

A Cue-to-Action Pilot Project to Increase Screening Mammography

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Breast cancer is the most common cancer among women in the United States.¹ The National Cancer Institute estimated that the number of new breast cancer cases and the number of deaths from breast cancer among women would approach 268,600 and 41,760, respectively, in 2019.² However, despite these numbers, the population-adjusted mortality rate for breast cancer decreased by 36% from 1989 through 2012.³ This reduction is due to a variety of factors, including improved chemotherapeutic treatments, reduced hormone replacement use among women, and the continued use of screening mammography to identify breast cancer among asymptomatic women.³ Case-control studies show a reduction in breast cancer–related mortality ranging from 36% to 70% for women who obtain screening mammography.⁴

In the United States,⁵ as in many countries around the world,^{6–8} national health officials have developed evidence-based guidelines to promote screening mammography among asymptomatic women. Guidelines from the US Preventive Services Task Force (USPSTF) indicate that women of average risk aged 50 through 74 years will receive the most benefit from regular biennial screening.⁵ With the introduction of the Patient Protection and Affordable Care Act (ACA), screening mammography became a covered, no-cost, preventive service.⁹

METHODS

Study Setting

Sendero Health Plans is a community-based health insurance plan serving an 8-county area of central Texas that offers health insurance on the ACA federal marketplace. In 2017, as part of its ongoing quality improvement focus, Sendero sought to increase uptake of screening mammography for members enrolled in its ACA line of business based on the USPSTF recommendation for mammography screening.¹⁰

Theoretical Basis

We used both the health belief model and the transtheoretical model as a basis for this pilot project. The health belief model

ABSTRACT

OBJECTIVES: Screening mammography is a preventive exam used to detect breast cancer in asymptomatic women. This cue-to-action pilot project sought to determine if outreach, education, and incentive would increase uptake of screening mammography among women aged 52 to 74 years who are members of a community-based health insurance plan.

STUDY DESIGN: Cohort study design with retrospective and prospective components.

METHODS: Women were eligible to participate in accordance with the CMS Quality Rating System technical specification for breast cancer screening. Eligible women with no documented screening for a mammogram from January 1, 2016, through November 7, 2017, were invited to participate in a campaign that included outreach about screening mammography as a no-cost covered benefit, education about screening mammography to detect asymptomatic disease, and a gift card to a local grocery merchant if the member obtained screening mammography by December 31, 2017.

RESULTS: During December 2017, 20.8% (27/130) of eligible women obtained a screening mammogram compared with 7.8% (5/64) of eligible women during the nonintervention reference period of December 2016. Mammography screening increased by 170% during the study period in comparison with the reference period of a year earlier [prevalence ratio [PR], 2.7; 95% CI, 1.1–6.6; $P = .02$].

CONCLUSIONS: A one-time, time-limited cue-to-action pilot project consisting of outreach, education, and incentive increased uptake of screening mammography by women enrolled in a community health insurance plan providing health insurance coverage as part of the Affordable Care Act. This increase is statistically significant in the intervention period compared with the reference period [PR, 2.7; 95% CI, 1.1–6.6; $P = .02$]. Despite a small sample size, the magnitude of the effect for this pilot study is encouraging and warrants future studies in a larger population.

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includes a variety of theoretical constructs, such as perceived susceptibility, perceived severity, perceived benefits, perceived barriers, self-efficacy, and cues to action, to guide health promotion activities.¹¹ The health belief model has been used to predict health behaviors for a variety of clinical issues, including screening for asymptomatic disease¹² and helping to improve breast cancer screening rates among asymptomatic women.¹³⁻¹⁵ In this pilot project, we used cues to action to provide an overt action (ie, outreach and education) as a stimulus to asymptomatic women aged 52 to 74 years to undertake a known preventive intervention to identify breast cancer. In addition, a financial incentive, which is rooted in the transtheoretical model, was used to encourage women who may otherwise be ambivalent to undertake this health-seeking behavior to undergo screening mammography.¹⁶

Study Design

We conducted a pilot project using a cohort study design to determine if cues to action involving outreach about screening mammography as a no-cost benefit, education about screening mammography to detect asymptomatic disease, and a financial incentive using a gift card to a local grocery merchant would encourage women to obtain a screening mammogram. We focused on a time-limited, 6-week pilot project from November 17, 2017, through December 31, 2017. Women were identified and eligible to participate in this study based on the following inclusion and exclusion criteria (Figure 1).

