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Insure Me Cancer Free: An Intervention Utilizing a Dynamic Communication Model

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Abstract

The purpose of this study was to examine the impact of a pilot insurance company-based intervention guided by a Dynamic Communication Model to increase breast and colorectal cancer screening in Appalachian WV, a medically-underserved population with low screening rates. Our team and key informants developed letters and a website to promote cancer screening, and these were mailed to patients needing screening (breast: *n* = 232; colorectal: *n* = 324). After 6 months, a sample of women (*n* = 22) and men (*n* = 27) continuing to need screening received telephonic case management counseling. Screening rates were assessed at baseline, 6 months, and 12 months. A final telephone interview was conducted at 12 months with a subset of participants. Key informants (*n* = 21) provided feedback on the letter/website, resulting in improved readability, organization, and informational content. The letter/website had minimal impact on screening (breast: *n* = 8; colon: *n* = 5). The final telephone interview of plan members (*n* = 12) found they liked the personalized approach and appreciated learning more about cancer, and that you need to "catch it early for good treatment." All understood the counseling and believed the information was correct. Nearly all intended to get screened. Following counseling, screening numbers increased (total breast: *n* = 39; total colon: *n* = 18). Our theoretically-driven, case management counseling intervention was well received and has the potential to increase cancer screening rates, particularly in a rural, medically-underserved populations.

Keywords

Appalachian region, colorectal cancer, breast cancer, intervention, insurance

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Insure Me Cancer Free: An Intervention Utilizing a Dynamic Communication Model

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Abstract

The purpose of this study was to examine the impact of a pilot insurance company-based intervention guided by a Dynamic Communication Model to increase breast and colorectal cancer screening in Appalachian WV, a medically-underserved population with low screening rates. Our team and key informants developed letters and a website to promote cancer screening, and these were mailed to patients needing screening (breast: *n* = 232; colorectal: *n* = 324). After 6 months, a sample of women (*n* = 22) and men (*n* = 27) continuing to need screening received telephonic case management counseling. Screening rates were assessed at baseline, 6 months, and 12 months. A final telephone interview was conducted at 12 months with a subset of participants. Key informants (*n* = 21) provided feedback on the letter/website, resulting in improved readability, organization, and informational content. The letter/website had minimal impact on screening (breast: *n* = 8; colon: *n* = 5). The final telephone interview of plan members (*n* = 12) found they liked the personalized approach and appreciated learning more about cancer, and that you need to "catch it early for good treatment." All understood the counseling and believed the information was correct. Nearly all intended to get screened. Following counseling, screening numbers increased (total breast: *n* = 39; total colon: *n* = 18). Our theoretically-driven, case management counseling intervention was well received and has the potential to increase cancer screening rates, particularly in a rural, medically-underserved populations.

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Breast cancer is the second leading cause of cancer death in women, and colorectal cancer is the second leading cause of cancer death in men and women combined (American Cancer Society, 2018). Some are disproportionately affected by cancer morbidity and mortality due to health inequities, such as those in the Appalachian region. The Appalachian region is a geo-politically defined region including over 13 states marked by higher rates of poverty, lower education, greater healthcare shortages, and higher median age compared to the United States as a whole (Pollard & Jacobsen, 2018; Wilson, Ryerson, Singh, & King, 2015). West Virginia is the only state entirely within the Appalachian region. It has one of the highest incidences and death rates from cancer in the country; colorectal cancer mortality is well above national rates (American Cancer Society, 2018), particularly in rural areas (Siegel, Miller, & Jemal, 2016). Cancer screening can prevent colorectal cancer through removal of cancerous polyps and can detect breast and colorectal cancer at its earliest and most treatable stage (United States Preventive Services Task Force, 2018; Centers for Disease Control and Prevention, 2018). In spite of its efficacy, the Behavioral Risk Factor Surveillance System indicated that West Virginians did not meet US Preventive Services Task Force guidelines for mammograms (25.8% WV vs. 24.5% US) or colorectal cancer screening (35.7% WV; 33.4% US) (Centers for Disease Control and Prevention, 2018). Cancer screening is a unique opportunity for efforts to promote health care among the medically-underserved population.

