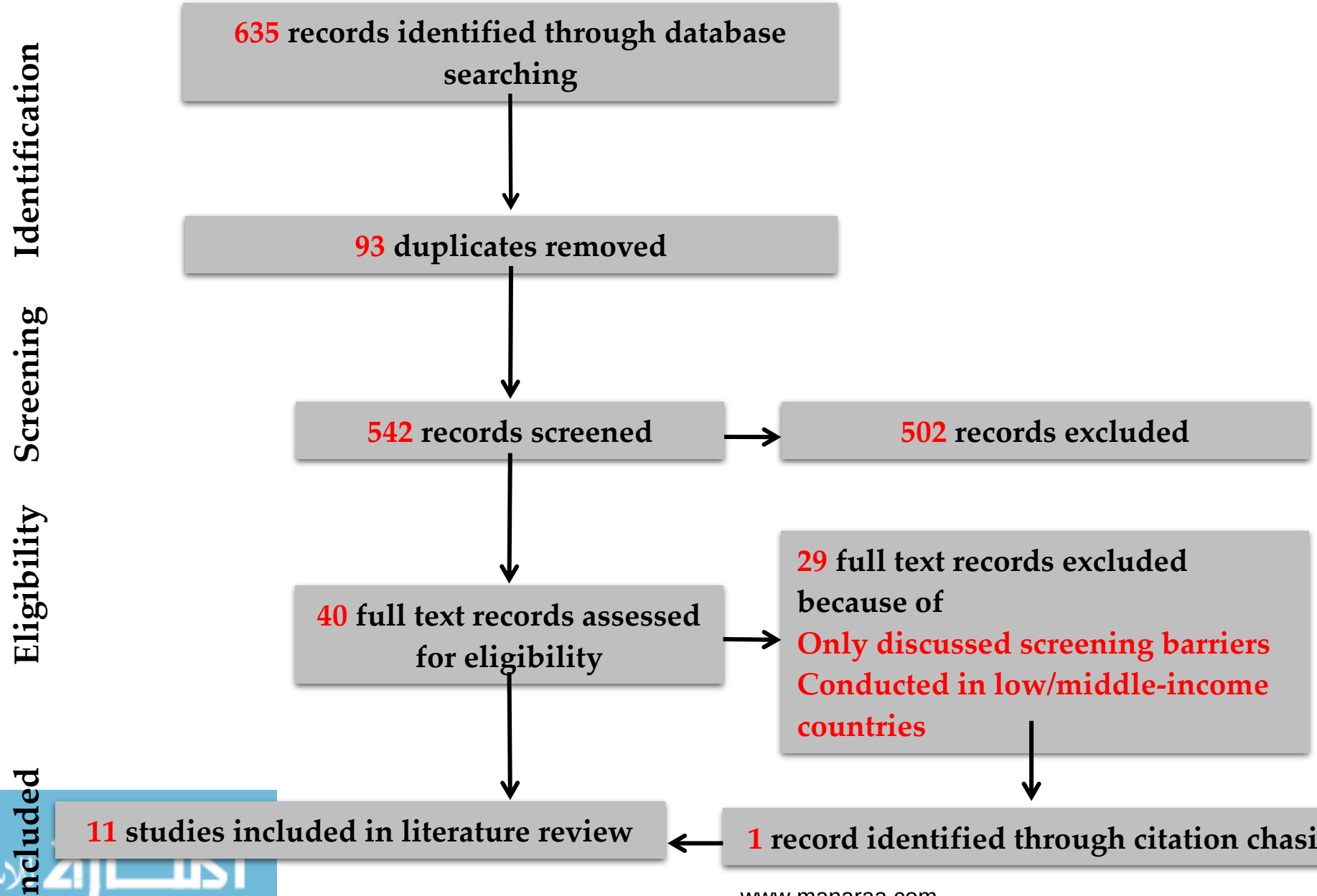
A thorough search was carried out, including the Joanna Briggs Institute (JBI), Cochrane Library, Trip medical database, Cumulative Index to Nursing and Allied Health Literature (CINAHL), and Medline with Full Text search engines. Search terms used were cervical screening, cervical smears, vaginal smears, Pap smear or Papanicolaou smear, uptake or participate, and improve or increase. In all search engines, evidence was limited to that published between 2015 and 2020, for the most recent evidence. JBI search terms were cervical screening or Pap smear; nine results were returned. In the Cochrane Library, search terms used were cervical cancer screening or Pap test; three results were found with this search. The Trip database was searched utilizing the title limiter with search terms cervical screening or Pap smear and uptake; results were limited to Guidelines, which returned 26 results. CINAHL was searched using Medical Subject Headings (MeSH) Cervical Smears or keywords Pap test or cervical screen, uptake or participate, and increase or improve. Limiters of English language, scholarly/peer reviewed, and female gender were applied; 143 results were returned. Finally, Medline was searched with the MeSH headings Vaginal Smears or Papanicolaou Test or keywords cervical screen, uptake or participate, and increase or improve. The limiters of English language, scholarly/peer reviewed, and female gender were again applied; 177 results were returned. A total of 358 pieces of evidence were found by searching all five databases. Titles were screened for relevance, and abstracts read if the title seemed applicable to the project. Inclusion criteria were articles which examined increase in uptake for CCS, not just increase in knowledge. In addition, the articles had to discuss interventions to increase CCS rates to be included. A total of 30 articles were found which fit the inclusion criteria. Articles were then excluded which only discussed barriers to screening or which were conducted in low or middle-income countries (see Figure 2.1).

After the exclusion criteria were applied, nine pieces of evidence were selected for the literature review, including one from JBI, seven from CINAHL, and one from Medline. Citation chasing was completed for all nine reference lists, and one additional resource was found in this way.

After review of the evidence and discussion with staff at the project site, it was decided that email would be a cost-effective way to deliver education and reminder interventions, but none of the articles found specifically addressed email education or reminders. An additional literature search was conducted in Medline, utilizing the search terms cancer screening, improve or increase, and email or e-mail or electronic mail. No date limiter was applied, to find any older literature supporting this intervention, but limiters of scholarly/peer-reviewed and English language were applied. A total of 277 results were returned; two articles were selected which described email interventions to improve CRC and breast cancer screening rates. Including the earlier search, a total of 635 pieces of evidence were identified through database searches, from which a total of 11 were selected for the literature review, plus the one found through citation chasing (See Figure 2.1).

Figure 2.1

PRISMA Flowchart



Levels of Evidence

The JBI criteria were used to level the evidence for this literature review. The JBI Levels of Evidence are designed to help the clinician make an initial quality assessment of that piece of evidence. Based on the study design, findings can be initially ranked, and then qualified by the evidence appraisal (JBI, 2014).

Among the 12 pieces of evidence selected for the literature review, nine fall within the Level 1 category and three within the Level 3 category. Of the Level I evidence, two were Level 1a, systematic reviews (SRs) of Randomized Controlled Trials (RCTs); three were Level 1b, SRs including RCTs and other study designs; and four were Level 1c, RCTs. The Level 3 evidence was all Level 3c, cohort studies.

Appraisal of Relevant Evidence

The JBI Critical Appraisal Tools were used to conduct a quality appraisal of the evidence. JBI Critical Appraisal Tools are intended to evaluate the methodological quality of a study and to assess for bias. These tools provide questions to rate a piece of evidence for any bias in design, conduct, and analysis. JBI does not give a quality rating within the tools, instead allowing the reviewer to determine whether to include or exclude the piece of evidence based on answers to the questions (JBI, 2018).

Different tools are provided by JBI depending on the type of evidence being evaluated. For this literature review, the Checklists for Systematic Reviews, Randomized Controlled Trials, Quasi-Experimental Studies, and Cohort Studies were utilized. Each checklist has different questions to evaluate the quality of that particular type of evidence; the checklists used for appraisal in this review have between nine and 13 questions total (JBI, 2018).

Each question on the JBI Critical Appraisal Tools has a yes, no, unclear, or not applicable designation. To further quantify the quality rating for each piece of evidence, the number of “yes” responses for each piece of evidence were tallied. If three or fewer questions were answered “no,” “unclear,” or “not applicable,” the piece of evidence was given a high-

quality rating. If more than half could be answered “yes,” this was a good quality rating; and if half or fewer could be answered “yes,” this was a low-quality rating. For the 12 pieces of evidence selected, seven received a high-quality rating and five received a good-quality rating (See Appendix A).

Level I Evidence

A good body of Level 1 evidence was found in this literature review. Five SRs were included and four RCTs. The SRs provide a wealth of evidence supporting interventions to improve CCS rates. Level 1 evidence is discussed in chronological order, apart from the article on email interventions, which is included following the other evidence.

Braun et al. (2015). This RCT investigated the use of lay navigators to improve CCS rates among Asian and Pacific Islander Medicare beneficiaries. Moloka’i, where this study was conducted, is designated as a medically underserved area, where cancer screening rates are lower, and mortality is higher, than the Hawaii state average. The study included 242 participants in the experimental group and 246 in the control group. The lay navigators assisted the experimental group with services, including reminders by phone and mail and information about screening for more than 95% of the patients. In addition, navigators helped with appointment scheduling for 65% of patients. In 10 to 15% of cases, they also helped individuals with paperwork, talking to healthcare professionals, transportation, payment and spouse or childcare arrangements. The control group received education on nutrition and cancer from a different healthcare entity (Braun et al., 2015). Surveys, which asked about screening behaviors, were conducted with all participants at baseline and at the end of the study. After 24 months, CCS rates were 57.0% in the experimental group, compared with 36.4% in the control group (p = 0.001). According to the JBI appraisal, this RCT was a Level 1b, high-quality evidence, with 10 of 13 questions answered yes. Since this study was conducted with Medicare beneficiaries, most participants were over age 65. However, about one-fourth of the population was less than age 65, so results are likely applicable to this project. Although the study utilized

lay navigators, this intervention was not feasible for the project. But it was possible to provide email education, in addition to email and phone reminders, to fulfill some services provided by the lay navigators. Appointment scheduling was also facilitated through a link to online scheduling embedded in the emails and transferring patients to appointment scheduling staff during the phone calls if they agreed to schedule.

Chan and So (2015). This SR examined the effectiveness of breast and CCS programs in improving screening uptake for women of ethnic minorities. Five databases were searched in this review, including Ovid Medline, CINAHL, Scopus, PsycINFO, and PubMed. A total of 10 RCTs were included in the review, four of which evaluated CCS programs' effectiveness in increasing Pap test uptake. These studies examined an outreach worker intervention, with a letter and home visit with education, in addition to assistance with scheduling, clinic referral, interpreter services, and transportation when necessary, compared with a direct mail intervention and control group. Results showed a significant increase in Pap testing in both the outreach worker intervention group (39%) and the direct mail intervention group (25%) compared with the control group (15%) (Chan & So, 2015). Another study utilized three weekly group educational sessions with an educational booklet and skill-building exercise, which significantly increased Pap test uptake (61.7%) compared with the control group (38.3%), who received the educational booklet after the exit survey. The third study utilized workshops, which significantly increased CCS rates, with 71% for the intervention group compared to 22% for the control group. The final study had three intervention groups: one with the full AMIGAS programme, including a video and flip chart; one using the flip chart only; and one utilizing just the video. All three groups showed a statistically significant increase in Pap test uptake compared with the control group: full AMIGAS programme at 52.3%, video only at 41.3%, flip-chart only group at 45.5%, and the control group at 24.8% uptake (Chan & So, 2015). Notably, all interventions were culturally relevant, in the participant's language, and included key messages about cervical cancer and screening. According the JBI criteria, this study falls into

the Level 1a category, and is of high quality, 11 out of 11 questions answered yes. This study was included since much of the patient population at the project site is from racial and ethnic minorities.