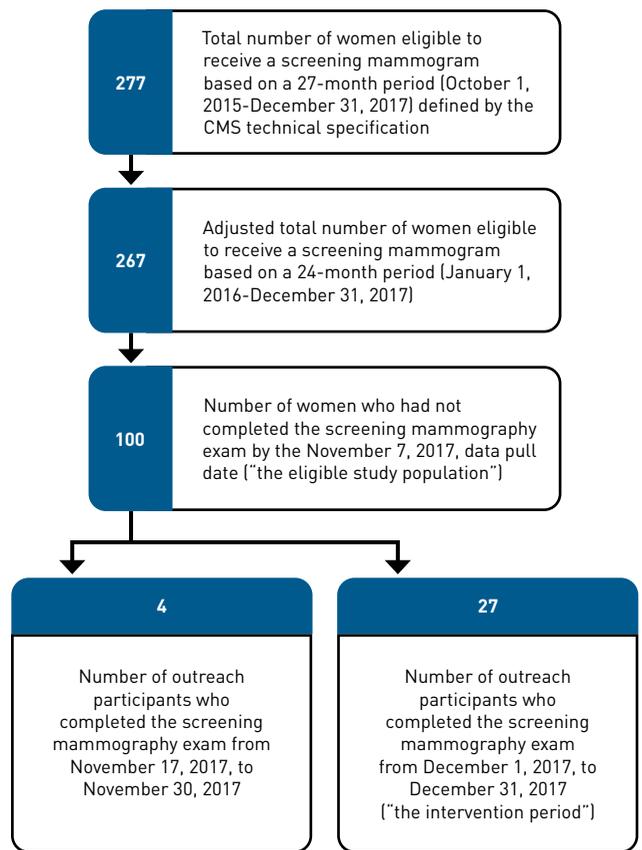
1. Women had to be eligible to receive a screening mammogram based on the CMS Quality Rating System technical specification for breast cancer.¹⁷ Using this technical specification, we identified 277 women aged 52 to 74 years who were continuously enrolled in the Sendero IdealCare plan for the period October 1, 2015, to December 31, 2017.
2. We adjusted this group to include only 2 full years of data for analysis, removing 10 women who were eligible in the period from October 1, 2015, through December 31, 2015. This resulted in 267 women eligible for screening mammography in calendar years 2016 and 2017.
3. We identified all women in the 2016 and 2017 time period who had not received a screening mammogram by November 7, 2017, based on submission of a medical claim for Current Procedural Terminology code 77067 or Healthcare Common Procedure Coding System code G0202. One hundred women were identified. These women are defined as the population eligible for this study.

Women were not randomized or otherwise allocated to an intervention or nonintervention group, as it was deemed unethical to restrict individuals from receiving a secondary prevention examination with known positive health benefits.

TAKEAWAY POINTS

Managed care organizations (MCOs) can help members achieve positive health outcomes through the consistent use and application of quality improvement activities. We demonstrated that an MCO can effectively target members to improve uptake of a preventive service through a series of cues to actions. MCOs should consider the findings from this pilot project as evidence that outreach, education, and incentives play a role in member decision-making with regard to using preventive services. This research also demonstrates that MCOs can effectively encourage members to use free, covered benefits available to them as part of the Affordable Care Act.

