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Text messaging Appointment Reminders to Increase Patient Appointment Adherence within a

Prevention and Wellness Program

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Abstract

Healthcare organizations want to provide quality care, decrease costs, and promote preventative services for the communities they service. Mobile health units have become an extension of many healthcare organizations and provide different types of services, such as mammography. Providing mammography and wellness exams on a mobile unit presents several challenges; appointment adherence is one of them. Mobile units typically travel to underserved areas to serve people at risk for various health conditions such as breast cancer. Breast cancer is estimated to affect over 250,000 women in the United States during 2017; women have a 1:8 lifetime risk of being diagnosed with breast cancer (American Cancer Society, 2017).

Text messaging (SMS) is a new technology that can be used to aid healthcare organizations in increasing their attendance rate to appointments. With 95% of Americans owning a cell phone and 73% of them engaging in text activity, it was hypothesized that text message appointment reminders would increase appointment adherence (Pew Research Center, 2011). A pilot study was implemented in a Prevention and Wellness department that provides mammogram screenings and wellness exams on a mobile unit. Implementation of text message appointment reminders was conducted for one month. Retrospective analysis of the data was conducted during the one month period. In total, 240 women attended their screening appointment. The non-attendance appointment rate for the intervention cohort group was 4.94%; the nonattendance rate for the customary method cohort group was 6.43%. There was a 23% reduction in non-attendance rate after the implementation of text message reminders.

Keywords: text messaging, appointment adherence, mammogram, mobile unit

Text messaging Reminders in a Prevention and Wellness Program

According to The American Cancer Society (ACS), breast cancer is the most frequently diagnosed cancer in women (American Cancer Society, 2017). An estimated 252,710 new cases of invasive breast cancer are expected to be diagnosed among women in the United States during 2017 (American Cancer Society, 2017).

The Centers for Disease Control and Prevention (2013) reported the United States invasive breast cancer mortality rate was 20.7 per 100,000 people and breast cancer morbidity rate was 124 per 100,000 people. The Midwest and South have the highest mortality rates; Kentucky ranks similar to the national death rate of 21.0 per 100,000 people. Healthy People 2020 has made it one of their goals to reduce the female breast cancer death rate from a starting point of 23 per 100,000 to a target goal reduction of 20.7 per 100,000. The cancer death rate in 2014 has been reduced to 20.6 per 100,000 (Healthy People.gov, 2017).

Background and Significance of the Breast Cancer Problem

Marriotto, Yabroff, Shao, Feuer, & Brown (2011) found that breast cancer has a financial burden on the patient and economy. There are several variables that influence the financial burden such as new chemotherapy treatments, diagnostic tools, and survival. Breast cancer represented one of the largest numbers of survivor rates in 2010 (Marriotto,Yabroff, Shao, Feuer, & Brown). Nationally, there was over 16 billion dollars spent on female breast cancer alone and this data represents the highest cost of all cancers treated (Campbell & Ramsey, 2009). By the year 2020, breast cancer is projected to lead in cost per body site, with costs reaching over 20 million dollars (Campbell & Ramsey, 2009). The increase in breast cancer survivors has important implications on increased demand for primary care providers, medical oncologists, and other oncology team members.

Campbell & Ramsey (2009) stated the cost of treating breast cancer varies extensively in methodology, population, time and perspective lifetime per patient, ranging from $20,000 to $100,000. Breast conserving surgery and mastectomy costs ranged from $23,000 to $31,000. The cost of caring for an individual with breast cancer increases as the stage of disease increases. Blumen, Fitch, & Polkus (2016) found that clinical disease stage (stage I vs. stage IV) was found to be indicative of the cost of treating breast cancer.

Due to reduction in the prescribing of hormone replacement and early mammograms, breast cancer rates decreased among Caucasian women between the years of 2002 to 2003 (American Cancer Society, 2017). Noted among recent data from years 2005 to 2014, breast cancer incidence rates have stabilized among Caucasian women and slightly increased for African American women (American Cancer Society, 2017). African American women in the past were more likely to die due to aggressive cancers and lack of insurance. The rate of African American and Caucasian women seeking screening has become equivalent (American Cancer Society, 2017). When breast cancer is detected at an early stage, the mortality rate decreases due to its early stage recognition. The ability to treat low-grade breast cancer (dependent on estrogen for its growth) with targeted therapy has increased. Often, low-grade breast cancers are estrogen-fed tumors that can be treated by targeted therapy, depriving the cancer of estrogen (CDC, 2014).