Insurance coverage of patients plays a critical role in cancer screening. Studies of the relationship between insurance coverage and cancer screening date back at least 30 years (Shapiro, W.Venet, Strax, L.Venet, & Roeser, 1985) with the Health Insurance Plan of Greater New York documenting the benefit of cancer screening to lower mortality (Chu, Smart, & Tarone, 1988). Numerous studies have documented the importance of insurance coverage in facilitating cancer screening (e.g., Robinson & Shavers, 2008). Populations with historically low screening rates such as those living in rural areas are of particular interest for understanding the impact of insurance on cancer screening (e.g., Carney et al., 2012). With healthcare reform and an increasing number of insured parties, payers have become more interested in making prevention and early detection a primary focus of their plans (e.g., US Department of Health and Human Services, 2018; National Committee for Quality Assurance, 2007). In spite of efforts to increase screening in insured individuals, screening rates are less than optimal (e.g., Spruce & Sanford, 2012; Marshall et al., 2016). Low breast cancer screening rates were found for the WV Medicaid population, and the apparent result was higher healthcare costs (Bhanegaonkar, Madhavan, Khanna, & Remick 2012; Khanna, Madhavan, Bhanegaonkar, & Remick, 2011). Thus, even though cancer screening may be covered by insurance companies, additional intervention is needed to promote screening.

In addition to reducing structural barriers, health inequities can be reduced through behavioral interventions that address the needs of medically-underserved populations. The Community Preventive Services Task Force has given patient reminders (e.g., letters) and one-on-one counseling a rating of "Recommend" for breast cancer screening with mammography and for colorectal cancer screening with fecal occult blood testing (Community Preventive Services Task Force, 2016). Further, multi-modal interventions have been shown effective in increasing cancer screening (Issaka, Avila, Whitaker, Bent, & Somsouk, 2019). Although these intervention modalities are well-established, they have not been widely used in the Appalachian population and promise to increase the cancer screening in insured individuals who live in rural areas. Further, frameworks such as the Evidence Integration Triangle advocate for the consideration of key stakeholders (e.g., insurers, case managers, insurance plan members), an intervention program (e.g., reminders, counseling), and practical process measures (e.g., cancer screening rates) (Glasgow, Green, Taylor, & Stange, 2012) in interventions. An intervention can be most successful when insurers, individuals, and researchers join together to address the issue of health inequities.

While studies have endeavored to increase cancer screening rates among insured individuals at the clinical and community levels, few have worked with insurance companies to increase screening rates among their plan members using behavioral science evidence-based practices. In countries with nationalized health plans, researcher-insurance partnerships have demonstrated improved screening rates. In Great Britain, behavioral science-guided interventions with the National Health Service using targeted mailings improved screening rates for colorectal and breast cancer (e.g., Evans et al., 2012; McCaffery, Wardle, & Waller, 2003). Similar results have been seen in Australia (Villanueva et al., 2008). A study of HMO enrollees in the United States found that screening rates were highest in those who were mailed tailored materials

(Rakowski et al., 1998). Similarly, a randomized control trial of a prevention care management intervention among Medicaid beneficiaries found screening rates improved for breast, cervical, and colorectal cancer (Dietrich et al., 2007). Thus, model-driven interventions have demonstrated effectiveness for increasing screening in insured populations and can be utilized to help attain "the highest level of health for all people" (US Department of Health and Human Services, 2018).

Tailoring based on behavioral models has evidenced improvement in cancer screening rates in medically-underserved populations (e.g., Leone et al., 2016). For example, tailoring can be accomplished by including salient message features that include cognitive and affective components, as well as barriers counseling. A Dynamic Communication Model (Kelly, Shedlosky-Shoemaker, Atkins, Tworek, & Porter, 2015) (Figure 1) can be used to increase health equity and integrates two well-established models: The Self-regulation (Leventhal et al., 1997) and Input-Output Model (McGuire, 1989), to improve the descriptive and prescriptive powers of these models. Prior work with the Self-regulation Model demonstrates its ability to improve screening and preventive health behavior (e.g., Meyer, Leventhal, & Guttman, 1985; Leventhal, Safer, & Panagis, 1983).