FIGURE 1. Process for Identifying the Eligible Study Population



Study Intervention

This study consisted of 3 interventions, all of which were targeted at women aged 52 to 74 years. The interventions were (1) outreach to inform women that screening mammography is a benefit available to them at no additional out-of-pocket cost as part of their Sendero health insurance; (2) educational information about the exam (adapted from material produced by the CDC), the benefits of screening mammography, and how to prepare for and what to expect on the day of the exam¹¹; and (3) an incentive of a \$50 gift card to a local grocery merchant to women who completed the screening mammography exam by December 31, 2017.

TABLE 1. Count of Unique Individual Screening Mammography Encounter Data for the Study Cohort in 2016 and 2017 by Month ($\chi^2_{23} = 88.80$; $P < .001$)

| Year | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| 2016 | 1 | 4 | 2 | 8 | 5 | 9 | 3 | 7 | 6 | 5 | 9 | 5 | 64 |
| 2017 | 10 | 4 | 6 | 5 | 8 | 7 | 18 | 15 | 11 | 10 | 9 | 27 | 130 |

Materials were mailed to eligible women on November 17, 2017, just prior to the US Thanksgiving holiday period. Follow-up text messages were sent 12 days later on November 29, 2017. Follow-up phone calls were initiated between December 4 and December 21, 2017, some 17 days after the initial mailing, to assist women with scheduling a mammogram appointment or to answer questions about screening mammography. All written materials, texts, and phone calls were provided in English and Spanish.

A member of the research team (N.T.) who is bilingual in English and Spanish made follow-up phone calls to women eligible for the campaign. A script was developed, and the research team member was trained on how to use the script, how to address comments or questions not in the script, and how to provide scheduling assistance if requested. Calls were recorded for quality assurance purposes but were not monitored or reviewed at a later date. After identity verification, the member was asked if she:

- Had received information about the breast cancer campaign in the mail;
- Had any questions about the campaign;
- Had an opportunity to schedule a mammogram or if she would like scheduling assistance;
- Would disclose why she did not wish to obtain a mammogram (if she declined); and
- Would like to be referred to Sendero health services or case management for more information or follow-up.

Statistical Analyses

Data were obtained from medical claim submissions and included the date on which screening mammography occurred, the county and zip code of the individual’s residence, and the individual’s age in years. Data on income and federal poverty levels by county were obtained from the US Census; such data are not reported to Sendero by federal officials and, therefore, we do not have the ability to provide member-level data analysis on this information.¹⁸ Similarly, data on race and ethnicity are not provided to Sendero by federal officials.

Descriptive statistics included age and proportion of women eligible to participate in the health promotion campaign and were based on full-year data in 2016 and 2017, respectively. Chi-square goodness of fit tests were used to test the hypothesis that there is no difference by month when women choose to obtain a screening mammogram. A separate χ^2 test was conducted for each calendar year, as well as for the 2-year period of the study. A prevalence ratio (PR), the 95% CI, and a *P* value were calculated to compare the

prevalence of women screened in the intervention period (December 2017) with the reference period of a year earlier (December 2016).

RESULTS

One hundred women were eligible to participate in the outreach, education, and incentive campaign. These 100 women were represented by 46 zip codes. Twenty-five zip codes were located in Travis County, 9 in Williamson County, 6 in Bastrop County, 3 in Hays County, 2 in Caldwell County, and 1 in Fayette County. Among these 46 zip codes, the median household income ranged from \$38,100 to \$136,138 and the percentage of people living at or below the federal poverty level ranged from 2.1% to 30.6%.¹⁸

Twenty-seven of the 100 individuals eligible for this intervention obtained a screening mammogram during the assessment month of December 2017. By comparison, 5 women obtained a screening mammogram during the reference period of December 2016. Women who received the intervention were 170% more likely to be screened in December 2017 compared with December 2016 (PR, 2.7; 95% CI, 1.1-6.6; $P = .02$).