The simplest screening method for breast cancer is breast self-examination but its performance does not decrease morality and it is not recommended by the United States Preventative Services Task Force (Mark, Temkin, & Terplan, 2014). Other agencies, such as the Susan G. Komen Foundation, encourage self-breast exam awareness (Mark, Temkin, & Terplan, 2014). The screening mammogram is the most effective tool used to detect asymptomatic breast cancer in women over 40 years of age. The breast x –radiation can find micro calcifications (tiny

calcium deposits) and tumors that may not be palpable. Finding the micro calcifications and tumors early aid women in obtaining expedient care, thereby decreasing morbidity. Early detection programs, such as mobile mammography, target vulnerable populations to decrease mortality. Examples of health disparate populations typically include people who have a low economic status, low education level, limited health literacy, uninsured status, or membership in minority racial/ethnic groups (Leiyu, Leburn, Zhu, & Tsai, 2011). These health disparate populations generally lack access to primary care and prevention (Leiyu, Leburn, Zhu, & Tsai, 2011). It is imperative that early detection programs decrease costs and continue to serve these targeted populations. The National Cancer Institute (2015) researchers found that mammography performed among women 40-74 years of age reduces mortality; the reduction in mortality is even greater for women over 50. The relative risk reduction rate of mortality is 15%- 20%. Because of such statistics, the current recommendation from the American Cancer Society (ACS) is for women to have the choice to begin annual mammogram at age 40-44. Women ages 45-54 should have a mammogram every year and women over 55 should have a mammogram every two years or may continue yearly (American Cancer Society, 2017). However, they should consider their individual healthcare needs, especially if facing a life expectancy of less than 10 years (BCSFR, 2016). In January 2016, after reviewing science, benefits, risks, and consulting with healthcare professionals and/or the public, the United States Preventive Services Task Force (USPSTF, 2016) developed a final recommendation statement regarding screening mammography. The USPSTF group is required by Congress to develop evidence based recommendations for preventative services in the primary care setting. The USPSTF recognizes that mammography is an important device to reduce the mortality rate for breast cancer; the benefits are greatest as women increase in age. Therefore, the organization recommends that women at average-risk

between ages 50-74 will benefit the most from bi-annual screenings. Women age 40-49 should

consider the risk versus benefit and after the consideration can start screening with an every two

year cycle. After age 75, women should consider the option of continuing or discontinuing

mammograms with their providers, based on their own healthcare needs. Women at moderate to

high risk for breast cancer, such as breast lesion, genetic mutation, and history of receiving chest

radiation at a young age, should consult with their healthcare provider for an individualized plan.

There are several organizations that are in agreement with the USPSTF for women in

their forties to use an individualized approach in making a decision on when to start screening

and frequency. The American Cancer Society, the American College of Physicians, the

American Academy of Family Physicians and the Canadian Task Force on Preventive Health

Care are all in agreement with the USPSTF (BCSFR, 2016). The American College of

Obstetricians and Gynecologists (ACOG, 2014) recommends clinical breast exam annually.

ACOG recommends annual screening mammography in women age 40 and over, based on

consensus and opinion. ACOG's expert opinion is based on the incidence of breast cancer

morbidity and mortality.

Background and Significance of Solution: Text messaging

The Prevention and Wellness department, a group within a large healthcare organization

in the southeast United States, follows the established ACS guidelines, assesses for disparities in

the community and screens women over 40 on an annual basis. The Prevention and Wellness

(PW) department continuously serves the community by conducting well woman exams, cervical

screenings, mammography, cardiovascular screenings, colon screenings, prostate and skin

screenings throughout the year at various events with the mobile unit. Mobile clinics are a part

of the healthcare community locally and nationally. At the Prevention and Wellness department, the screenings are based on zip codes identified as at-risk areas.

The PW program is concerned with providing services for uninsured, underinsured, and low-income women. Its services are available to all women within its service areas in Kentucky and southern Indiana. The hospital organization performs over 40,000 screening mammograms annually. In 2016, the Prevention and Wellness department completed over 2,100 screenings and found 16 cancers. Prevention and Wellness screenings accounted for only 5% of the screening mammograms completed by the organization. Since the program's establishment in 2008, the Prevention and Wellness department has detected more than 100 breast cancers in women within the areas served.

The Prevention and Wellness department functions with grant money from multiple sources to provide mammograms to insured and uninsured women on the mobile unit. The Affordable Care Act (ACA) designed health plans to improve access to preventive care by requiring recommended preventive services at no cost (Koh & Sebelius, 2010).

In order to provide the mammograms, there are several staff members who are integral to the success of the program. There is a director, clinical manager, grant writer, secretary, driver, mammogram technician, registered nurse, lay health navigator, and nurse practitioner. The goal for increasing access to the mobile unit in 2016 consisted of providing services to 20 community events monthly. Typically, the mobile unit would schedule 20 patients per location. Effective January 2014, the minimum requirement is 10 women on the schedule before the unit is dispatched. Due to the variation between patients who schedule appointments and the non-attendance rate, over-booking patients is a common practice. The PW staff overbooks the unit in order to combat the 32% non-attendance rate. This over-booking process can cause patients

limited access to care, as well as both staff and patient discontent, which are pertinent causes for

concern. Salameh, Olsen, & Howard (2012) noted that individuals give many reasons for

nonattendance to appointments such as emotional issues, forgetfulness, and frustration of long

wait times, poor provider collaboration, appointment times, improved health, and transportation.