Thompson et al. (2016). This RCT compared a low-intensity intervention and high-intensity intervention with a control group on CCS rates in a population of rural Latina women receiving care at an FQHC. The study included 443 participants, with 150 randomized to the low-intensity group, 146 to the high-intensity group, and 147 to the control group. The low-intensity intervention was a Spanish-language video that was culturally appropriate, with information on CCS, recommendation to receive screening, and information on low-cost clinics where CCS could be sought. For the high-intensity screening, a *promontora* (lay health worker) provided a home visit that included an education session incorporating the video, as well as scheduling an appointment or committing to do so. The *promontora* also gave participants a local resource sheet, reminder refrigerator magnet and appointment card and answered any questions. Participants in the control group received usual care, with information on CCS from their health care providers. Measurement was through a survey to determine Pap test uptake after seven months. The high-intensity arm had a significantly higher proportion of women (53.4%) who received a Pap test compared with the low-intensity arm (38.7%) and the usual care arm (34.0%), but there was no significant difference between the low-intensity and usual-care arms (Thompson et al., 2016). This RCT was appraised as Level 1c, with a high-quality rating,11 out of 13, by the JBI criteria. Having been conducted within an FQHC, it provides good evidence for this project and support for culturally appropriate interventions.

Duffy et al. (2017). This rapid review was conducted to find evidence for interventions to improve uptake of cancer screening, especially among underserved populations. A literature search of PubMed was conducted for the rapid review. The authors found 68 articles in total, with 18 on CCS, including RCTs, quasi-RCTs, and non-randomized controlled trials. Five of the studies found a significant increase in CCS uptake with reminder letters, some of which also

included education, or phone calls, while two found increases that were not statistically significant and two found no significant difference between uptake following letters and phone calls. One study showed a significant increase in CCS rates in an area which received multiple outreach interventions compared with the usual care control area (84% compared to 71%), though this was not a randomized study (Duffy et al., 2017). Self-sampling resulted in a significant increase in CCS in five of the studies, and a non-significant increase in one additional study. Fixed appointment times also increased attendance rates for CCS in one study. Finally, one of the studies found an increase in CCS (43% versus 35%) with home visits. Reminders, endorsement by family practice providers, and more acceptable screening tests were most consistently found to improve uptake of screening (Duffy et al., 2017). By the JBI criteria, this review is Level 1b and appraised as good quality, with eight of 11 points. Unfortunately, self-sampling was not an available intervention at the project site. However, the focus on underserved populations was very applicable to this EBP project.

Kitchener et al. (2018). This cluster randomized trial was conducted to evaluate the effects of a two-phase intervention on CCS rates in young women. Conducted in both Greater Manchester and Grampian, the trial also evaluated feasibility of the interventions. The study included 20,879 participants in 276 practices. In phase one, 138 practices with 10,461 women were randomized to receive a mailed educational leaflet three months prior to the usual invitation to cervical screening, while 138 practices with 10,418 women were randomized to the control group, receiving usual care with the mailed invitation. The 103 practices in Manchester had the option for online booking, so these practices were also randomized to online booking (n = 52) or no online booking (n = 51) in Phase 1 (Kitchener et al., 2018). During Phase 2, women who had not yet received screening were re-randomized to a control group or one of five interventions: timed appointments, nurse navigator, self-sampling sent, self-sampling offered, or a choice between nurse navigator and a self-sampling kit. During Phase 1, there was a small, non-significant increase in CSS after 6 months in the group that received the leaflet (31.13%)

compared with the control group (30.63%; $p = 0.747$) and the group that received the online booking (28.82%) versus the control group in Manchester (26.64%; $p = 0.242$) (Kitchener et al., 2018). In Phase 2, CCS uptake increased significantly in the group sent self-sampling kits at 12 months ($p = 0.001$) and 18 months ($p = 0.012$) and in the timed appointments intervention group at 12 months ($p = 0.001$). This RCT was appraised as Level 1c, with a good quality rating, eight out of 13. This RCT had a different population from this project, since it assessed women due for their first CCS rather than those who are overdue. However, some of the interventions, including online booking and educational information, were utilized in this EBP project.

Rees et al. (2018). This SR examined RCTs and quasi-RCTs with evidence on interventions which increased CCS among those with low SES. Medline, CINAHL, Embase, and the Cochrane Register of Controlled Trials were searched for this review; the OpenGrey database was also searched for grey literature. From the literature search, 16 studies were selected for review and analysis. In addition, this review built on an earlier review from 2010 on the same topic, which included 13 studies (Rees et al., 2018). HPV self-test kits were found to significantly increase CCS uptake in two studies. In seven of the studies, use of lay health advisors (LHAs) improved CCS rates significantly; one additional study showed a non-significant increase, and one showed no significant difference between individual and group education by LHAs (Rees et al., 2018). In three of the studies, mailed reminders significantly increased CCS, whereas phone calls were effective in two studies, and mailed reminders in addition to phone calls improved CCS in three of the studies. Several studies utilized mixed interventions; two of these indicated significant increases in CCS, three had increases that were not statistically significant, and three found no significant difference in screening. In addition, the evidence suggests that letters with simpler communication, key messages, and follow-up phone calls for support and evaluation of barriers increased their effectiveness (Rees et al., 2018). The JBI appraisal found this study to be a Level 1a with a high-quality rating, 10 out of 11. The focus

on low SES groups and information on phone calls, letters, and education was helpful in developing this EBP project.

Saei Ghare Naz et al. (2018). An SR was undertaken for the purpose of assessing the efficacy of educational interventions on CCS behavior. The Cochrane Library, Web of Science, Science Direct, PubMed, and Scopus databases and Google Scholar were searched for evidence, and 37 articles were selected for inclusion. The results indicated that in-person education improved CCS rates significantly in seven studies, with an additional seven studies showing non-significant increases. In addition, a mailed letter and educational video were found to significantly increase CCS rates. A phone intervention had a non-significant increase, and other studies showed increases in knowledge or decreased barriers to CCS, but CCS rates were not reported (Saei Ghare Naz et al., 2018). The study was appraised by JBI criteria as Level 1b, good quality, seven out of 11. This review gives good support for a variety of educational interventions to increase CCS.

Jayasekara (2020). This JBI Evidence Summary reviewed evidence regarding CCS uptake with the Pap test. A structured rapid review literature search and search of evidence-based health care databases were conducted. Five pieces of evidence were selected from the search, including one SR with meta-analysis, two SRs, and two observational studies. Two of the SRs supported many educational strategies, including mailed materials, individual and group sessions, and media outreach; culturally appropriate education was shown to be effective. Telephone and mailed reminders were also supported by one of these SRs. This SR and the SR with meta-analysis also found evidence that HPV self-testing increases CCS uptake. It should be noted that two of these SRs are also included separately as part of the body of evidence and summarized above (Rees et al., 2018; Saei Ghare Naz et al., 2018). In addition, an observational study found that invitation letters increased Pap test uptake; the proportion of women who had never had a Pap test decreased by 13.72% (Jayasekara, 2020). The other observational study stated that starting CCS at 30 years is most cost-effective but

recommended that nations with higher cervical cancer rates start screening earlier. This evidence is Level 1b by JBI leveling, and appraised as high quality, nine out of 11. More support is found for reminders and education of various types in this Evidence Summary.

Chaudhry et al. (2007). This article was included to support effectiveness of email interventions for this EBP project. The purpose of this RCT was to determine feasibility of a Web-based information system for staff and its effect on mammography rates, assess the effect of patient reminders for mammography scheduling on annual physical exam rates, and compare efficacy of email and U.S. mail reminders. The sample population was women age 40 to 75 who were patients of a large group practice and due for mammography within three months. Women were randomly assigned to usual care (n = 3339) or to receive the intervention (n = 3326), a reminder letter from that patient's physician with a brochure on preventive services. Patients in the intervention group who were employees of Mayo Clinic were randomized to also receive either a US mail or email reminder through their work e-mail. In addition, participants received a second reminder one month later and then a phone call one month after that if they did not respond to earlier reminders. Annual mammogram screening rates were measured for each group at the end of the one-year study period. A significantly higher proportion of women in the intervention group (64.3%) had mammograms than in the control group (55.3%; $p < 0.001$) (Chaudhry et al., 2007). Among the Mayo Clinic employees, 72.2% in the email group received a mammogram, compared with 68.1% in the US mail group and 57.5% in the control group. Both email and U.S. mail interventions had a statistically significant increase over the control group ($p < 0.001$), but no significant difference was found between email and U.S. mail ($p = 0.24$). By the JBI appraisal, this article was Level 1c, good quality, eight out of 13. It provides support for email reminders as a cost-effective measure to improve mammography screening rates, which could be generalized to CCS to support email as comparable with U.S. mail reminders.

Level III Evidence

From the literature search, three cohort studies, which are Level 3 according to JBI, were selected for inclusion in the body of evidence for this EBP project. The first two are reviewed in chronological order, and the last one pertains to email interventions to increase CRC screening rates.

Tavasoli et al. (2016). In this cohort study, the purpose was to measure the effectiveness of mailed invitation and reminder letters to increase CCS among women in Ontario ages 30 to 69. The sample included 99,278 women in the intervention group, who were compared with a historical non-intervention cohort of 130,181 women from one year earlier. The intervention was an invitation letter, which included CCS information. The women in the intervention group who had not received a Pap test after 4 months were then sent a reminder letter. Rates of Pap testing in this group were measured 9 months after the invitation letter. This was compared with Pap testing rates in the historical cohort during the 9-month period a year earlier, when they were eligible for CCS. Women who received the intervention were significantly more likely to have a Pap test (14.1%) during the 9-month period than those who did not (8.5%; OR: 1.8, 95% CI 1.7-1.8) (Tavasoli et al., 2016). This study was appraised as a Level 3c, high quality, eight out of nine, by the JBI criteria. Although a cohort study is not as strong a design, the large sample size in this piece of evidence provides good support for a mailed intervention.

Dunn et al. (2017). This was a matched cohort study conducted to evaluate efficacy of CARES, a community-based program, to increase CCS and breast cancer screening uptake for underscreened or never-screened women. The study included 331 women in the intervention group, and 969 matched controls. The intervention included group education sessions which were language-specific; peer leaders and program staff facilitated the sessions. Participants were also assisted with screening, and peer leaders contacted them several months later to encourage and help with scheduling CCS if they had not yet attended. CCS uptake for

participants and controls was obtained from a national cancer registry. CCS uptake rates were 26% in the intervention group, while only 9% of the control group had CCS (OR = 5.1; 95% CI = 2.4, 10.9) (Dunn et al., 2017). This article was rated Level 3c by the JBI criteria, of high quality, nine out of 11. More support is provided for the effectiveness of patient education with this piece of evidence.