During 2016 and 2017, 194 women obtained a screening mammogram (Table 1). The number of women who obtained a screening mammogram varied by month during 2016 ($\chi^2_{11} = 14$; $P = .23$), during 2017 ($\chi^2_{11} = 42.62$; $P < .001$), and across the 24-month reporting period of January 1, 2016, through December 31, 2017 ($\chi^2_{23} = 88.80$; $P < .001$) (Table 2 and Figure 2). The difference was not significant in 2016, but it was statistically significant during 2017 and during the overall 2-year observation period. In both 2016 and 2017 the number of monthly screening mammograms varied: 2016 (range, 1-9) and 2017 (range, 4-27).

Follow-up texts were transmitted to 94 women based on contact preferences; 54 of the text messages were confirmed as having been received. Follow-up phone calls were initiated to 85 members based on contact preferences, with 145 attempted calls resulting in a conversation with 40 members. Of the 40 women contacted by phone, 15 had not scheduled a mammogram by the time of the call. Eight women (53.3%) accepted the offer of assistance to schedule an exam, 6 (40.0%) did not accept scheduling assistance, and 1 (6.7%) reported she had, unbeknownst to us, scheduled her mammogram prior to the call.

DISCUSSION

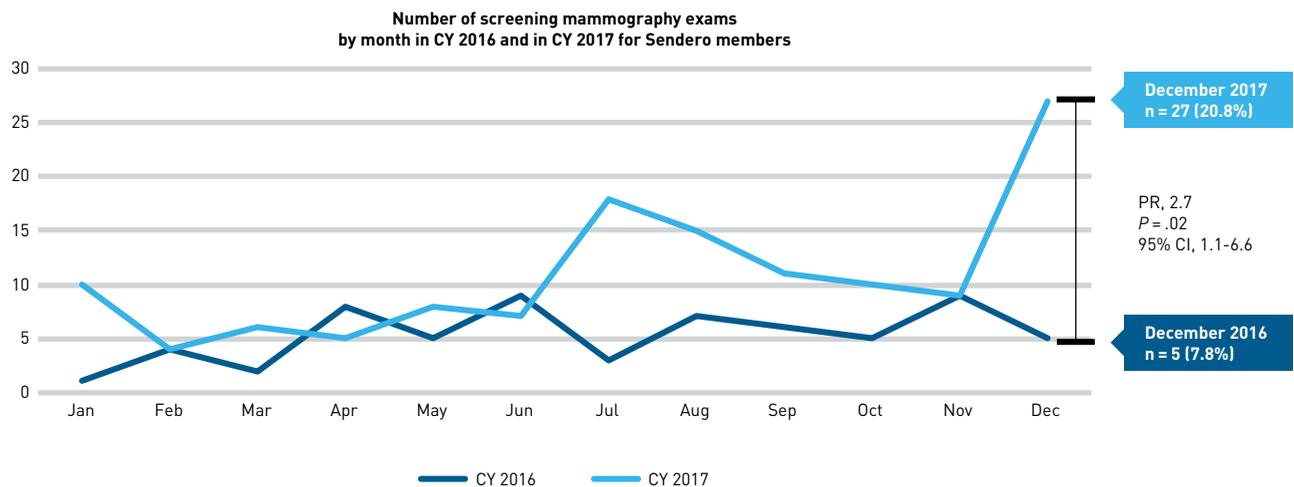
Two cues to action and 1 incentive component were used to encourage uptake of screening mammography among women aged

TABLE 2. Mean, Median, and Age Range for Individuals Who Were Eligible for Screening Mammography as Part of the CMS Quality Rating System Breast Cancer Technical Specification From January 1, 2016, Through December 31, 2017, and Who Obtained Screening Mammography in 2016 and 2017

