

Increasing Breast Cancer Screening Rates through an Alert System in the Electronic Medical
Record

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Abstract

Objective: To utilize a real time clinical decision support tool, also known as a best practice advisory (BPA) alert, in the electronic medical record (EMR) to facilitate and encourage referral for breast cancer screening. The use of this BPA alert was intended to assist primary care providers in increasing screening mammography referral for the targeted female population, especially the most vulnerable. **Design and Sample:** Women, 39 to 75 years of age, presenting to primary care clinics for health care. **Measures:** Initial mammography screening rates with separation of insured and uninsured populations will be compared to the primary endpoint of mammography completion after initiation of the intervention. In addition, adherence to the alert system will be tracked including ordering, acknowledgement, health maintenance adjustment and cancellation. **Intervention:** The clinical informatics and population health teams worked collaboratively to design the mammography BPA alert. When a woman presented for health care at a primary care clinic, an alert was populated upon initial entry into her EMR for the provider. The alert system would then prompt a discussion between the provider and patient. This included individualized education and recommendations for breast cancer screening guidelines for all women due for mammography. **Results:** An alert system in the EMR has demonstrated increased provider adherence to breast cancer screening guidelines. **Conclusion:** A real time clinical decision support tool in the EMR assists providers in achieving increased screening mammography referral. Future work is planned to include an interface within the BPA alert for a direct order process for the uninsured population. In addition, continuing education will be provided for primary care providers in utilization of the BPA alert. This practice change is cost effective and replicable.

Increasing Breast Cancer Screening Rates through an Alert System in the Electronic Medical Record

Primary care providers (PCP) are increasingly responsible for multiple health screening activities for their patients all within the restrictive time constraints of a busy office practice. In addition, the trend to transition to the primary care model of patient centered medical home (PCMH) has increased access to care. This increased access to care contributes to improved population health outcomes while minimizing costs to the patient.

An example of the need for increased access to care can be found in preventive health care for women. Breast cancer remains the second leading cause of cancer death in women in the United States. Approximately 1 in 8 women will develop invasive breast cancer during their lifetime.¹ A woman may not always schedule an annual physical exam for health maintenance but will likely seek care for acute or chronic illnesses. These office visits could be missed opportunities for providers to recommend preventive services. This article will describe collaboration between the clinical informatics and population health teams to increase mammography referral as a part of a woman's preventive health program. A real time clinical decision support tool was integrated into the electronic medical record (EMR) to assist primary care providers in ordering clinical preventive services at any patient office visit. In addition, collaboration between clinical informatics and the population health team helped the gap between health services and community prevention efforts. Involvement with the population health team also allowed for assessment of priority health issues and identification of health disparities.

Background and Significance

According to the American Cancer Society, about 252,710 new cases of invasive breast cancer will be diagnosed in women during 2017, and estimated breast cancer deaths will be 40,610.^{1,3} Breast cancer represents 14.6 percent of all new cancer cases in the United States.³

Since 1989, the United States death rate attributed to breast cancer has been declining as a result of increased screenings. Increased breast cancer survival rates reflect positive public health changes of improved screening and continued discovery of better treatments. Healthy People 2020 set a target goal of an 81.1% breast cancer screening rate.⁹ Routine screening has been shown to reduce breast cancer mortality by 30-40%.⁷ The greatest disparity in mammography compliance is among low-income and uninsured women, resulting in late stage diagnosis and shorter survival times.^{2,5}

Breast cancer screening guidelines continue to vary across government and professional organizations. This could contribute to an overall confusion of when to initiate mammography along with the frequency of screening. In addition, these variances could lead to family medicine provider's misunderstanding and failure to recognize when breast cancer screening is warranted for various patient populations. Healthy People 2020 follows the recommendations of the United States Preventive Services Task Force (USPSTF): biennial screening mammography for women 50 to 74 years.¹⁰ However, USPSTF promotes individual discussion of mammography screening prior to age 50¹⁰ (see Table 1). The use of screening recommendations within primary care practices could decrease late stage diagnosis of breast cancer.

EMR Alert: Real Time Clinical Decision Support Tool

The intent of this project was to utilize the most advanced technology in the EMR system to increase breast cancer screening compliance thus earlier identification of treatable breast cancer. A real time clinical decision support tool for breast cancer screening increases

mammography referral. Participants included women, ages 39 to 75, with no recorded mammography screening in the last two years. When a woman presented for health care at a primary care clinic, an alert was populated upon initial entry into her EMR for the provider. The alert system would then prompt a discussion between the provider and patient. This included individualized education and recommendations for breast cancer screening guidelines for all women potentially due for mammography. Although mammography screening is not recommended until age 40, women 39 years old were included to provide anticipatory guidance for breast cancer screening.

This user-friendly tool alerts the PCP that the patient is potentially due for mammography and lists the last recorded mammogram in the EMR. Subsequently, a cascade for a prepopulated mammogram order set with an associated ICD-10 code is generated. The prepopulated order set allows the PCP to choose the mammography technique for 2D or 3D screening options. In addition, there are prompts for choosing Medicare or non-Medicare insurance preferences for order placement. The provider simply signs the order on the same screen within the EMR, which completes the patient referral process for screening mammography.