Muller et al. (2009). This cohort study was conducted to evaluate efficacy of email reminders to increase rates of CRC screening. A sample of 2100 patients was randomized to a control group (n = 494), letter intervention (n = 458) or email intervention (n = 457). From the original sample, some patients were found to be ineligible during the time delay between randomization and start of the intervention, which accounts for the difference between the sample size and total group numbers. The letter intervention group received one letter reminder, the email intervention group received one email reminder through the HMO's secure email system, and the control group received usual care. The proportion of patients completing CRC screening within 90 days of the reminders was the outcome measured. The results showed that 22.7% of the patients who received the email reminder obtained CRC screening, compared with 23.6% of the letter reminder group and 7.8% of the usual care group (Muller et al., 2009). The letter and email interventions both achieved statistically higher response rates than the usual care group ($p < 0.0005$), but no significant difference was found between email and letter reminders ($p = 0.711$). By the JBI criteria, this article appraised as Level 3c, good quality, eight out of 11. This study provides support for the efficacy of an email intervention and its equivalence to letter reminders, which were found quite effective to increase CCS rates by the other evidence cited above.

Construction of Evidence-based Practice

Synthesis of Critically Appraised Literature

The body of evidence provides support for many types of interventions to increase CCS rates. Different types of patient education were found to significantly increase CCS rates in most

of the literature examined (Chan & So, 2015; Dunn et al., 2017; Jayasekara, 2020; Kitchener et al., 2018; Saei Ghare Naz, 2018; Thompson et al., 2016). Specifically, mailed educational materials increased uptake significantly in a few studies and in several systematic reviews (Chan & So, 2015; Duffy et al., 2017; Jayasekara, 2020; Kitchener et al., 2018; Saei Ghare Naz, 2018). Rees et al. (2018) reported that phone education, support, and evaluation of barriers were also effective to improve CCS rates. Several studies also supported language-specific, culturally appropriate education as part of a program which increased CCS rates (Chan & So, 2015; Dunn et al., 2017; Jayasekara, 2020; Thompson et al., 2016). In addition, Chan and So (2015) reported in their SR that education strategies were more effective when they included key messages about cervical cancer and screening.

Much of the literature also supports patient reminders to increase uptake of CCS (Braun et al., 2015; Chaudhry et al., 2007; Duffy et al., 2017; Jayasekara, 2020; Muller et el., 2009; Rees et al., 2018; Tavasoli et al., 2016). Specifically, mailed reminders were a supported intervention in much of the literature reviewed (Braun et al., 2015; Chaudhry et al., 2007; Duffy et al., 2017; Jayasekara, 2020; Muller et el., 2009; Rees et al., 2018; Tavasoli et al., 2016). In addition, phone reminders were reported effective to increase CCS uptake (Braun et al., 2015; Duffy et al., 2017; Rees et al., 2018). Chaudry et al. (2007) and Muller et al. (2009) found that email reminders were also effective to increase cancer screening uptake, and their efficacy was not statistically different from that of mailed reminders. Multimodal interventions were often found to be more effective in improving uptake than a single intervention (Braun et al., 2015; Chan & So, 2015; Duffy et al. 2017; Rees et al., 2018; Thompson et al., 2016).

Best Practice Model Recommendation

The reviewed literature identified education and reminders as best practice to address low CCS rates. A variety of educational methods are supported by the literature. Email is a cost-effective method to deliver education on CCS at the EBP project site, so this is an appropriate initial intervention to encourage women to obtain screening. The email should include key

messages and simple communication for the best impact and be sent in the patient's primary language. Multiple interventions were often more effective than a single intervention. Reminders by several methods had good efficacy for improving CCS rates. In some facilities, an automated phone message has been utilized as a reminder, but this is not available at the project site. However, a follow-up reminder email is a cost-effective method to deliver reminders at the project site for patients who do not respond to the initial educational email and should be included as an additional way to reach this patient population. Finally, phone calls were shown to be quite effective in improving uptake of CCS, and therefore should be included as an additional, more personal, intervention for those patients who do not respond to the second email. The phone call also provides an opportunity to discuss concerns and address barriers to women getting CCS.

CHAPTER 3

IMPLEMENTATION OF PRACTICE CHANGE

This chapter will include a description of the process employed to implement this EBP project, describing the participants and setting, interventions employed, comparison group, outcome measurements, and time for completion. The EBP project involved developing best practice to improve CCS rates among underserved women who are clients of a health center in Northwest Indiana. This patient population experiences many barriers to obtaining CCS, including lack of knowledge, lack of access to care, cost, transportation, and fear. Through this EBP project implementation, the goal was to reduce the barriers that the clinic could address and increase CCS rates. Through increasing CCS, the population served would be expected to subsequently have reduced incidence of cervical cancer morbidity and mortality. The aim of this project was to increase CCS rates and address the following PICOT question: among (P) women ages 21 to 65 who are patients at an FQHC, will (I) email education and reminders plus phone calls (C) compared with the usual practice increase (O) cervical cancer screening uptake (T) during a period of five months?

Participants and Setting

This EBP project was conducted at an FQHC in Northwest Indiana. An FQHC provides high-quality care to all patients regardless of insurance status, income, or ability to pay, especially benefiting individuals who are of low SES, uninsured, and underinsured. Important stakeholders in this practice change include the Director of Quality and Patient Safety, Chief Medical Officer, family practice and gynecologic providers, case managers, and appointment scheduling staff. The project manager is involved in the practice change as well, although not an employee of this FQHC.

Patients who were due for CCS were identified by review of the population health tool at the clinic in August 2020, determined by age, medical history, and overdue status for CCS. The

phone intervention was only completed at the Portage location as a pilot, due to feasibility. Phone calls were made to those patients who have a Portage family practice physician or nurse practitioner listed as their usual provider, to capture those who were regular patients of the health clinic. Female patients ages 21 to 65 who had not received a Pap test within the past 3 years, or ages 30 to 65 who had not received a Pap plus HPV test within the past 5 years, met the inclusion criteria for this project. The population included only active patients of the FQHC, defined as patients who have completed at least one visit at the health center in the past 12 months. Patients who had a hysterectomy with removal of cervix, congenital absence of a cervix, or were on hospice care were excluded. Also, patients who did not have an active email address on file with the health center were excluded from the interventions.

Pre-Intervention Group Characteristics

The inclusion criteria for this EBP project included women ages 21 to 65 who had no Pap test recorded in the past 3 years and women ages 30 to 65 who did not have a Pap plus HPV test recorded in the past 5 years. Once these criteria were applied and participants were selected, participants in the project included women who varied in age from 24 to 65. Racial characteristics of the participants included Caucasian women, Black women, Asian women, American Indian or Alaska Native women, more than one race, and some whose race was not reported. For ethnicity, some of the patients reported Hispanic or Latino ethnicity, some women were Non-Hispanic, and some did not report their ethnicity. Insurance status of these patients varied among the participants from private insurance, Medicaid, Medicare, and self-pay or uninsured.

An email was written, with input from quality improvement staff, which included education regarding the importance of CCS and information on Pap and HPV testing (see Appendix B). The email was evaluated for reading level, with a goal of a sixth-grade reading level to make it accessible for all patients. However, the final approved version included some medical terms, per the request of the Medical Director, which slightly increased the reading

level. In addition, the email included the clinic phone number and a link to schedule an appointment online, as well as a link to an online fact sheet about CCS tests (see Appendix C for fact sheet). The email was translated into Spanish and the fact sheet sent as a Spanish version for patients who indicated Spanish as their primary language. A link to the website where the educational fact sheet was obtained is included in Appendix C and the Spanish version of the fact sheet can be obtained from the website (Office on Women's Health, 2018). The email was sent out to all patients who were due for CCS within the FQHC, at all six locations in Northwest Indiana. The project manager and Quality Improvement Coordinator sent the email in mid-September through the FQHC's secure healthcare software. A total of 5,401 emails were sent out, 5,242 in English and 159 in Spanish. Four hundred fifty-three of those sent in English and 20 in Spanish generated an error message, indicating the email had not gone through; so, a total of 4,928 emails were successfully sent.

Before the first email was sent out, the appointment scheduling staff was informed about the project and educated to anticipate an increased number of calls to schedule CCS. The dates of the emails and phone calls were provided to the appointment scheduling staff. Data were collected on how many patients scheduled and attended appointments for CCS after the email was sent out; 59 patients completed CCS and an additional 60 scheduled appointments but had not yet completed them. In addition, the number of emails received and opened was tracked; 2,109 emails sent in English and 65 in Spanish were opened. Those patients with emails that generated an error message were removed from the list before the second email was sent out. Participants who had not scheduled an appointment for CCS within two weeks after the initial email received a reminder email through the same software (see Appendix D). The reminder email was sent two weeks after the educational email. The reminder email was also sent in Spanish to patients who indicated Spanish as their primary language. The links to online scheduling and the fact sheet were also included in the reminder email. However, the link was not included in the Spanish-language emails, since it would only appear in English and link to

the English-language scheduling site. The second email was sent out to 4,809 patients and 32 of these emails received an error message. 4,777 were sent successfully to patients of all six clinics. For the second email, 1,624 sent in English and 64 sent to Spanish-speaking patients were opened.

Following the email reminder, the number of patients who scheduled and attended CCS appointments continued to be tracked, with a total of 49 additional participants completing and 59 scheduling CCS. The phone calls were initially planned to start in mid-October. However, due to staff assisting with the project being out of the office due to health concerns, and then difficulties with getting a phone line set up, the start of phone calls was delayed by three weeks. Starting in early November, reminder phone calls were made to the patients at the Portage location who had not yet made an appointment for CCS. Phone calls were made to patients whose usual provider is one of the family practice clinicians at the Portage site. Patients of the Portage site whose usual provider was not a clinician at that site received a third email (see Appendix E). Phone calls were made to 554 participants. The phone calls were also an opportunity to address any concerns and some of the barriers that participants experienced to scheduling or attending CCS. The barrier of lost work time was addressed by mentioning the availability of evening and Saturday appointments. The cost barrier was addressed by discussing sliding scale fees to provide free or low-cost screening. Sending an educational email and answering any questions raised by the patients in the phone calls assisted in resolving the knowledge barrier. Also, any fears or concerns expressed could be answered, to help with the barrier of fear about the test or a cancer diagnosis. In addition, the calls were transferred to the appointment scheduling staff if the participant agreed to schedule that day. If a phone message was left, privacy and confidentiality were maintained with a request to call the clinic to schedule their test, but no diagnosis-specific information was included in the message. The approved script used for the phone calls made, as well as for messages left, is included in Appendix F.

Comparison

Data driving this practice change included low CCS rates among underserved, uninsured, or underinsured women who are clients of an FQHC in Northwest Indiana. CCS rates of these women pre-intervention were compared with CCS rates post-intervention. Also, CCS rates following each intervention were compared to evaluate the efficacy of multiple interventions. In addition, due to potential effects of the COVID-19 pandemic on patients seeking routine health care, rates of CCS in a historical group of patients who received care at this FQHC as of one year before this project, in October 2019, were compared as well. As part of its usual practice, the facility sent out a reminder email to all patients due for CCS in May 2019. Including the historical comparison group will capture CCS rates following this intervention.