| | Women obtaining/eligible for screening in 2016 and 2017 [N=267] | Women who obtained screening mammography in 2016 (n=64) | Women who obtained screening mammography in 2017 (n=130) |
|--------------------------|--|--|---|
| Exam uptake | 194/267 (72.7%) | 64/194 (33.0%) | 130/194 (67.0%) |
| Age in years, mean (SD) | 59.4 (4.7) | 59.0 (4.7) | 59.1 (4.4) |
| Age by interval, n (%) | | | |
| 52-54 years | 42 (21.6%) | 17 (26.6%) | 25 (19.2%) |
| 55-59 years | 62 (32.0%) | 17 (26.6%) | 45 (34.6%) |
| 60-64 years | 67 (34.5%) | 23 (35.9%) | 44 (33.8%) |
| 65-69 years ^a | 20 (10.3%) | 6 (9.4%) | 14 (10.8%) |
| ≥70 years ^a | 3 (1.5%) | 1 (1.6%) | 2 (1.5%) |
| Age range in years | 52-73 | 52-73 | 52-70 |
| Statistics | $\chi^2_{23} = 88.80; P < .001$ | $\chi^2_{11} = 14; P = .23$ | $\chi^2_{11} = 42.62; P < .001$ |

^aIndividuals 65 years and older may enroll in a Sendero health plan because they are ineligible for Medicare (eg, because they are not US citizens or because they have not attained 40 quarters of Medicare-eligible employment).

FIGURE 2. Screening Mammography Events by Month During 2016 and 2017 for Sendero Members Eligible for Screening Mammography as Part of the CMS Quality Rating System Breast Cancer Technical Specification Ending December 31, 2017^a



CY, calendar year; PR, prevalence ratio.

^aPR, 2.7; 95% CI, 1.1-6.6; P = .02 for difference between December 2016 and December 2017.

52 to 74 years. To our knowledge, no other health insurance plan in Texas has conducted a similar pilot project to increase uptake of a USPSTF preventive service as part of the ACA package of benefits.

Outreach and Education

The outreach and education cues to action informed women that screening mammography was a covered benefit of their health insurance policy, how screening mammography can identify breast cancer in its earliest stages when it is usually more effective to treat, and what screening mammography entails. Reminders tied to a specific date have been shown to improve uptake of

screening mammography,¹⁹ which in our case were focused on a specific intervention time frame. Educational material has been shown to be a useful tool to encourage women to obtain screening mammography.^{20,21}

The Incentive Component

The incentive component provided women with a \$50 gift card to a local grocery merchant if they obtained their screening mammography between November 17, 2017, and December 31, 2017. The incentive was designed to encourage a healthy behavior among women for a known preventive service. However, the notion of a financial

incentive sometimes prompts disquiet among those who believe that “paying” a person to obtain a known health benefit is somehow wrong or immoral, whereas others question the medium- or long-term viability of such an activity. We provide our insight into these notions from the health insurance company perspective.

First, we do not believe there is any reason to suggest or imply that providing a financial incentive to obtain a preventive service is somehow wrong; in fact, this notion strikes us as both paternalistic and judgmental. Financial incentives are a part of contemporary life and are used to guide people into making decisions. In health care, the goal is to encourage individuals to make healthy choices; therefore, it seems appropriate to provide incentives to encourage healthy behavior and thus maximize utility.²²⁻²⁴ As a form of trade, this is a voluntary action that, if implemented, benefits both parties.²² In this case, a woman obtains a preventive health service with demonstrated evidence of success and the health insurance company fulfills its obligations to promote the health and well-being of its members. If the woman chooses not to participate in the incentive program, which 73 did not for this campaign, then this is her right as would be expected of any type of voluntary transaction.

Second, with regard to the medium- and long-term viability, several items need to be considered. One is to identify the expected outcome of the financial incentive. The idea is not, as some might suggest, to “pay” a person to obtain a preventive service; rather, the idea is to use the incentive to introduce and support ongoing positive behavioral change. Further research on the impact of financial incentives and behavioral change within a community-based health insurance plan is needed.