Currently, the demographic sheet asks if the patient is interested in receiving text

messages. Responses received on intake forms in 2016 revealed that 1495 (67%) patients gave

informed consent allowing the department to text them, 264 (12%) left the question blank, and

467 (21%) answered no. The numbers show a strong interest in maximizing the use of text

messaging and other technology in a cancer prevention program. To help increase the attendance

rate for appointments, it was proposed by the nurse practitioner that the Prevention and Wellness

department consider piloting a text messaging reminder system. Before the pilot, the women

received both a telephone call the day before and a letter several months before the due date of

the mammogram. The lay health navigators (LHN) called the patients on the telephone. The

LHNs spent approximately two hours daily making telephone calls and usually experienced a

long conversation with the client whenever the telephoned was answered. The Prevention and

Wellness leadership team, Information Technology, and the healthcare organization's executive

leadership team gave approval to conduct a pilot study using text message reminders. This

organization's leadership was invested in implementing text messaging system-wide. This

healthcare organization, during the past 15 years, has implemented two major software changes

for their electronic medical record keeping and is invested in technology that enhances the

patient experience.

Technology is an avenue for keeping costs down and continuing high quality care. The

United States government has recognized different forms of telehealth as good investments.

President Obama's administration provided support for technology by implanting telehealth as a main resource within the approved American Recovery and Reinvestment Act of 2009. Telehealth is defined as delivering healthcare or related activities regardless of location (Fairchild, Varghese, Deickman, & Catelli, 2010).

Communication and health information technology are essential to improving outcomes; increased efficiency in the health care system is imperative to reach populations who lack access to care (Healthypeople.gov, 2012). New technologies have emerged in the mainstream social arena that are now essential parts of healthcare, including Facebook, Twitter, email, text messaging, and computerized medical records. Text messaging in healthcare is one form of using technology to reach clients. Text messaging has been used to promote behavior change, provide education, remind people of appointments reminders, and promote health. The Cellular Telecommunications and Internet Wireless Association (CTIWA, 2011) has over 300 million subscribers to its wireless services; approximately 200 billion text messages are sent monthly. Over 90% of American adults own a mobile device (CTIWA, 2011).

Traditional methods of patient reminders have been reminder calls and letters. It is important to explore different avenues for getting clients to their appointment because it helps with client outcomes and efficiency within the health care system. Short Message Service (SMS) is another term for text messaging and is defined as sending 160 character messages via mobile phone or device (Centers for Disease Control and Prevention, 2010). Text messaging can be used to prevent patient non-attendance rates. The use of SMS can reach large numbers of individuals and is effective (Chen, & DAI, 2008).

There are many stakeholders in the future of healthcare text messaging. Stakeholders include patients, patients' family members, hospitals, information technology

companies/departments, physicians, nurse practitioners, and the population as a whole. There are studies about using telephone messaging and letters for reminders but only a smaller number concerning SMS use and its effects on client and provider collaboration (Militellp, Kelly, & Melnyk, 2012).

There is significant evidence from peer reviewed journals that support the use of text messaging in increasing appointment adherence, disease management, and positively impacting patient outcomes. The articles that addressed text messaging in their research used them on disease management, pediatric patients, education, and medication adherence. There is a gap in the literature regarding the use of text messaging in a wellness and prevention program to increase adherence to appointments for mammogram and cervical services.

The United States Department of Health and Human Services has developed a Text4health task force named Mhealth to recommend polices and promote innovation for health text messaging. In this recommendation it suggests delineating privacy and security issues. The taskforce also recommends a subcommittee to be developed by the division of health information technology to develop research regarding text messaging of health information, policy, and the establishment of guidelines (U.S. Department of Health and Human Services [HHS], 2014).

CDC (2011) developed a best practice guideline for writing CDC text messaging. The guide provides the reader with recommendations such as the length, abbreviations used and not used, messaging, and opt out instructions. This guide gives sample CDC text messages and provides recommendations to those in healthcare seeking guidance on developing text messaging in their own organizations.

The Joint Commission (2016) is an independent nonprofit accrediting and certifying organization that accredits healthcare organizations throughout the United States. Their mission

is to improve the quality and health of individuals that come in contact with healthcare

organizations, as well as establish standards, rules and regulations. The Joint Commission's

position on text messaging is that it is improper for physicians and/or licensed independent

practitioners to text orders to healthcare facilities and that the use of secure text message orders

at this time are prohibited (Joint Commission, 2016). Currently, there is not a position statement

from Joint Commission pertaining to appointments and patient engagement.

When examining the current Health Insurance Portability and Accountability Act

(HIPAA) policy regarding text messaging in healthcare, its (HIPAA) laws cannot be overlooked.

HIPAA has a Security Rule and a Privacy Rule designed to protect the health information of the

patient. The HIPAA Security Rule is the national standard set for the security of electronic

protected health information. The Security Rule explains the requirements for disclosing

protected health information electronically. The Security Rule states that there must be technical

safeguards in place, such as access control of who will be able to enter patient information, the

ability to audit patient charts, and the ability to check the integrity and transmission security

(Health Information Privacy, n.d.). In general, confidentiality and reliability of the system must

be maintained to protect against reasonable disclosures (Health Information Privacy, n.d.).

Karasz, Eiden, & Bogan (2013) concluded that no communication tool is 100% secure and text

messaging is the same as other communication tools; risk and benefits have to be examined.

Text messaging notification is a developing use of technology and further examination of using

text messaging in healthcare is important to the advancement of its use.

Results from the literature reviewed confirmed that there was a great need for continued

development of local, state, federal, and global policy as it pertains to text messaging and its use

in the healthcare setting. Many organizations are using text messaging for education, chronic

illness maintenance, and appointment reminders. Very few journals, if any, have addressed

policy procedures. A Cochrane Review does acknowledge that the subject of text messaging use

in healthcare is of interest. There was some interest in the population for the use of technology to

augment their current care providers' methods.