Outcomes

The primary outcome of this project was the increase in CCS rates in the population of eligible women who receive care at the Porter County location of this FQHC. This was analyzed in comparison with the uptake in patients from 2019 utilizing the Chi-square test for independence. Secondary outcomes included the CCS uptake following each intervention, to compare the additional effect of the second email and phone call, which were analyzed using McNemar's test. In addition, CCS completions in women who are patients at the other five locations were collected as a secondary outcome, since they received the email education and reminder email. These data were collected through chart reviews and reported as frequencies. In addition, through a post-visit survey, data were collected on relevance of the education, ease of making the appointment, and the healthcare visit; these were intended to be analyzed as a secondary outcome and reported as frequencies.

Time

Interventions and measurement of outcomes for this project were expected to take approximately five months to complete. The educational email was sent out in mid-September.

Because many women targeted were mothers with young children, September seemed a good time to start, since they would have their children back in school and hopefully have time for their own healthcare appointments. Following the email, two weeks were needed to allow time for women to schedule a CCS appointment according to their preference and collect data on those who were still overdue. The reminder email could then be sent, and two more weeks allowed for time to schedule before evaluating uptake again and beginning the phone calls. Starting the phone calls in mid-October was initially planned, to provide several weeks in which to complete the calls prior to the holiday season. However, starting the phone calls in early November allowed them to be completed by the end of the first week in December.

Protection of Human Subjects

Protection of human subjects was maintained throughout this EBP project. When patients enroll at this FQHC, they sign a general consent to participate in research and quality improvement projects that do not pose any risk of harm to themselves. Therefore, individual consent from participants was not necessary for this project. The project manager successfully completed an ethics course as part of the requirement of Valparaiso University's DNP curriculum. In addition, the project manager completed the Collaborative Institute Training Initiative (CITI) program entitled "Social Behavioral Educational Research: Basic Course." An Institutional Review Board (IRB) Questionnaire was completed to determine what review would be needed for this project. This EBP project was determined to be exempt from IRB approval by Valparaiso University. Approval was also obtained from the health clinic's Board of Directors before proceeding with implementation of the project.

All data and confidential information were kept in a secure location. All information was protected to maintain standards of research ethics and the Health Insurance Portability and Accountability Act (HIPAA). Any data on demographics and CCS rates which was stored outside of the Electronic Health Record had patient identifiers removed. In addition, information

was stored on a flash drive kept in a locked box. The project manager's laptop computer was password protected, so any information uploaded was protected there, as well.

CHAPTER 4

FINDINGS

This chapter will present the results of the EBP project. The purpose of this EBP project was to determine whether email education and reminders plus phone calls would increase CCS rates among the patient population at the primary Porter County site of an FQHC over a five-month period compared with the usual practice of sending one reminder email. The primary outcome, rates of CCS for the intervention group, were determined through chart review and compared with rates of CCS at the project site during a five-month period in 2019. A secondary outcome to be examined compared effectiveness of each email and phone call intervention in improving CCS. In addition, uptake of CCS among patients at all six clinics of the FQHC, who received only the email interventions, was reported as a secondary outcome. This chapter will include details of participant demographics, outcomes, and statistical analyses.

Participants

Eligible participants were identified by chart review in August 2020. Inclusion criteria were female patients between ages 21 and 65 who had no Pap test in the past 3 years, or those between ages 30 and 65 who did not have a Pap test plus HPV in the past 5 years. In addition, only patients whose usual provider was a primary care provider (PCP) at the primary project site were selected for inclusion. The project manager and Quality Improvement Coordinator reviewed charts to identify participants for inclusion based on age, past medical history, usual provider, and date of last Pap test and HPV. Patients were excluded who had no email address on file, did not speak Spanish or English, had a hysterectomy or were on hospice care. Following this review, 554 participants were identified for inclusion in the sample. Demographic information on participants collected from charts included age, race, ethnicity, and insurance status.

While the phone call intervention was being completed, it was discovered that 60 of the participants were up-to-date for their CCS with a provider outside of the project site, so these participants were excluded from the sample since only those overdue for CCS were to be included. In addition, 16 of the participants stated they had a hysterectomy, so they were excluded, since they would have initially been excluded had the hysterectomy been found in their medical history from the chart review. Finally, three of the participants said they had moved out of the area, so they were excluded since they would not be expected to complete CCS at the project site but were reminded to schedule CCS with a new provider in their local area. After these participants were excluded, the intervention group included 475 participants.

The comparison group from 2019 was identified through chart review in August 2020 and included participants with the same criteria as the intervention group: female patients between age 21 and 65 who were overdue for CCS, defined as no Pap test in the past 3 years, or women age 30 to 65 who did not have a Pap test plus HPV in the past 5 years; and those whose usual provider was a PCP at the project site. Patients who had no email address on file, had a hysterectomy, were on hospice care, or spoke a language besides Spanish or English were excluded. 634 participants were identified for the comparison group.

Demographic Data

The demographics of the intervention group were quite similar to the comparison group. Racial characteristics of the intervention group were 80.4% white, 9.7% African American, 1.3% More than One Race, 0.8% Asian, 1.1% Other, and 6.7% did not specify their race. Similarly, the comparison group from 2019 was 79.2% White, 10.1% African American, 2.2% More than One Race, 0.9% Asian, 0.6% Other, and 6.9% did not specify race. Compared with demographic data for Porter County, which is 92% White, 4% Black, and 4% other races, the participant population for both groups has a higher proportion of minorities than the county (U.S. Census Bureau, 2019).

Ethnicity between the two groups was also similar, with 8.4% Hispanic/Latino, 60.0% Non-Hispanic, and 31.6% who did not specify for the intervention group. The comparison group was 10.9% Hispanic or Latino, 58.4% Non-Hispanic, and 30.8% did not specify ethnicity. The ethnicity of the project participants is similar to that of Porter County as a whole, which is 10.4% Hispanic or Latino (U.S. Census Bureau, 2019). Language was very similar between groups, with 98.9% English-speaking and 1.1% Spanish-speaking in the intervention group and 99.1% English-speaking and 0.9% Spanish-speaking in the comparison group. A Chi-square test of independence was calculated comparing age for the two groups. No significant relationship was found (X^2 (41, N = 1109) = 39.739, $p > .05$. Age does not appear to be associated with membership in the comparison or intervention group. Average age was quite similar for the intervention group (M = 43.14, SD = 12.32, n = 475) and the comparison group (M = 42.83, SD = 12.11, n = 634). For both groups, participants ranged in age from 24 to 65.

However, insurance status for the two groups was somewhat different, with 33.9% private insurance, 43.4% Medicaid, 18.1% Self Pay, Sliding Fee Scale or Uninsured, 1.1% Medicare, and 3.6% other Government Insurance for the intervention group. The comparison group had a lower percentage with Medicaid but more with private insurance and Self Pay: 37.5% private insurance, 34.4% Medicaid, 25.1% Self Pay, Sliding Fee Scale or Uninsured, 0.6% Medicare, 2.2% other Government Insurance, and 0.2% other. This difference could be due to the pandemic; with rising unemployment in 2020, more Hoosiers may have qualified for Medicaid than in 2019. Compared with Porter County's population, a higher proportion of the project population had Medicaid or no insurance and fewer had private insurance or Medicare (Towncharts, 2020).

Changes in Outcomes

The increase in CCS for the intervention group was statistically significant in relation to CCS uptake for the comparison group. In addition, a greater number of participants completed CCS following each of the three interventions, with subsequently greater uptake after each

successive intervention. Primary and secondary outcomes, statistics, and frequencies will be discussed.

Statistical Testing and Significance

Statistical tests include Chi-square to determine the change in CCS uptake from the comparison group of patients to the intervention group. The Chi-square test of independence was selected to determine whether the difference in CCS uptake between the two groups was due to the interventions as opposed to sampling error or chance (Cronk, 2018). In addition, McNemar's Test was conducted to compare the effectiveness of each intervention: the educational email, second reminder email, and phone call. McNemar's Test was chosen since it could show a change in the proportion of participants who completed CCS after each intervention (Glen, 2015). Both Chi-square and McNemar's Test are designed for use with nominal data such as that collected for this project. The overall CCS uptake at all six clinics were reported as frequencies. Finally, the results from post-visit patient surveys were collected via chart review and examined.

Findings

Primary Outcome

Cervical Cancer Screening Rates at Primary Site. This project found that 16.4% (n = 78) of the participants completed their CCS following the interventions. This was increased from the comparison group, which had 11.4% (n = 72) complete CCS during the 5-month period following the email that was sent out in 2019 (See Figure 4.1). The difference in CCS rates between the comparison group and the intervention group was analyzed using a Chi-square test of independence, which showed a significant increase X^2 (1, N = 1109) = 5.96, $p < .05$.

Secondary Outcomes

Increased Rates with Interventions. A total of 78 participants in the intervention group completed CCS during the study period. This included 13 participants who completed CCS after receiving the first email, 27 after the second email, and 38 following the phone calls (See Figure

4.2). The effectiveness of each intervention was analyzed utilizing McNemar's test, which found a significant increase in CCS after the second email (X^2 = 25.04, *df* = 1, N = 475, p = .000). McNemar's test also showed a significant increase in CCS completions after the phone call intervention (X^2 = 36.03, *df* = 1, N = 475, p = .000).

Cervical Cancer Screening Rates at all Six Clinics. Patients of all six clinics within the FQHC received the two emails and patients of the primary site with a usual provider who was not one of the clinic's PCPs received a third email. Patients who had at least one visit at the FQHC in the past 12 months received the emails. Out of the total 4,374 participants who only received emails, 7.15% (313) completed CCS during the 5-month period of data collection. This does not include usual patients of the pilot site who also received the phone calls.

Post-visit Survey Data. All clients of the FQHC receive a link to a post-visit survey following each appointment. For those participants who completed CCS, their survey responses in relation to making the appointment and educational materials available were examined. However, only nine patients completed the post-visit survey, and not all had a response to the question about educational materials. Therefore, it was determined that insufficient data were available for analysis.