The BPA alert possesses other important features for proper utilization. The USPSTF Breast Screening Guide is embedded into the BPA alert for providers to reference up to date screening recommendations. The providers have the option to ignore the BPA alert and cancel out of it all together. This action, although discouraged, deletes the BPA alert for that individual encounter. The provider is encouraged to select one of the following acknowledge reasons: “Patient declines,” “Medically not appropriate,” “Not appropriate today,” or “Performed elsewhere.” Additionally, providers may choose to add a modifier to the alert to place the patient

on a more frequent screening timeline. Providers may choose to follow other professional or governmental agency's recommendations for breast cancer screening (see Table 1).

A real time clinical decision support tool for mammography allows the PCP to promptly recognize the patient's need for breast cancer screening at any office visit. This alert bypasses additional work the primary care provider often goes through, such as reviewing voluminous patient records, in order to determine the preventive screen necessity. Providers also save time with the prepopulated mammography orders and associated ICD-10 codes that are needed for proper billing and coding.

Population Health Implications for Mammography Compliance

Population health teams strive to make improvements in the community conditions and systems through developing and using strategic action plans. This tool supports a system-wide population health initiative to address breast cancer screening health disparities among low income and uninsured women. PCPs collaborated with population health leadership to identify the health disparity within breast cancer screening. This interdisciplinary collaboration supports the strategic plan for wellness and prevention activities related to breast cancer. Increasing the proportion of women receiving breast cancer screening based upon current recommendations is an action directed towards community early intervention and treatment. Ultimately screening mammography will improve population health outcomes by reducing late-stage breast cancer and subsequent deaths. The real time clinical decision support tool is influential as demonstrated by improved health, cost savings and efficiency in ordering practice. Furthermore, sustaining breast cancer screening rates is possible through application of a BPA alert system in the EMR.

The population health team provides analysis of vulnerable populations and available resources in the community to meet the needs of these individuals. Low-income women

continue to express confusion with the clinical care process along with the awareness of available resources.⁴ There is a gap between the desire for preventive cancer care and these women actually receiving it.⁴ Having a consistent way to assist patients in receiving mammography or referral to a subsidized program is imperative. Population health teams utilize the PCMH model, which parallels health care efforts to support patient involvement as a part of the decision making about mammography.

Analysis

The performance reports for the primary care practices across the entire health care system prior to implementation of the BPA alert revealed 45% mammogram completion rate for insured women and 5% for uninsured women. Local reports were generated by the population health team for primary care clinics included in phase one of the PCMH project. Their mammography rates (43% and 5%, insured and uninsured respectively) were consistent with the regional mammography completion rates. Subsequently, a coordinator from the state's subsidized breast cancer screening program provided education on breast cancer screening resources for uninsured women. Subsequent mammography completion rates over a three month period showed minimal improvement. These data reflect an overall poor mammography completion rate and the greatest disparity among uninsured women.

Over the next three months, the BPA alert was built in the EMR. The alert went live in March 2017. The medical director of informatics assisted with implementation and data collection. Subsequent reports were generated to illustrate the use of the mammogram BPA alert. These reports were made available for providers to view in order to monitor overall compliance with mammography screening interventions.

Data were obtained at one week, two weeks, three weeks, four weeks, five weeks, and six weeks after implementation of the BPA alert. The BPA alert prompted 8,108 times within the first six weeks in ambulatory clinics: family medicine, internal medicine, and women's health. Seventy-five mammograms were ordered through the BPA alert: 71 in family medicine, 0 in internal medicine, and 4 in women's health. The majority of alerts were populated in family medicine, 90% (n=7,290). These data are consistent and varies approximately 1% throughout the first six weeks. Although the local data reported providers acknowledging the mammogram BPA alert, 50% to 85% of providers across primary care cancelled the alert. National alert cancellation rates in general have been reported as high as 85% to 90% (D. Zanone, personal communication, May 2, 2017). This local data indicate better compliance with the alert system.

Discussion

Outcome metrics reflect the overall health of a population and distribution of health among different economic groups.⁶ The initial goal for this quality improvement project was to increase the mammography completion rate using a real time clinical decision support tool. EMRs can improve public health outcomes and improve risk management through clinical alerts and reminders.⁸ This project has revealed that collaboration between the clinical informatics and population health teams can identify health disparities in the community. Extending this discussion to PCPs, specifically family medicine providers, addresses population health needs and has been reported in this article.

Further efforts are needed to ensure breast cancer screening completion among low-income and uninsured women. Although a BPA alert can increase mammography completion, additional steps need to be integrated into the system in order to decrease the disparity between the insured and uninsured populations. It appears that addressing low compliance rates among

low-income women is a multistep process that requires addressing each patient's individual barriers, concerns, and beliefs. As the BPA alert continues to evolve, the PCP must have the capacity to order mammography within the EMR for the uninsured patients. This can be accomplished with an interface with the state program funded by the CDC's National Breast and Cervical Cancer Early Detection Program (NBCCEDP).

This project identified primary care providers underutilized the clinical decision making support tool. A mammography BPA alert tip sheet had been designed and sent to communicate the new practice change to providers. However, additional education needs to focus on increasing provider compliance with the BPA alert. Educational efforts include presentations at provider meetings, reminders during daily rounding to use the BPA alert, and continued communication of the available tool through email.

Clinical informatics and population health teams have the potential to significantly improve health care for all women, especially the vulnerable populations. Additional tools can complement the mammography BPA initiative. These include bulk birthday outreach to patients, mass mammography orders, patient education outreach and development of financial assistance counselors in vulnerable communities. This project demonstrated the impact of this collaboration with the generation of a real time clinical decision support tool to improve screening mammography rates for all women.

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