Third, there may be a concern about the overall financial benefit of screening and early detection. Routine screening, simply put, is designed to identify disease in its earliest stage before it has had an opportunity to metastasize. Treating breast cancer in situ is more successful and less costly than treating metastatic cancer.²⁵ For example, breast cancer in situ is reported to have mean per-patient costs of \$48,477 and \$71,909 at 0 to 6 months and 0 to 24 months post diagnosis, respectively. On the other hand, breast cancer that has spread beyond the breast tissue and may have entered the lymph node is reported to have mean per-patient costs of \$84,481 and \$159,442 at 0 to 6 months and 0 to 24 months post diagnosis, respectively.²⁶ In our cue-to-action project, the maximum total expenditure for the financial incentive would have been \$5000 if all women had participated in the pilot project. Had 1 case of breast cancer in situ been identified rather than waiting until regional lymph node involvement had occurred, the amount of money expended due to early treatment vs late-stage treatment would have more than offset the cost of the entire incentive program.

Women Who Choose Not to Be Screened

Women who choose not to be screened represent a small but important part of the overall population eligible for screening mammography. Of the 267 women eligible for screening, 73 (27.3%) in the 2-year

period from January 1, 2016, to December 31, 2017, did not obtain screening mammography as part of their Sendero health insurance benefit. The research team member who made follow-up calls to members to encourage participation in this pilot project collected information about why women chose not to participate. Although this was not a primary outcome for this pilot study, we present here some of the qualitative findings from the conversations that took place with the 40 members who were contacted. (Each statement is from a specific person, with additional comment, if any, by the authors in brackets.)

- Personal objection to getting a mammogram
- Discouraged due to the inability to find a primary care provider
- Primary care physician does not allow for mammogram self-referrals [although Sendero does not have such a policy]
- Wanted to ask primary care physician if a mammogram was recommended
- Hesitant to schedule a mammogram out of her primary care physician's practice
- No time to get a mammogram
- Received a mammogram in 2017 as part of a community screening effort [which did not result in a medical claim to Sendero]
- Did not want a mammogram and would not do anything about it if she found out she had breast cancer
- Did not want to get a mammogram because of radiation
- Was not sure if getting a screening mammogram was the best way to detect cancer and was looking into getting a “thermal” mammogram, which does not involve radiation
- Was not interested in the \$50 gift card but was interested in getting her mammogram.

This feedback indicates that primary care physicians play an important role in helping women make an informed decision about whether to obtain screening mammography. Further research on the impact of the role of the primary care physician and behavioral change to support secondary prevention campaigns is warranted.

Limitations

Several limitations have been identified with this study. The first limitation is the timing of the campaign and its potential impact on mammography screening uptake. The 6-week intervention time period included 3 major holidays, which may have limited participation and may have impacted service availability; however, based on discussions with our preferred mammography provider during the planning process, they did not indicate a lack of availability during the 6-week time period. Second, some campaign-eligible women may have already scheduled a mammogram before receiving campaign material in the mail. Third, although the campaign included 3 cues to action, we did not seek to, nor were we able to, ascribe variance to any particular cue to action. Fourth and finally, we are blinded to some data that could be useful in the analysis of these findings. Such data include income and race/ethnicity data,

as this information is not provided by the federal Marketplace to health plans.

CONCLUSIONS

A one-time, time-limited cue-to-action pilot project consisting of outreach, education, and incentive increased uptake of screening mammography by women enrolled in a community health insurance plan providing health insurance coverage as part of the ACA. This increase is statistically significant in the intervention period compared with the reference period (PR, 2.7; 95% CI, 1.1-6.6; $P = .02$). Despite a small sample size, the magnitude of the effect for this pilot study is encouraging and warrants future studies in a larger population. ■

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Authorship Information: Concept and design (JRL, NT, WD, RT); acquisition of data (JRL, NT, WD, RT); analysis and interpretation of data (JRL, NT, RT); drafting of the manuscript (JRL, RT); critical revision of the manuscript for important intellectual content (JRL, RT); statistical analysis (JRL, NT, RT); provision of patients or study materials (NT); obtaining funding (WD); administrative, technical, or logistic support (JRL, NT, RT); and supervision (JRL).

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