Figure 4.1

Cervical Cancer Screening Completion Rates

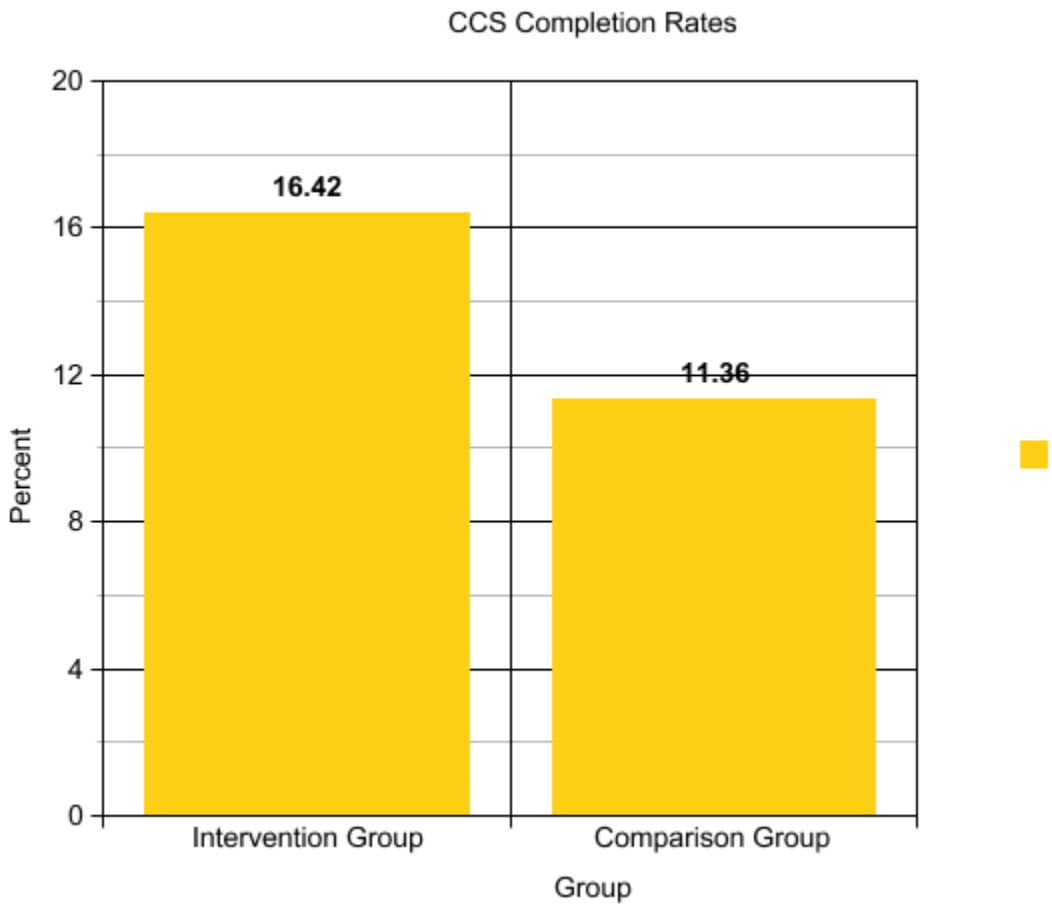
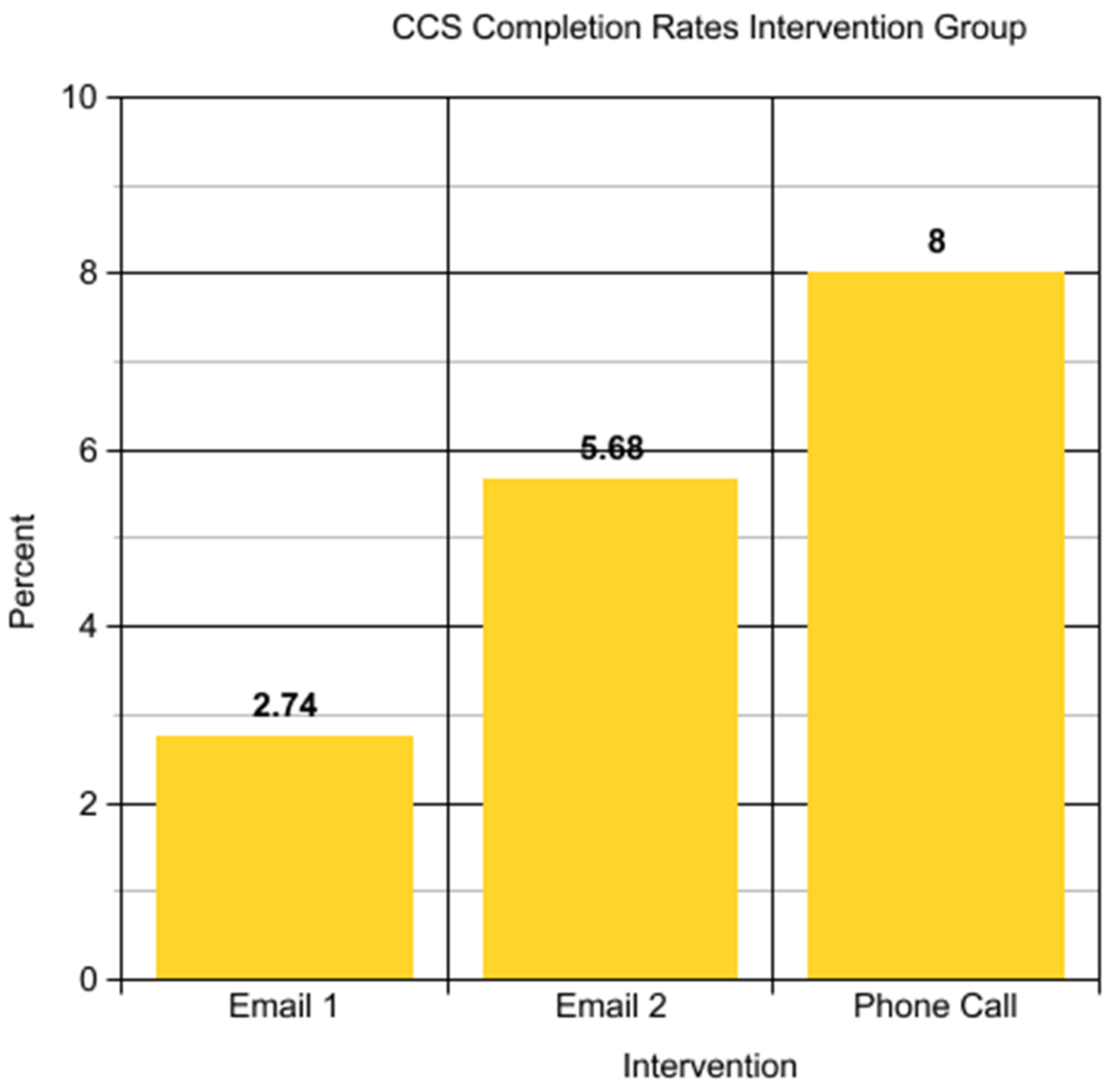


Figure 4.2
Cervical Cancer Screening Completions Following Each Intervention



CHAPTER 5

DISCUSSION

The purpose of this EBP project was to determine whether an educational email, in addition to a reminder email and phone call, would increase CCS rates in the population at an FQHC clinic in Porter County compared with usual practice. Specifically, the project was designed to answer the PICOT question: among (P) women ages 21 to 65 who are patients at an FQHC, will (I) email education and reminders plus phone calls (C) compared with the usual practice increase (O) cervical cancer screening uptake (T) during a period of five months? Data analysis indicated that there was a significant increase in CCS completions compared with a similar group of patients from the same clinic in 2019. Secondary outcomes included examining whether adding the second email significantly increased CCS completions as opposed to just sending one email, and whether the phone call had increased efficacy compared with uptake following the two emails. Patients of the other five clinics also received the emails; the rate of CCS uptake in that population was also collected and reported as a frequency.

This chapter will discuss the findings of the EBP project in relation to the body of literature. In addition, strengths and limitations of the project and its implementation are covered. Implications for future practice, theory, research, and education will be addressed.

Explanation of Findings

Primary Outcome

The primary outcome of this EBP project found that an educational email, reminder email, and phone call increased rates of CCS (16.42%) compared with the usual practice of a single email (11.36%). The increased uptake associated with the interventions was significant X^2 (1, N = 1109) = 5.96, $p < .05$). This is concordant with evidence found in the literature search. For example, an RCT conducted by Braun et al. (2015) found that education, mailed, and phone interventions by a lay navigator were effective to increase CCS rates (57.0%) compared with a

control group (36.4%, p = .001). Reminder letters were also found to increase CCS uptake in several SRs and RCTs (Duffy et al., 2017; Jayesakara, 2020; Kitchener et al., 2018; Rees et al., 2018; Saei Ghare Naz, 2018). A large cohort study (N = 99,278) also found that mailed reminders were effective to increase CCS rates (14.1%) compared with a cohort who did not receive the intervention (8.5%) (Tavasoli et al., 2016). Email reminders were also found to be effective for increasing cancer screening rates and were equivalent to mailed reminders (Chaudhry et al., 2007; Muller et al., 2009). In addition, a quality improvement project found that educational handouts combined with a patient engagement tool and health advocate, along with improving staff processes, led to 87% of the women enrolled receiving CCS (Kiser & Butler, 2020). The relatively small percentage increase found in this EBP project could be due to reluctance of participants to complete screening due to the COVID-19 pandemic, and in particular, rising COVID-19 case numbers in Porter County during the phone call intervention.

Secondary Outcomes

CCS uptake was collected following each intervention so that the relative efficacy of each additional intervention could be assessed. McNemar's test was conducted, and it was found that the increase following the second reminder email was significant compared with CCS completions following the initial reminder email X^2 (1, N = 475) = 25.04, p = .000. In addition, the increase in CCS after the phone calls was significant compared with the CCS rate following the two emails X^2 (1, N = 475) = 36.03, p = .000. In the literature, it was also found that multiple interventions were more effective than single ones. Chan and So (2015) reported that an outreach worker intervention, which included a letter and education, increased CCS more than a direct mail intervention. In addition, it was found that letters combined with follow-up phone calls led to an increase in CCS (Rees et al., 2018). Thompson et al. (2016) reported that the high-intensity group, who received a lay health worker providing education, reminder, and assistance in scheduling an appointment, had a significant increase in CCS compared with the low-intensity group receiving an educational video. Finally, Fernandez-Esquer et al. (2020) reported that

participants who received the services of a peer navigator, including education, assistance with scheduling, and reminders, had increased CCS uptake (83.8%) compared with participants who only received educational sessions and brochures (50%); the increase was significant (X^2 = 8.54, *df* = 1, *p* = .003).

For patients of all six clinics who only received the emails, CCS uptake was also collected over five months. Patients of all six clinics received two emails and patients of the clinic in Porter County who were not usual patients of that clinic's PCPs also received a third email. Within this group of participants, it was found that 313 out of 4,374 (7.15%) had completed CCS. This proportion was lower than among the target group because it represented all patients who had been seen at the clinic in the past year. Many of these patients had a PCP who was not affiliated with the FQHC, and therefore, were not likely to complete their CCS at the project site. Some patients may have seen the reminder and scheduled their CCS elsewhere. Participants were sent an email even if they only had one encounter, including an urgent care visit, within the past year before the project was implemented.

For the 391 total participants who completed CCS, results of the Pap and HPV tests were collected via chart review. This review included patients of all six clinics of the FQHC, the one in Porter County and the other five. It was found that 37 participants (9.4%) had abnormal Pap test results, 30 (7.7%) had HPV detected, and 19 of these had both an abnormal Pap and HPV detected. Of the abnormal Pap tests, only two were in the severely abnormal range and likely to require treatment. The others were only slightly abnormal and likely only needed further testing. For these participants, the abnormal cells were caught and could be monitored or treated early, before they became cervical cancer, in most cases. In addition, 24 participants had an infection discovered by the test, including Candida, Bacterial Vaginosis, Trichomonas, Actinomyces, Herpes, or Fungal infection. Finding and treating these infections provided another way to improve these women's health.