Purpose Statement

The purpose of this project was to implement appointment reminders via text messaging

in a mobile mammogram program. The objective was to use the text messaging reminders to

increase attendance rates of screening mammograms and/or wellness exams.

Hypothesis 1: Women of the general population, with emphasis on underserved women

receiving an intervention appointment reminder via text messaging, will attend screening

mammogram and/or wellness exam appointments more frequently on a mobile unit.

Hypothesis 2: The overall no show rate to screening mammograms on the mobile unit will

decrease by 15% (from August 24, 2016 to September 24, 2016) after implementation of text

messaging reminders.

Literature Review

A search of Cumulative Index to Nursing and Allied Health Literature (CINAHL),

ProQuest, PubMed, Cochrane System Literature Reviews, EBSCOhost, Bing, and Google search

engines was conducted using key search terms. The author also searched the corporate policy of

her organization and the Mayo Clinic as it pertained to technology, social media, and text

messaging usage. The key terms used to identify relevant articles to the subject were: short

messaging service (SMS), texting, text messaging, social media, Telehealth, mobile-health

policy, health policy, breast, Pap smear, mammograms, Nurse Practitioner, evidence based

practice, reminders, and healthcare adherence. Abstracts and opinion papers were excluded from

this search. Government websites were included in the search. The search resulted in the use of

data from various government agencies such as the National Guideline Clearinghouse, the

Agency for Healthcare Research, the Centers for Disease Control and Prevention (CDC), and the

Agency for Healthcare Research and Quality (AHRQ). The search provided a limited amount of

information pertaining to the DNP role and implementing text messaging in a healthcare system.

The use of text message appointment reminders in the healthcare setting is a new

innovation. Peer reviewed journals are starting to provide the evidence for the use of text

message appointment reminders. A search scanning the years 2006-2017 was conducted; the

search resulted in several articles pertaining to the use of text messaging reminders in various

healthcare settings. These studies took place in various countries with the study population size

ranging from 40-22,000 individuals. Numerous variables were addressed including race,

ethnicity, comorbidities, nonadherence baseline rates, age, methods used, and cost analyses.

Social media, appointment adherence, behavior change, and education were four themes

identified from reviewing the articles. Behavior, education, and social media themes in the

articles addressed subjects such as medication adherence, exercise promotion, health education,

and reported positive outcomes. All the articles reported that text message appointment

reminders was a low cost intervention and increased the attendance in their settings ranging from

23%-87% (Chen, Chen, & Dai, 2008; Downer, Fisher & Clayton, 2011; Goelen, De Clerq, &

Hassens, 2010; Haberer, Kiwanuka, Nansera, & Hanauer, 2010; Hanauer, Wentzell, & Laffel,

2009; Lin, Mistry, Bonch, Li, & Lazebnik, 2016; Robeznieks, 2009; Rutledge, Renaud,

Shepherd, Bordelon, Haney, 2011).

For the purpose of this project, appointment adherence was the main theme of interest.

Appointment adherence was increased using text message appointment reminders in several

articles. Goelen et al. (2010) examined community peer volunteer telephone reminder call method to increase attendance in mammogram screening; the telephone reminder calls group produced a 22% increase in mammogram screening. Kratzke, Wilson, & Vilchis (2012) established that 37% of their studied population had an interest in text messaging appointment reminders for their mammogram. The purpose of the Kratzke et al. (2012) study was to seek out breast prevention behaviors via cell phone and text message communications. Kerrison, Skukla, Cunningham, Oyebode, & Friedman (2015) found that women receiving the text message intervention had higher rate of attendance to their appointment at 65%, compared to the usual method of letter invitation at 59%. There were limited studies pertaining to the use of text messaging appointment reminders for breast screening programs.

The Centers for Disease Control and Prevention (CDC), Mayo Clinic, Center for Research in Implementation Science and Prevention (CRISP) have published guidelines on how to implement text messaging and social media into clinical practice. CRISP (n.d.) developed and published a Text Messaging in Healthcare Research Toolkit to help healthcare organizations develop text messaging use. The Mayo Clinic (2010) developed a social media network connecting healthcare providers to tools, guidelines, and individuals; this network was used to introduce providers to different types of social media. The CDC gave implementation of text messaging and social media guidelines (CDC, 2011).

Theoretical Framework

The Social Marketing theoretical framework was the framework chosen for this project. It is defined as the use of commercial marketing techniques to analyze, plan, execute, and evaluate programs. The intent is to change the behavior of a target audience that improves their health and/or well-being. Social marketing in the business world examines price, product,

promotion, and place. Using social marketing for health promotion and well-being consists of focusing on behavior; it centers the subject matter on the target audience and uses it to benefit the individual and society. For this project the target audience was women scheduled for the mammogram prevention program; the goal was to increase the adherence rate to their mammogram/wellness exam appointments. Women benefit from early disease detection and early detection benefits the individual and society (CDC, 2011).