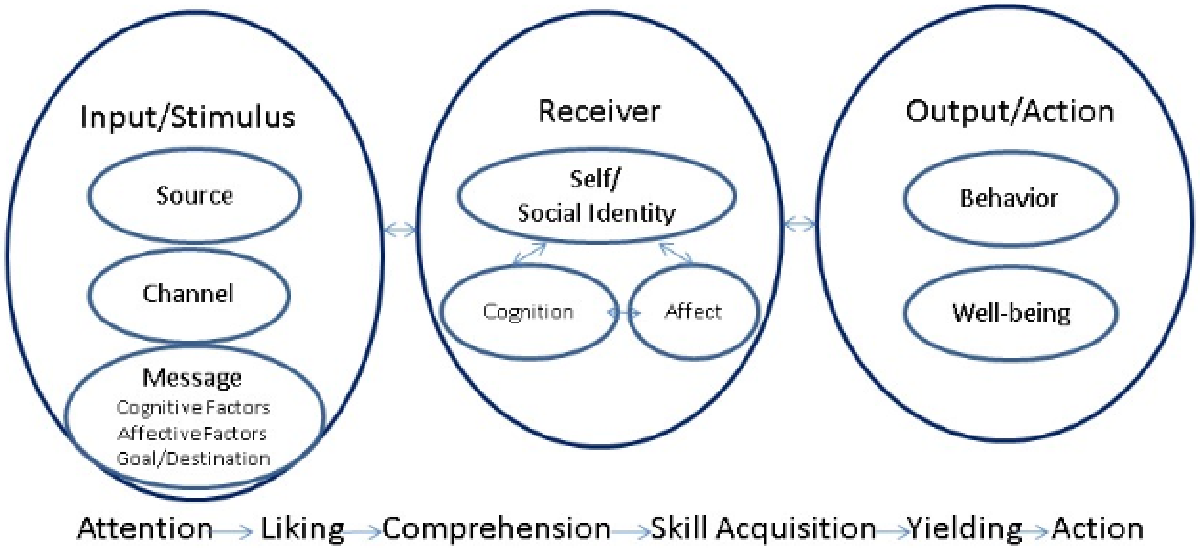

Figure 1. A Dynamic Communication Model.

A Dynamic Communication Model specifies the input, receiver, and output/action to yield behavior change. Inputs include source variables (e.g., insurer, university), message variables (e.g., importance of cancer screening), channel variables (e.g., mail, website, case manager, which should be chosen to promote health equity), receiver variables (e.g., knowledge, worry, and factors associated with root causes of health inequities, including health care access), and destination variables (e.g., attitude vs. behavior change). When presented with an input, the receiver (1) determines if the communication is self-relevant (e.g., age, region), (2) forms cognitions (e.g., knowledge) and emotions (e.g., worry) about the health threat, and (3) examines their resources to take action. Finally, outcome is the target behavior relevant to the input. Along with these three key factors, attention must be paid to the input, the receiver must like and comprehend the input, intend to act and then act. Assessment of intentions and actions can be further refined by concepts from the Stage of Change Model, which specifies where a person lies on a continuum of behavior change (e.g., if they thought about mammogram/colorectal screening, if they planned to have a mammogram/colorectal screening in the next 6 months, if they planned to have a mammogram/colorectal screening in the next 30 days, or if they had scheduled a mammogram/colorectal screening; Prochaska et al., 1994). Our previous work with the Dynamic Communication Model found it to be a useful model to improve reporting of cancer family history information and to encourage discussions about cancer family history (Kelly et al., 2015). The purpose of this pilot study was to examine the impact of an insurance company-based intervention guided by a Dynamic Communication Model to increase breast and colorectal cancer screening in a population with low screening rates.

Methods

Participants

Approximately 97,000 individuals were insured by CoventryCares of WV (Coventry). Most (80%) were Medicaid patients, with the remainder being commercially insured. Two types of participants were included: (1) key informants to review letters and website, and (2) insurance plan patients. Key informants were Coventry case managers, Cancer Prevention and Control members, and individuals from WV not insured by Coventry but with similar demographics (community individuals). Insurance plan patients were identified by Coventry as those who had a 50-55th birthday in the initial months of the study. At baseline, screening rates per guidelines among insurance plan members were 40% for breast and 26% for colorectal cancer screening, as some plan members had only recently acquired health insurance. Insurance plan members were ineligible if they had a pre-existing condition for which procedures were diagnostic (e.g., inflammatory bowel disease).

Procedure

Institutional Review Board approval was received before study initiation. Figure 2 provides a flow chart for the pilot study design. Mammography and colorectal cancer screening claims were tracked by Coventry. Letters for men (colorectal cancer screening) and women (breast and colorectal cancer screening) were developed, based on a Dynamic Communication Model. Consistent with the letter, but with more detailed information about screening and referrals, the website content was given to developers (including a brief demographic survey to be completed by members using the website), and the website was programmed to be personal computer and mobile application compatible. Both the letter and website were reviewed by key informants. Key informant interviews were conducted after review of the letters and website; key informant interviews were conducted in person with community individuals to ameliorate potential literacy concerns. Refinements to the letter and website were then made based on feedback to interviews. The letters were then reviewed and approved by Coventry (Quality Improvement and Legal for Medicaid). Once determined suitable, our targeted mailing with website link was sent by CoventryCares of WV to insurance plan patients near their 50-55th birthday to encourage breast (for women) and colorectal (for men and women) cancer screening. Website usage was tracked.