Strengths and Limitations of the DNP Project

Strengths

Strengths of this project included the large number of participants who were able to be included in both the intervention and comparison groups (N = 1109). Since patients at the project site opt-in to quality improvement type projects when they enroll with the FQHC, no consents were needed. Therefore, all eligible patients of the facility could receive the interventions and be included in the project. The large sample size allows for more confident generalization of the results to a larger population. Also, the population health software utilized by the project site was helpful in collecting information on the intervention and comparison groups. This software allowed data on demographics and CCS completion status to be collected more quickly and easily for the group, rather than needing to complete individual chart reviews for each participant.

In addition, the support of staff members was important in this project's success. The Quality Improvement Coordinator was available to assist the project manager in utilizing the population health software, sending the emails, and obtaining data on patient surveys. She and the Information Technology staff provided a laptop for the project manager to use, including troubleshooting when things were not working correctly, as well as setting up a phone line for the phone call intervention. In addition, a Spanish-speaking case manager assisted with translating the emails into Spanish and making phone calls to the Spanish-speaking patients. The Quality Improvement Coordinator and Quality Improvement Director worked with the project manager and appointment scheduling staff to identify an appropriate individual to whom calls could be transferred for scheduling. Finally, the data analyst provided invaluable support in pulling data on CCS completions periodically throughout the project.

Within the emails that were sent, having a link to online scheduling was a strength of the intervention. The Quality Improvement Coordinator reported an increase in online self-scheduling during the days following the two emails being sent out. This could be another

potential advantage over a mailed intervention, allowing for quicker and more convenient scheduling of CCS compared with having to make a phone call during business hours.

An advantage of the phone call intervention was that it allowed discovery of 60 participants who had completed CCS with another provider outside the FQHC. The project manager collaborated with the Quality Improvement Coordinator and provided the names of these participants to her. Those participants' medical records would then be requested from the appropriate provider and their charts updated, increasing the overall rates for CCS among the FQHC's patient population, although these completions were not included in this project. In addition, the finding that 16 participants had a previous hysterectomy was also forwarded to the Quality Improvement Coordinator and could be verified and added to the patient's medical history, allowing them to be excluded from the population due for CCS. These findings helped improve the clinic's performance on the quality measure of CCS rates. Updating these patient charts was an additional benefit of this EBP project, helping increase overall CCS rates among the FQHC population. In addition, some participants stated they would schedule their CCS with an outside provider. Therefore, the project had benefits for those women's health, although the outcomes were not measurable due to being with a different facility. By expanding the phone call interventions to the other five clinics, the FQHC has the potential to further increase its CCS rates in this way.

Limitations

Some limitations were encountered with regards to providing the interventions to Spanish-speaking patients. Although the emails were sent in Spanish, the link to online scheduling was not included in their emails. The link and the website that it went to were in English. Therefore, it was decided that the link would not be included, and participants were instead instructed to call for an appointment. The phone line would then have the option to reach a Spanish-speaking appointment scheduler. Being able to provide a link and website with some information in Spanish would have allowed this patient population to complete online self-

scheduling, as well. In addition, since the project manager is not fluent in Spanish, the phone call intervention was completed by a Spanish-speaking case manager, whereas the other phone calls were all made by the project manager. This could have led to greater variability in the intervention. However, a script in Spanish was provided to the case manager to promote consistency.

Many limitations were encountered during this project due to the COVID-19 pandemic. First, a reluctance to receive cancer screening has been reported during the pandemic, with an 86% to 94% decrease found between January and March 2020 in a recent study (Kiser & Butler, 2020). During the phone call intervention, several participants stated they were not willing to schedule CCS due to concerns about COVID-19. The project manager reassured these participants that the FQHC had extra precautions in place to promote safety, educated them on the importance of completing CCS in a timely manner, and encouraged them to call back when they were ready to schedule their appointment.

In addition, the project site had safety protocols in place due to the pandemic which restricted the project manager's ability to collaborate with stakeholders. The project manager was not permitted to present the project proposal directly to the board or to the clinic or scheduling staff due to safety protocols to reduce contact between clinic staff and other staff of the facility. Instead, a proposal was written by the project manager and presented to the board by the Quality Improvement Director for their consideration and approval. In addition, a PowerPoint presentation was prepared by the project manager, then distributed to the healthcare providers and managers at their meeting by the Quality Improvement Director. An email was written by the project manager and sent to the appointment scheduling staff by their manager describing the project, giving dates when the emails would be sent and phone calls made, and requesting their assistance. Periodically, emails were sent to the managers, healthcare providers, and scheduling staff to update them on the preliminary outcomes and progress of the project. The project manager provided her contact information but did not

receive any comments or questions from the staff. Following completion of the project and outcome evaluation, a voice-over PowerPoint was developed and sent to managers and PCPs via email. Also, an email was sent to the scheduling staff summarizing the results, along with the poster. In this way, appropriate information was provided to the clinic staff, but feedback and collaboration was not facilitated as would have been possible with in-person meetings.

Additional challenges were encountered due to limited resources. Initiation of the phone call intervention was delayed by a week due to difficulty in securing a phone and setting up a phone line for this purpose. When the project site began administering COVID-19 vaccines, laptops were needed for staff administering the vaccines and no laptop was available for the project manager to use during the first week and a half. Fortunately, the timing was after implementation was complete, so not having a laptop only delayed the data entry and analysis.

While conducting the phone call intervention, another limitation was that the project manager did not reach most of the participants and instead left a voicemail. The facility did not want a message left to return the call to that extension, since the project manager may not be there the following day. So instead, a more general message was left instructing the participant to call the facility's main number to schedule their appointment. If the participants had been able to return calls to the project manager, this would have allowed for a more personalized intervention. Also, some of those participants may have been up-to-date on their CCS with an outside provider, but this information was not able to be discovered without talking directly to them. In addition, a few of the participants were not able to receive even a phone message, due to their voicemail being full or not set up or the number out of service. The project manager attempted these phone calls again at a later date and was able to reach some of them, but nine participants were unable to be reached. Finally, the facility phone line was down a few times during the phone call intervention, which delayed their completion and may have prohibited participants from calling back to schedule appointments.

Implications for the Future

Practice

The results of this project suggest that education and reminders are effective strategies to increase CCS rates. Since this EBP project was conducted at only one clinic of the FQHC as a pilot, it would be recommended to implement these interventions at all six sites in the future. The Quality Improvement Coordinator who assisted with the project plans to send out the education and reminder emails to patients of all six clinics in the future. However, the project manager is not employed by the facility and would not be able to assist with phone calls in the future. According to the Quality Improvement Director, the FQHC is now working with patient care navigators, who are making phone calls to patients to encourage them to complete screening tests. She stated that they are starting by calling those patients who already have a test ordered but have not yet completed their screening. However, she stated that the patient care navigators would be able to call all patients due for screening at all sites in the future, as well as providing personalized care to address barriers and educate patients on the free screenings available. Lay health navigators who provided education and reminders were found to be effective to increase CCS in the literature (Dunn et al., 2017; Rees et al., 2018). In addition, Plourde et al. (2016) and Duffy et al. (2017) reported that patients who received a recommendation for CCS from their healthcare provider were more likely to complete it than those who did not. Therefore, another recommendation would be for healthcare providers to remind and encourage their patients to complete CCS.

EBP Model

Utilizing the six steps within the Larrabee Model for Change to Evidence-Based Practice was a positive framework to guide this change. The EBP Model gave the project manager, who was new to the project site and to EBP implementation, a detailed roadmap to follow. During the initial step, assessing the need for change in practice, identifying the problem, including stakeholders such as quality improvement staff and the medical director, collecting data on

current practices, and comparing internal with external data for CCS rates helped to define the problem (Rosswurm & Larrabee, 1999). Following this process helped support the need for change in practice. In step two, linking problem interventions and outcomes, the outcome indicator of CCS completion was identified and possible interventions, including education and reminders, were considered.

While following step three of the Larrabee Model, synthesizing best evidence, a comprehensive literature search was conducted, best evidence was critiqued and synthesized, and the results were compared with what was feasible within the project site, as well as benefits and risks to participants (Rosswurm & Larrabee, 1999). In step four, designing the practice change, it was determined that sending out mass text notifications was not possible, so an alternative plan of sending a second email was developed. For step five, this project was implemented as a pilot study at one clinic, as suggested by the model, and the increased CCS rates provide strong support for a change in practice at the other five clinics of the FQHC. Finally, step six involves integrating and maintaining the change in practice. The project manager was able to meet with the Quality Improvement Director and Quality Improvement Coordinator and found that implementing the phone call and email interventions at all six clinics is planned in the future. In this way, the project manager promoted sustainability of the interventions in the future.

Research

The results of this project were certainly affected by its being conducted during a pandemic. Recommendations for future research would include carrying out similar projects or research in the future when there would be fewer challenges and restrictions due to the pandemic. In addition, several pieces of literature found provided strong support for the use of lay health navigators or outreach workers to increase CCS, especially for women of minority race or ethnicity (Braun et al., 2015; Chan & So, 2015; Dunn et al., 2017; Rees et al., 2018; Thompson et al., 2016). Training and utilizing lay health navigators were beyond the time frame,

budget and scope of this EBP project. However, future research could focus on the use of lay health navigators within the FQHC population.

Education

Patient education is needed, especially in the underserved population of this FQHC with its low CCS rates. The education is necessary to inform participants about why CCS is needed, what is involved with Pap and HPV testing, and the benefits of early detection of cervical cancer. The outcomes of this project supported providing educational materials as an effective intervention to increase CCS rates. In addition, much of the literature supported in-person individual and group education to improve CCS uptake (Chan & So, 2015; Duffy et al., 2017; Saei Ghare Naz, 2018). Continuing patient education about CCS through emails and phone calls, as well as in-person education, would be recommended.

Conclusion

The primary outcome of this project determined that an educational email, combined with a reminder email and phone call intervention, significantly increased CCS uptake when compared with the usual practice of sending a single email. Examining the secondary outcome found that the second email and phone calls each were significantly more effective than the previous interventions alone. The phone call interventions were conducted only at one clinic of the FQHC, as a pilot. Due to the success of this project, it is recommended to implement the interventions at all six clinics of the FQHC on an annual basis in the future. In addition, these interventions should be implemented in other primary care clinics to increase CCS rates.

By finding abnormal results on Pap and HPV tests, several of the women who completed CCS could be treated early or monitored more frequently, enabling prevention and less invasive treatment. In this way, morbidity and mortality could be decreased. This EBP project met its goals of improving CCS rates and reducing eventual cases of cervical cancer which develop in the at-risk population of an FQHC. Education and reminders were provided to encourage women to make their health a priority.