Methods/Procedures

An innovative approach such as text message reminders for screening mammogram and wellness exam patients was added to the Prevention and Wellness routine, with the goal of increasing attendance on the mobile unit screening appointments. The objective was to implement evidenced based strategies of text message implementation in a medical facility. Women who had an appointment scheduled between August 2016 and September 2016 were sent a text message reminder and were asked to respond to the text message; they did not receive a traditional reminder call unless they did not respond to the text message.

Participants/ Population Sampling

It was projected that 100-200 women would be enrolled over a 30 day period, based on approximately 20 appointments per screening and 10 mobile events. Three Hundred- sixty eight women made an appointment for a mammogram and/or wellness exam from August 24, 2016 to September 24, 2016 with 16 mobile events. It was anticipated, that the population size would be varied, due to history of frequent no-shows, disconnected service and use of other providers. Inclusion criteria included women between ages 40-85, English and Spanish speaking, new and returning patients, and interest in text messages. Exclusion criteria were women over 85, inability to engage in text messaging and/or no interest.

Setting

The setting was a Prevention and Wellness department, which operates a mobile unit, at a large healthcare organization in Southeast, United States.

Intervention

This was a retrospective study with a convenience sample recruited from the prevention and wellness program. The participants were divided into two different groups; control (letter/phone call) and intervention (letter/phone, text message). The women were from the existing and new patient population who were due for their annual mammogram and/or wellness exam. The patients were enrolled in the text messaging reminders after they scheduled an appointment via the organization's EMR software. The sample size was 368 women in the 2016 cohort; the 2015 cohort was calculated to resemble the 2016 de-identified data. Participants were recruited through usual department methods such as Lay Health Navigators, fliers, and advertisements. The women received a text message three days before the appointment and 2 days before the screening if they did not confirm the appointment. The frequency was based on literature review recommendations and the vendor contract (Chen, Chen, & Dai, 2008; Downer, Fisher & Clayton, 2011). The women had the opportunity to opt out of receiving text messages per Federal Communications Commission (FCC) guidelines, which state that a person can withdraw from receiving text messaging at any time; this withdrawal could be achieved by sending a text "CANCEL" back to software (FCC, 2015).

Required Approval

The Institutional review board (IRB) approval was obtained through a University Institutional Review Board (IRB), located in the southeast United States. The participating health

care organization agreed to the project and was given a copy of the written IRB approval from the University.

The text message reminders were sent via the electronic medical record and text messaging Clientele software. The service was provided to the entire organization, including the Prevention and Wellness department. The messaging that was sent during daytime hours read: **Initial Message** "You or a family member have an appt.w/ Mobile Mammogram Unit on XX/XX at XX/XX am/pm Reply ok to confirm, NO to Cancel   Msg & data rates may apply Reply STOP to opt Out of text **REPLY OK Confirmation Message: Your appt at** XXX Mobile Unit at XX: XX for your XX; XX appt. Please call 502- 000-0000 for more information. Rply STOP to Opt Out of text. **REPLY NO Confirmation Message** Your appt has been cancelled. Please call Office Number to reschedule. Rply STOP to Opt Out of text".

The resources needed for this project involved staff commitment, such as committee meetings, as well as weekly staff training and/or meetings about text messaging procedures. The nurse practitioner /project manager donated her time. Materials such as computer, paper, pens and copy machines were used during the project. Other personnel used for this project were a data analyst and information technology specialist. See appendix A below for a detailed budget.

Evaluation Plan

After the text messages were sent, a retrospective review of text messages report, screening data was obtained. The study population was 368 women receiving screening mammogram and/or wellness exam on the mobile unit. The scope of this project was specific to the women receiving mammograms and/or wellness exams on the prevention mobile unit.

Design

The Plan, Do, Study, and Act (PDSA) Worksheet for Testing Change was obtained from the Institute for Healthcare Improvement (IHI) and used to assist in delivering the change process. The PDSA worksheet instructs the project manager to assess the progress of their project by using 5 simple methods: Aim, Plan, Do, Study and Act (APDSA) (Institute for Healthcare Improvement, 2016).

The implementation of a text-messaging service was completed to help achieve the goals of increased attendance, increase mammogram screenings for high risk populations, employee satisfaction, and efficiency within the office. The outcomes were measured against previous year attendance, screening rarely/never screened status, and high risk zip codes. Variables such as race, ethnicity, age, rarely/never screened, zip code, cancer found and, appointment adherence were assessed. The planning committee discussed weekly what went well after implementation, what went wrong, and any feedback the staff received from patients.

Data Collection Plan

Data was collected for four weeks. During the data collection period an Excel spreadsheet was kept with de-identified data and password protection. The EMR software text message report was generated by the staff and nurse practitioner daily. The help of a statistician and data analyst was enlisted. The de-identified data was given to the statistician to analyze and compute. Data from the previous year and current year was compared using IBM SPSS STATISTICS 23 statistical analysis software.

Ethical Considerations

There was no increased risk to participants for this project. The information collected was de-identified to reduce risks to the patient. Confidentiality was maintained by de-identifying

the data. The Excel spreadsheet and EMR software were kept on a computer that was password protected in a locked office space.

Results

Of the 368 patients that received text messaging during the pilot between August 24, 2016- September 24, 2016, 240 patients kept their appointments. The women's ages ranged from 40-75. The women had an appointment for a screening mammogram and/or wellness exam. The women included both new and established patients. The mobile unit traveled to high risk zip codes as well as other zip codes. There were 16 mobile unit events conducted during the pilot period, which was consistent with the year average. In 2016 PW demographic was Caucasian 58.53%, African American 32.71%, Asian 7.67%, American Indian/Alaska Native 0.63% and declined to disclose 0.46% (Figure 2). A patient's race is not a predictor if they attended their appointment after receiving the text message. The control group consisted of patients who did not receive text messages in the previous year (2015) during the same period of time; the intervention group were women in 2016 receiving a text message reminder for their appointment.

The non-attendance appointment rate for 2015 during this period was 6.43%. The 2016 patient group who received text message appointment reminders had a non-attendance rate 4.94% (Figure 1). These numbers revealed a 23% reduction in the no show rate, but the reduction was not found to be statistically significant (-6.561 vs. .311, t= 1.938, p>.05). Based on the data collected, it is difficult to validate that text message reminders increase attendance. While statistical significance was not achieved, the 23% reduction did accomplish hypothesis goal two as evidenced by a decrease in the no show rate by 15%.

Figure 1. Non-attendance rate for 2015 control group and 2016 intervention group.
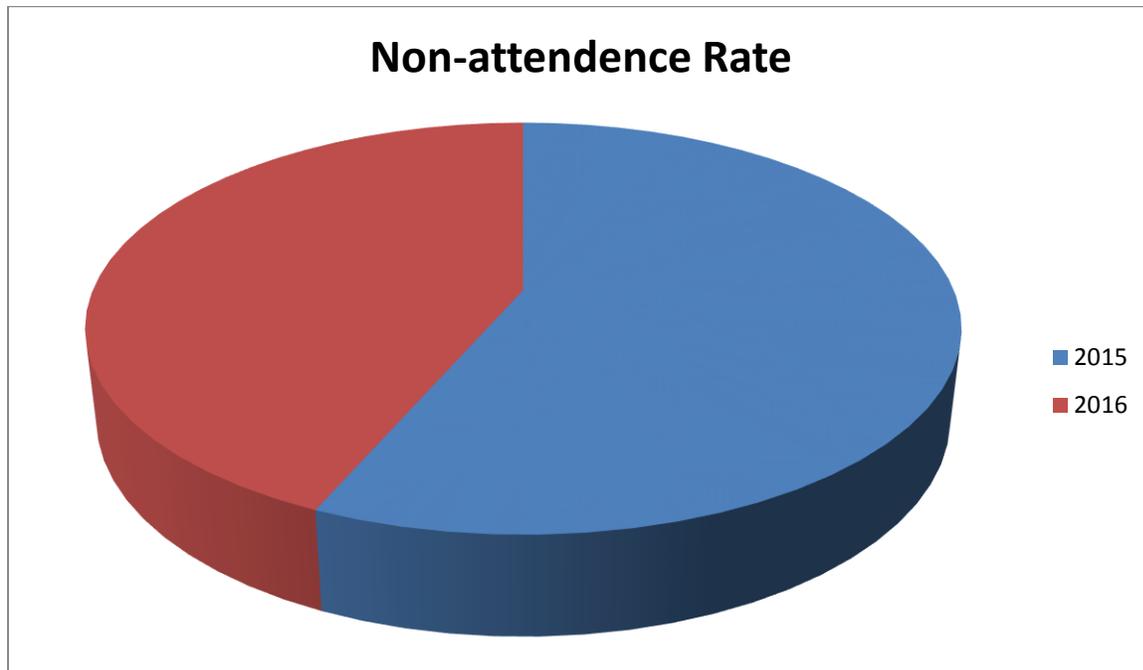
Other variables associated with women receiving text message reminders and attending

their screening mammogram and/wellness exam were addressed to determine if they influenced

the outcome data. These variables included race, age, color, English speaking, limited English

speaking, private insurance, government-sponsored insurance, ability to perform self-breast

exam, history of having a colonoscopy, reporting having a pap smear, family history of cancer,

tobacco use, and zip code. The logistic regression model was used to help identify any statistical

trends that could affect outcomes. During the quarter-period involving the pilot study, Prevention

and Wellness (PW) had 32.5% women who were considered never or rarely screened status.

During this pilot it was found that women in high risk zip codes did not adhere to

appointments, with or without the SMS. This answered the hypothesis one that receiving a text

message reminder and living in a high risk zip code does not predict that a person will show up

for their appointment. The women in 2015 who lived in high risk zip codes had a higher rate of

reporting colonoscopy and cancer history. Patients from 2016 that lived in low risk codes had higher rates of attending their appointment whether or not they received a text message. The data suggest that age of the patient is a predictor of attendance to the mobile unit after receiving a text message. The results revealed women over 50 who received a text message reminder are statically more likely to attend their appointment. Patients under 50 are 19% less likely to attend an appointment when receiving a text message, compared to those over age 50 ($p<.05$).