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BIOGRAPHICAL MATERIAL

Christiana E. McLean

Christiana McLean graduated from Purdue University with an Associate of Science in Nursing in 2009. After graduation, she worked in assisted living and long-term care settings before returning to Purdue for her Bachelor of Science in Nursing, which she received in 2015. She obtained her Certified Rehabilitation Registered Nurse (CRRN) certification in 2016 while working in acute rehabilitation and has subsequently worked on orthopedics and medical-surgical units in Northwest Indiana. Christiana also has served as a parish nurse and assisted in planning for and handling emergent medical situations within her church. Mrs. McLean is currently attending Valparaiso University to earn her Doctor of Nursing Practice (DNP) degree in 2021. As an undergraduate, she was inducted into the Alpha Sigma Lambda Honor Society and is currently a member of Sigma Theta Tau-Zeta Epsilon chapter. Christiana has served on the Graduate Student Advisory Council, Student-Faculty Senate, and as an adjunct clinical instructor for undergraduate nursing students at Valparaiso University. She presented her abstract and poster for her evidence-based practice (EBP) project in progress on increasing cervical cancer screening rates among at-risk women at a Federally Qualified Health Center (FQHC) at the Virtual Indiana Nursing Summit in 2020 and to the Sigma Theta Repository. Following graduation, she intends to complete a nurse practitioner residency with another FQHC in Northwest Indiana, continuing work with vulnerable populations. In addition, she plans to serve others by volunteering for mission trips to Guatemala with her church group, using her advanced practice nursing skills to provide healthcare to those in need. Christiana also would like to continue teaching undergraduate nursing students part-time, as she has a passion for influencing the next generation of nurses.

ACRONYM LIST

ACS: American Cancer Society

CCS: cervical cancer screening

CINAHL: Cumulative Index to Nursing and Allied Health Literature

COVID-19: Coronavirus disease 2019

CRC: colorectal cancer

EBP: evidence-based practice

FQHC: Federally Qualified Health Center

FPL: federal poverty level

HPV: Human papillomavirus

IRB: Institutional Review Board

ISDH: Indiana State Department of Health

JBI: Joanna Briggs Institute

LHA: Lay health advisor

MeSH: Medical Subject Heading

ODPHP: Office of Disease Prevention and Health Promotion

Pap: Papanicolaou

PCP: primary care provider

RCT: Randomized controlled trial

SDOH: Social determinants of health

SES: Socioeconomic status

SR: Systematic review

USPSTF: United States Preventive Services Task Force

Appendix A

EBP Project Evidence Table

Citation (APA)	Purpose	Design	Sample	Measurement/ Outcomes	Results/Findings	Level/ Quality
Braun, K. L., Thomas, W. L., Domingo, J-L. B., Allison, A. L., Ponce, A., Kamakana, P. H., Brazzel, S. S., Aluli, N. A., & Tsark, J. U. (2015). Reducing cancer screening disparities in Medicare beneficiaries through cancer patient navigation. *Journal of the American Geriatrics Society, 63*(2), 365-370.	To assess whether lay navigators would increase cancer screening in Asian and Pacific Islander Medicare beneficiaries.	Randomized Controlled Trial	N = 488 Medicare-eligible residents, randomized to 242 in the experimental group and 246 randomized to control group.	IV: Lay navigators provided services to experimental group, including mailed and phone call reminders, providing information, and scheduling appointments. Control group received usual care. DV: CCS rates in experimental and control groups.	57.0% of experimental group and 36.4% of control had Pap test after 24 months (p = 0.001).	Level 1c High
Chan, D. N. & So, W. K. W. (2015). A systematic review of randomized controlled trials examining the	To assess effectiveness of breast and CCS programs on minority	Systematic Review	10 RCTs conducted with minority women in United States and Canada;	Effective strategies were culturally relevant and in participants' language, theory-	All 4 studies on CCS showed statistically significant increase in Pap test uptake in intervention groups (p ‹ 0.01).	Level I High

effectiveness of breast and cervical cancer screening interventions for ethnic minority women. *European Journal of Oncology Nursing, 19,* 536-553.	women's beliefs and knowledge about cancers, cancer screening intentions and uptake.		6 on breast cancer screening, 4 on CCS programs.	based, education in community setting, key messages about cervical cancer and screening, used multiple interventions, including outreach worker individual education/group workshops and multimedia, direct mail or distributed educational materials		
Chaudhry, R., Scheitel, S. M., McMurtry, E. K., Leutink, D. J., Cabanela, R. L., Naessens, J. M., Rahman, A. S., Davis, L. A., & Stroebel, R. J. (2007). Web-based proactive system to improve breast cancer screening. *Archives of Internal Medicine, 167,* 606-611.	To determine feasibility of a Web-based information system for staff to use and improve mammography rates; to assess effect of patient reminders for mammography scheduling on annual physical	Randomized Controlled Trial	Female patients ages 40-75 at an academic primary practice. N = 7183, 6665 consented; control group n = 3339, intervention group n = 3326. Mayo clinic employees in intervention	**IV: Control:** Usual care. **Experimental:** Patients received a personalized letter through US mail from their physician with a brochure about preventive services. Mayo Clinic employees also received an additional reminder by US mail or email; a	Mammography rates were significantly higher in the intervention group (64.3%) than in the control group (55.3%; $p < 0.001$). Mammography rates for Mayo Clinic employees in email group were 72.2%; 8.1% for the US mail group; and 57.5% for the control group; which was statistically significant ($p < 0.001$); there was no significant difference between e-mail and US mail reminders ($p = 0.24$).	Level 1c Good

	exam rates; and compare efficacy of email and US mail reminders.		group further randomized to e-mail (n = 399) or US mail (n = 448)	second reminder email or letter was sent 1 month later, followed by a phone call 1 month later, if they had not scheduled a mammogram. **DV:** Mammography rates		
Duffy, S. W., Myles, J. P., Maroni, R., & Mohammad, A. (2017). Rapid review of evaluation of interventions to improve participation in cancer screening services.	Find and review evidence on interventions which increase cancer screening uptake, emphasis on underserved populations.	Rapid Review	68 articles on cancer screening, including 18 RCTs, quasi-RCTs and non-randomized controlled trials about CCS; other cancer screening studies included observational studies	Effective interventions include personalized letters with education leaflet, phone reminders, invitations with fixed appointment time, multiple outreach activities, HPV self-sampling. Home visits	11 studies showed statistically significant increase in uptake; additional 5 showed increase, but not reported as significant; 2 studies did not find difference in uptake between intervention and control groups for phone call and letter interventions. "Interventions which were found most consistently to improve participation in cancer screening, including in underserved populations, were pre-screening reminders, general practice endorsement, more personalized reminders for non-participants, and offering a more acceptable screening test in cervical and bowel screening, both of which	Level 1b Good

					may suffer from social and cultural taboos" (p. 143).	
Dunn, S. F., Lofters, A. K., Ginsburg, O. M., Meaney, C. A., Ahmad, F., Moravac, M. C., Nguyen, C. T., & Arisz, A. M. (2017). Cervical breast cancer screening after CARES: A community program for immigrant and marginalized women. *American Journal of Preventive Medicine, 52*(5), 589-597.	To assess the effect of the CARES community-based program on cervical and breast cancer screening uptake in underscreened or never-screened (UNS) women.	Matched Cohort Study	N = 372 women in CARES cohort, 331 eligible for Pap screening. Matched controls, n = 969 for Pap screening.	**IV: Control:** Usual care**. Experimental:** CARES program: language-specific group education sessions taught by peer leaders and program staff; PowerPoint followed by assistance with screening for UNS women; reminder from peer leader several months later if no Pap test. **DV:** Pap testing uptake within 8-25 months following sessions.	26% of CARES attendees had Pap testing by end of study period, compared with 9% of control group, OR = 5.1 (95% CI = 2.4, 10.9).	Level 3c High
Kitchener, H., Gittins, M., Cruickshank, M., Moseley, C., Fletcher, S., Albrow, R., Gray, A., Brabin, L., Torgerson, D.,	To assess feasibility and efficacy of interventions in increasing CCS rates in	Two-phase cluster Randomized Controlled Trial	N=20,0879 women	**IV: Control:** Usual care in practices randomized to control group.	In phase II, self-sample kits increased uptake at 12 months (p = 0.001) and 18 months (p = 0.012). Timed appointments increased screening uptake at 12 months (p = 0.001).	Level 1c

Crosbie, E. J., Sargent, A., & Roberts, C. (2018). A cluster randomized trial of strategies to increase uptake amongst young women invited for their first cervical screen: The STRATEGIC trial. *Journal of Medical Screening, 25*(2), 88-98.	young women.			**Experimental:** Phase I: Pre-invitation leaflet and online booking access. Phase II: after 6 months, non-attenders randomized to vaginal self-sample kits, timed appointments, nurse navigator, or given choice of nurse navigator or self-sample kit. **DV:** CCS uptake		
Jayasekara, R. (2020). Papanicolaou (pap) smear: Cervical screening. *The Joanna Briggs Institute EBP Database,* JBI@Ovid. JBI11579.	Summarize evidence about the uptake of CCS with the Pap test.	Evidence Summary	5 sources of evidence including 2 systematic reviews, 1 systematic review with meta-analysis, and 2 observational studies.	N/A	All articles detailed interventions that increased screening uptake, including education, LHAs, mailed or telephone reminders, and HPV self-sampling.	Level 1b High
Muller, D., Logan, J., Dorr, D., Mosen, D.. (2009). The effectiveness of a	To determine efficacy of email reminders for	Randomized Prospective Cohort Study	Patients at a nonprofit HMO in the U.S.	**IV: Control:** Usual care. **Experimental:** Email	Letter reminders increased uptake of CRC screening (23.6%) compared to usual care (7.8);this was statistically	Level 1c Good

secure email reminder system for colorectal cancer screening. *AMIA 2009 Symposium Proceedings,* 457-461.	increasing CRC screening.		N = 1397, randomized to letter reminder (n = 458, email reminder (n = 457), or usual care (n = 494).	intervention: email reminder sent through secure system; Letter intervention: sent letter with identical content to email. **DV:** Completion of CRC screening within 3 months.	significant ($p < 0.0005$). Email reminders also increased uptake significantly compared with usual care (22.7%; $p < 0.0005$), but no significant difference between letter and email reminders ($p = 0.711$).	
Plourde, N., Brown, H. K., Vigod, S., & Cobigo, V. (2016). Contextual factors associated with uptake of breast and cervical cancer screening: A systematic review of the literature. *Women & Health, 56*(8), 906-925.	Critical literature review for provider- and system-level contextual factors correlated with breast and cancer screening uptake.	Systematic Review	13 studies, including 5 cross-sectional studies about Pap test uptake.	Contextual factors associated with increased Pap test uptake: female providers, facilities with QI program, PCP notified of specialty visits, areas with more access to a car.	PCP notified of specialty visits (OR: 6.24; 95% CI: 1.26-30.77) and female providers associated with statistically significant differences in screening; having QI program associated with higher rates for Pap testing (OR: 1.04; 95% CI: 1.01-1.08).	Level 1b Good
Rees, R., Jones, D., Chen, H., & MacLeod, U. (2018). Interventions to improve the uptake of cervical cancer screening among lower	To review RCTs and quasi-RCTs showing evidence of interventions that increase CCS in low	Systematic review	16 studies, RCTs and quasi-RCTs	Various interventions, including HPV self-testing, lay health advisor education, multimedia and print materials,	LHAs increased uptake of CCS, statistically significant in 7 studies. Invitation or reminder letters and phone calls also increased uptake significantly in 5 studies, as did other education interventions.	Level 1a High