There is a positive relationship with women who reported self-breast exam performance from year 2015 to 2016 (.01203 vs. .15226, t = 2.306, $p<.05$). More women reported doing self-breast exam year 2016. The analyzed data produced positive statistical significance in women reporting limited English (-.09301 vs. -.00699, t=2.288, $p=<.05$), receiving a pap smear in two years (.00703 vs. .05725, t=2.520, $p<.05$), reporting private insurance (323.30 vs. 325.88, $p<.05$), colonoscopy completed (68.356 vs. 69.943, t=1.053, $p<.05$) and showing for their appointment. Of the fourteen individuals diagnosed with cancer found in 2016, four were discovered during the pilot study. Due to the data being de-identified to preserve confidentiality, it was unclear if the participants diagnosed with breast cancer were in the rarely or never screened category.

Figure 2. **Descriptive Statistics**

Race	Percentage of Mobile Unit Participants
American Indian/Alaska Native	0.63%
Asian	7.67%
Black/African-American	32.71%
White/Caucasian	58.53%
Patient declined to answer	0.46%

Barriers of Implementation

The studied population has a history of decreased attendance for their appointments.

Therefore, the sample size was increased to account for the women that were predicted to miss

their appointments. Many barriers can be identified related to the studied population missing

appointments. Patients may have disconnected cellular telephone lines; which required them to

be contacted via land-lines for appointment reminders and/or patients were obtained by same-day

appointments. It was anticipated that patients would be no-show due to the use of other

mammogram and wellness providers in the community. In order to maintain retention of

patients, both the provider and accompanying staff provided caring, high-quality and competent

care. The Prevention and Wellness team identified problems after implementation such as

limited communication with the patients. Staff members were accustomed to telling patients

more detailed information such as bringing the insurance card, identification card, and other

pertinent information. This was no longer an option available with the text messaging option. In

the beginning there were inconsistent processes among team members and retraining had to

occur. The staff members were retrained together on how to generate and review the text

message report from the EMR. In addition, staff had to be restrained on how to input information

into the EMR system, such as language and cellular phone numbers, to ensure that the patient

would receive the correct information. The messages sent in Spanish had to be checked by the

certified Spanish translators in the department to ensure accurate information was being

communicated.

Community partners were tasked with recruiting patients but dependence on the

community partners to communicate the list of patients in a timely manner was a barrier. The

patient names had to be placed in the computer at least four days before the event. Some of the

community partners would not give the list until approximately 1-2 days before the event. The

text message was informing participants to arrive 15 minutes early. On the mobile unit, there is

limited waiting room space. A patient arriving 15 minutes early was not as feasible as it is in a

traditional office space. In addition, other problems not anticipated were the separate

malfunctions of both the mobile unit generator and mammogram machine, which resulted in

three event cancelations during the pilot. This resulted in approximately 60 women missing a

screening opportunity.

To address the barriers of implementation, the nurse practitioner retrained staff and

followed up on processes to ensure the problems were resolved. The information technology

partner was notified regarding the mobile unit's inability to handle early-arriving patients. Thus,

the request of arriving 15 minutes prior to an appointment was removed. Process and procedures

were documented for any staff member to learn how to obtain a text message confirmation

report. This documentation would ensure the continuity of the project.

Significance and Implications

The project of implementing text messaging to a mobile mammogram program, for

increased participation, is a valued choice for saving healthcare dollars. Several studies have

demonstrated the use of text messaging, social media, and telephone reminders to be effective

and low cost. Most of the studies state that there is greater need for assessment of population

needs/ability, assessment of provider interest, and larger population studies. A project of this

nature could be expanded to include patient education. The project will be submitted for

inclusion consideration in the Journal of the American Academy of Nurse Practitioners

(JAANP), a peer-reviewed journal for Advanced Practice Registered Nurses.

Limitations

This pilot study used a retrospective convenience sample, and because of this, it may be

hard to generalize the findings. There could be some bias, as we do not know how many women

were repeat patients and most likely going to attend their appointments regardless of the

intervention. There was a small sample size and the study length of time was limited to one

month which also makes the data not generalizable. It is unknown how many patients had

prepaid and/or government cellular telephones; this would be good information to know because

these plans typically have limited text message ability. Patients were not formally surveyed after

receiving text message reminders to see if they liked the service but the staff encountered

patients who verbally acknowledged that they liked the text message appointment reminders. A

few participants over the age of 70 expressed they did not know how to use text messaging

services.

Recommendation

It is recommended that other researchers look to replicate this project with a larger and

more diverse population size over a longer period of time. Because the study had a higher

attendance rate in women over 50, it suggested that text messaging reminders in a breast

screening program serving women over the age of 50 would increase their attendance. There was

a statistically significant difference in women over the age of 50 attending their appointments

versus women under the age of 50. Patients should be surveyed in future studies to see if they

want to use text message appointment reminders and asked, after implementation, if they

preferred the text message appointment reminders. It should also be determined if they would be

interested in text messaging patient education. This study was one of few studies that examined

variables associated with mammography screening and the use of text message reminders. Future

studies should examine the barriers to appointment adherence, especially after they have

received a text message. Other health history information could be added to look further for

cofounding variables.

Conclusion

In conclusion, the project of implementing text messaging appointment reminders for a

mobile screening mammogram and/or wellness exams program for women, though statistically

insignificant, can work in this setting and has promising effects on the attendance of women,

especially those over 50. This study found that women over age 50 are more likely to show for

their appointments after receiving a text message appointment reminder. Since the USPTF

recommends women over 50 have mammography screening more often than the 40-49 aged

women, this may provide great opportunity for women over 50. Fisher & Clayton (2011) suggest

that future research needs to include older adults, which they cited as over fifty. The mobile unit

healthcare industry is a unique one and mobile units have the same challenges that traditional

office environments have to increase attendance. A project like this one may increase attendance

to mobile units, like it does for traditional offices. Future studies, on mobile unit attendance and

the use of text message appointment reminders, should be conducted to provide evidence based

knowledge on this subject**.**

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Appendix A

Proposed/Actual Project Budget

Student Time	Estimated	Actual
Donated Nurse Practitioner Time for 1 month during the trial is an estimated 2 hours per day.	$6,000.00	$2,000.00
Total	$6,000.00	$2,000.00

Data Analyst and IT Consultant	Estimated	Actual
IT Consultant: 2 hours per consult 100.00 per hour for 18 hours Actual-IT Consultant : Hours donated	$1,800.00	$.00
Data Analyst: 1 hour per consult at $75.00 per hour for 25 hours Actual- Data Analyst – $21.00 per hour 40 hours Actual Statistician: $25.00 per hour of work, 10 hours	$1,875.00	$1,090.00
Total	$3,675.00	$.00

Text Messaging Service	Estimated	Actual
IT is covering the cost of texts. In the future it could be internally billed back to the department. Each text cost .08 cents, (2) will be sent per patient.		0
Example .08 **X** (2) **X** 200 patients=32.00per patient. If there are 200 patients (200x32.00)=6400.00 Actual used 368 (.08)x(2)=58.88 x368 cost to IT department	6,400.00	21,638.40
Total	$6,400.00	$

Miscellaneous	Estimated	Actual
Just in case fund	$13,000.00	0
		0
Total	$13,000.00	00

Refreshments/Office Supplies	Estimated	Actual
Copier/Fax machine (Donate)	$0.00	$0.00
Food for staff-(25)	$200.00	50.00
		$0.00
Total	$29,275.00	$24,728

Total Expenses	Estimated	Actual
	$29,275.00	$24,728

Appendix B

Office of Research Administration (NHORA)

224 E. Broadway Louisville, KY 40202 (502) 629-3501 Phone (502) 629-3480 Fax nhora@nortonhealthcare.org www.nortonhealthcare.org

August 17, 2016
Janel Willingham, MSN, APRN
3999 Dutchman's Lane
Louisville, KY 40207
NHORA# 16-N0191 / IRB# 522 / Implementation of Text Message Reminders In a Prevention and Wellness Department
Dear Dr. Willingham:
The Norton Healthcare Office of Research Administration (NHORA) is pleased to notify you that your IAA application to conduct the above-mentioned research study in a Norton Healthcare (NHC) facility has been approved.
Please note: NHORA approval reflects permission to conduct the study within a Norton Healthcare facility from a regulatory and contractual perspective, and is independent of approval by the sponsor for initiation of the study. The sponsor or site may have additional requirements to address before the study can begin.
Research billing procedures are still applicable to exempt research if there is any billing involved. If applicable, the Research Patient ID form must be submitted to NHORA Billing daily with reportable activity. Please email the form to NHORABilling@nortonhealthcare.org. Please contact Regina Schaefer at 502-629-3580 for specific instructions regarding the notification of your subject enrollment at NHC.
Because your agreement is with an IRB that the NHORA does not typically communicate with, you must notify the NHORA of ALL amendments and/or changes to your research, and all annual continuation approvals.
We look forward to the successful completion of your study. If you have any further questions or need assistance, please contact the NHORA at 502-629-3501.
Please let us know how we are doing. Follow the link https://www.surveymonkey.com/s/NHORAsatisfaction to complete the NHORA Satisfaction Survey in less than two minutes. Your feedback helps NHORA improve the services we provide and meet the needs of the research community.
Sincerely,
Rhonda Hoffman
System Director Research

Norton Hospital • Kosair Children's Hospital • Norton Audubon Hospital Norton Suburban Hospital • Norton Immediate Care Centers • Norton Brownsboro

Required Approvals for Implementation

Dr. Ta'Neka Lindsay	Completed
Dr. Kathy Hagar	Completed
Dr. Steven Heilman	Completed
Craig Johnson Director Prevention and Wellness Norton Healthcare	Completed
Krista MacArthur Clinical Manager Prevention and Wellness Norton Healthcare	Completed
Shay Young, DNP	Completed
Jessica Lott Mammography Technician	Completed
Jennifer Powell Mammography Technician	Completed
Joanne Smyzer Lay Health Navigator	Completed
Hanna Hernandez Lay Health Navigator	Completed
John Renfro Lay Health Navigator	Completed
Amanda Lopez Secretary	Completed
Noel Ricketts Medical Assistant/Coordinator	Completed
Janet Farfan Medical Assistant/Coordinator	Completed

SWOT Analysis

Strengths

Low cost

Organization supports

Technology in healthcare is the future

Weaknesses

The population is inconsistent

Patient cellular phone disconnected

Text Message Reminders for Prevention and Wellness

Opportunities

Using new technology is where healthcare is headed.

Opens opportunities for other uses of text messaging, such as education.

Threats

Security breach

Non-participation

New innovations on the horizon