socioeconomic groups: A systematic review.	socioeconomic groups					
Saei Ghare Naz, M., Kariman, N., Ebadi, A., Ozgoli, G., Ghasemi, V., & Rashidi Fakari, F. (2018). Educational interventions for cervical cancer screening behavior of women: A systematic review. *Asian Pacific Journal of Cancer Prevention, 19*, 875-884.	To evaluate effectiveness of education interventions on women's CCS behavior.	Systematic Review	37 articles: 13 RCTs, remaining were quasi-experimental or pre-test post-test design	Education methods studied were phone calls, mailed letters or postcards, individual or group education and consultation sessions and interviews, multimedia, and a self-learning package or brochure.	Face-to-face individual and group education, mailed education materials, and phone education resulted in statistically significant increases in CCS in 8 studies; non-significant CCS increases reported in 12 studies, and the remaining studies reported increased knowledge and decreased barriers to CCS with interventions. Different interventions are effective to increase CCS, and healthcare providers can choose methods based on client situation.	Level 1b Good
Tavasoli, S. M., Kone Pefoyo, A. J., Hader, J., Lee, A., & Kupets, R. (2016). Impact of invitation and reminder letters on cervical cancer screening participation rates in an organized screening program. *Preventive Medicine, 88,* 230-236.	To measure the effect of invitation and reminder letters on CCS uptake in eligible Ontario women age 30 to 69.	Cohort Study	N = 99,278 women in Intervention group. N = 130,181 women in historical Non-Intervention group.	**IV:** Control group, usual care Experimental group: mailed invitation letter with information on CCS, then reminder letter 4 months later to women who had not yet received Pap test. **DV:** Pap test uptake 9 months	Receiving mailed letter increased Pap test uptake (AOR = 1.74).	3c High

				after invitation letters mailed.		
Thompson, B., Carosse, E. A., Jhingan, E., Wang, L., Holte, S. E., Byrd, T. L., Benavides, M. C., Lopez, C., Martinez-Gutierrez, J., Ibarra, G., Gonzalez, V. J., Gonzalez, N. E., & Duggan, C. R. (2016). Results of a randomized controlled trial to increase cervical cancer screening among rural Latinas. *Cancer, 123*, 666-674. DOI: 10.1002/cncr.30399.	To compare the effectiveness of a low-intensity intervention with a high-intensity intervention and control group on CCS uptake.	Randomized Controlled Trial	N = 443 Latina women at an FQHC in Washington state; n = 147 control arm, n = 150 low-intensity, n = 146 high-intensity.	**IV:** Control group, usual care. Low-intensity intervention: culturally appropriate Spanish-language video mailed to home. High-intensity: LHA-led education session in home, including watching same video sent to low-intensity arm.	Significantly higher Pap testing in high-intensity arm (53.4%) than control arm (34%; p ‹ 0.001) or low-intensity (38.7%; p ‹ 0.01). No statistically significant difference between low-intensity and control (p = 0.40).	Level 1c High

Appendix B

Cervical Cancer Screening Education Email

It is time to schedule your Pap test!

Dear (Patient Name),

Our records show that you are past due for a Pap appointment.

Women ages 21 to 30 in most cases need a Pap test every three years, while women ages 31 to 64 usually need a Pap every five years. Getting timely Pap exams is a vital way to protect your health.

Cervical cancer can develop with no initial symptoms. A Pap exam can find changes in your cervix cells before they turn into cancer. Early detection of precancerous or cancerous cells can lead to less invasive procedures and treatments. A Pap test is a quick and simple procedure to detect cervical cancer.

To find out more about Pap and HPV testing, click here Fact Sheet.

You can get a Pap test from one of our gynecologists or family practice providers at [redacted] Health Centers. Make your health a priority by scheduling an appointment with your healthcare provider.

Book a Pap appointment today. Call us at (219) 763-8112 or schedule your appointment online below.

SCHEDULE NOW

Sincerely,

[redacted] Health Centers

[redacted]

[redacted] Health Centers is taking the COVID-19 Pandemic very seriously. During these challenging times, we assure you that we are staying true to our mission and will continue to care for our community. There may be some visible changes as we have made adjustments to our registration procedures. We are working very hard to keep all patients, employees, and visitors safe.

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Appendix C

Educational Fact Sheet

A FACT SHEET FROM THE OFFICE ON WOMEN'S HEALTH

Pap and HPV tests

Pap tests (or Pap smears) look for cancers and precancers in the cervix. Precancers are cell changes that can be caused by the human papillomavirus (HPV). HPV is a sexually transmitted infection that goes away on its own in most people. If it does not go away, HPV can lead to cervical cancer. An HPV test looks for HPV in cervical cells.

Q: Why do I need Pap and HPV tests?

A: A Pap test can save your life. It can find cervical cancer cells early. The chance of successful treatment of cervical cancer is very high if the disease is caught early.

An HPV test can give your doctor more information about the cells from your cervix. For example, if the Pap test shows abnormal cervical cells, the HPV test can show whether you have a type of HPV that causes cervical cancer.

Q: Who should get regular Pap or HPV tests?

A: Most women 21 to 65 years old should get Pap tests as part of routine health care. Even if you are not currently sexually active, got the HPV vaccine, or have gone through menopause, you still need regular Pap tests. Experts recommend:

- Women 21–29 get a Pap test every 3 years
- Women 30–65 get:
  - A Pap test every 3 years, **or**
  - An HPV test every 5 years, **or**
  - A Pap and HPV test together (called co-testing) every 5 years

Women older than 65 need a Pap test if they have never been tested or if they have not been tested after age 60. Some women may need Pap or HPV testing more often.

Q: How do I prepare for a Pap or HPV test?

A: You do not have to do anything special to prepare for a Pap or HPV test. Also, you should not douche before a Pap or HPV test. Most doctors do not recommend douching for any reason. You also should not put anything in or around your vagina to clean it, other than soap and water on the outside of your vagina.

Q: Are Pap and HPV tests painful?

A: Some women find Pap and HPV tests uncomfortable, but the tests should not be painful. You will feel pressure as your doctor or nurse puts the speculum (a tool that helps your doctor or nurse see your cervix) into your vagina.

If you have never had sexual intercourse or if you have had pain when something is put into your vagina, you can ask your doctor or nurse to use a smaller speculum.

You can also help lessen or prevent pain by urinating before the test to empty your bladder or by taking an over-the-counter pain reliever, such as aspirin, acetaminophen, or ibuprofen, about an hour before your Pap or HPV test.

Q: What do my Pap test results mean?

A: Your Pap test results will say one of these three things:

- **Normal.** The cells collected from your cervix during the Pap test look like they should and you do not have to do anything until your next Pap test.
- **Unclear.** Your doctor does not know whether the cells collected from your cervix are normal or abnormal. Your doctor may do more testing right away to rule out any problems, or your doctor may have you come back in 6 months or a year for another Pap test.
- **Abnormal.** The cells collected from your cervix during your Pap test look abnormal. Abnormal Pap test results do not mean you have cancer, so your doctor must do other tests to find out what should happen next. Your doctor may do another Pap test right away or, if the cell changes are minor, wait 6 months or a year before doing another Pap test.

Q: Can a Pap test tell me whether I have a sexually transmitted infection (STI)?

A: No. A Pap test is not used to find STIs. You must ask your doctor to test you for STIs if you want to have STI testing.

For more information…

For more information about Pap and HPV tests, call the OWH Helpline at 1-800-994-9662 or contact the following organizations:

National Breast and Cervical Cancer Early Detection Program, CDC, HHS
1-800-232-4636 • *www.cdc.gov/cancer/nbccedp*

National Cancer Institute (NCI), NIH, HHS
1-800-422-6237 • *www.cancer.gov*

American Cancer Society
1-800-227-2345 • *www.cancer.org*

National Cervical Cancer Coalition
1-800-685-5531 • *www.nccc-online.org*

Planned Parenthood
1-800-230-7526 • *www.planned parenthood.org*

Content last updated: September 20, 2018.

OFFICE ON WOMEN'S HEALTH

www.facebook.com/HHSOWH
www.twitter.com/WomensHealth

Appendix D

Cervical Cancer Screening Reminder Email

You are due for a Pap test!

Dear (Patient Name),

It is time to schedule your Pap test. Our records show that you are past due for this appointment. This is a reminder to call us or go online to make your appointment today.

Put your health first!

If you are concerned about cost, know that [redacted] provides free and low-cost screening tests to those who qualify based on income.

To find out more about Pap and HPV testing, click here Fact Sheet.

Book a Pap appointment today. Call us at (219) 763-8112 or click below to schedule online.

SCHEDULE NOW

Sincerely,

[redacted] Health Centers

[redacted] Health Centers is taking the COVID-19 pandemic very seriously. During these challenging times, we assure you that we are staying true to our mission and will continue to care for our community. There may be some visible changes as we have made adjustments to our registration procedures. We are working very hard to keep all patients, employees, and visitors safe.

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Appendix E

Cervical Cancer Screening Third Email

Remember to schedule your Pap test!

Dear (Patient Name),

We noticed you have not yet scheduled your Pap test. According to our records, you are past due for this appointment. This is a reminder to call us or schedule your appointment online today. It is important to get screening tests done on time to catch any abnormal cells early while they are typically more treatable.

To find out more about Pap and HPV testing, click here Fact Sheet.

You can get a Pap test from one of our gynecologists or family practice providers at [redacted] Health Centers. We have appointments during typical hours as well as evening and Saturday hours.

If you are concerned about cost, know that [redacted] provides free and low-cost screening tests to those who qualify based on income.

Book your Pap appointment today. Call us at (219) 763-8112 or click below to schedule your appointment online.

SCHEDULE NOW

Thank you for choosing [redacted] for your healthcare needs. If you have any questions or concerns about Pap or HPV testing, please contact your healthcare provider.

Sincerely,

[redacted] Health Centers

[redacted] Health Centers is taking the COVID-19 Pandemic very seriously. During these challenging times, we assure you that we are staying true to our mission and will continue to care for our community. There may be some visible changes as we have made adjustments to our registration procedures. We are working very hard to keep all patients, employees, and visitors safe.

Unsubscribe from this list

Appendix F

Phone Call Script

Hello, this is Christiana McLean, a nurse practitioner student calling from [redacted] Health Centers. I'm calling today because our records show that you are due for a Pap test. It's important to get this screening test done on time to find any abnormal cells early, while they are typically more treatable. Can I help you schedule that today?

We have appointments available during typical hours, as well as evening and Saturday hours. If you are concerned about cost, know that [redacted] provides free and low-cost screening tests to those who qualify based on income.

Do you have any questions or concerns about getting the Pap test?

(If they agree to schedule, transfer to scheduling. If not, ensure they have number and encourage them to call back to schedule.)

Thank you for your time and have a great day!

If leaving a message:

Hello, this is Christiana McLean, a nurse practitioner student calling from [redacted] Health Center. This message is for (Name). I am calling to follow up on the email you received about scheduling your screening test. We have evening and Saturday appointments available as well as typical hours. If you are concerned about cost, know that [redacted] provides free and low-cost screening tests to those who qualify based on income. Call us at 219-763-8112 to schedule your appointment.