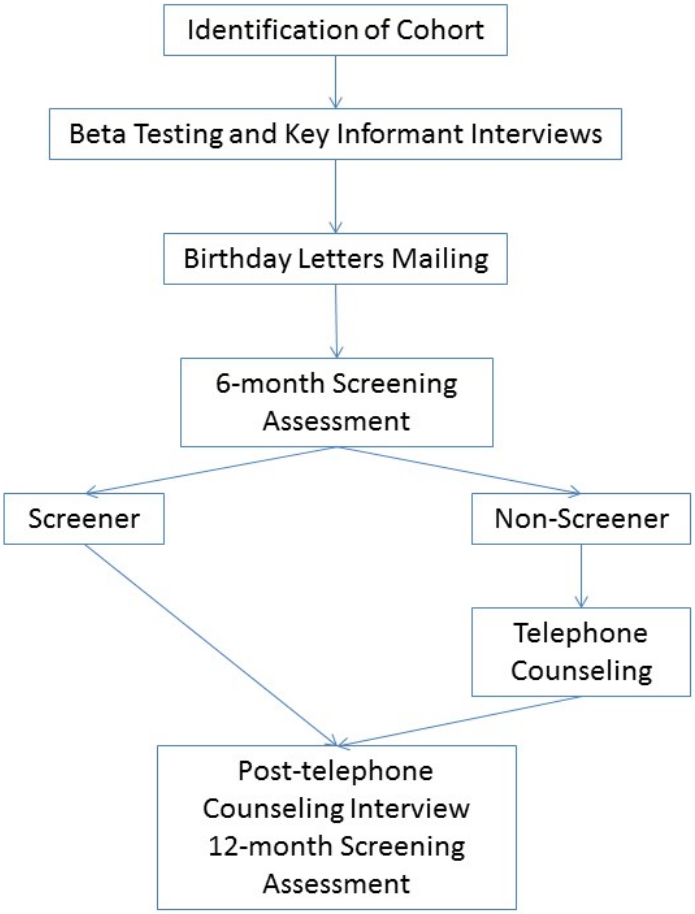

Figure 2. Flow of Study.

Following the letter/website, the research team met with insurance company administrators and case managers to understand their experiences and discuss opportunities for a communication intervention. Based on this meeting, we developed a counseling protocol including barriers counseling. Screening rates were assessed (6-month screening assessment) and those not having screening were 'triaged' to receive individually-tailored, one-on-one telephone counseling from a health coach/case manager. Using telephone counseling after an additional mailing was a cost-saving measure that provided for a more intensive intervention for those most in need. Case managers made a single telephone call to all insurance plan members who had not yet had screening according to their records. Case managers provided contact information of patients willing to receive a follow-up interview to the research team. A non-case manager member of the research team conducted a post-telephone counseling interview of insurance plan patients to understand patient response and how to improve the intervention. A non-case manager was utilized to decrease bias (e.g., to provide some level of blinding to the content of the counseling, to reduce potential concerns about making a bad impression on case managers). After an additional 6 months, final screening rates were assessed to understand the impact of the letter, website, and telephone counseling.

Measures

A variety of measures were included for the study. Screening rates for breast and colorectal cancer were assessed at (1) baseline, (2) at 6 months (after letter and website), and (3) at 12 months (after counseling interview). In addition, a key informant letter and website interview and patient post-telephone counseling interview were conducted. Readability for interviews was at or below the 8th grade level, according to Flesch-Kincaid assessments, and we have used these assessments previously in the rural, Appalachian population.

Key informant letter and website interview. Key informant interviews included: demographic information, the Cancer Worry Scale where 1 = not at all to 4 = a lot (Lerman, Kash, & Stefanek, 1994), perceived risk compared to the general population where 1 = lower to 3 = higher than the general population (Kelly et al., 2005), knowledge of breast and colorectal cancer screening tests (Kelly, Dickinson, Degraffinreid, Tatum, & Paskett, 2007). In addition, feedback regarding the letter and website were requested, including attention, liking, comprehension, and intentions on a 1 = not at all to 7 = very much scale and with open-ended items (Kelly et al., 2015).

Patient post-telephone counseling interview. The post-telephone counseling interview asked if they had received a letter about cancer screening from Coventry, if they had Internet access, if they had used the website about cancer screening, and if they had talked to a case manager about cancer screening. Further, feedback about the entire intervention was sought, including attention, liking, comprehension, and intentions, on a 1 = not at all to 7 = very much scale and with open-ended items.

Intervention

Our pilot intervention included a mail and website intervention, followed by telephone counseling. This multi-method, triage approach was chosen to reach individuals in the rural, mountainous Appalachian region where travel to healthcare or other community facilities may be challenging. Our materials were written at or below the 8th grade level, according to Flesch-Kincaid assessments. Notably, the grade level of the materials may be artificially inflated as we made efforts to include medical terminology (e.g., colonoscopy) and to provide definitions of these terms to familiarize participants with such screening methodologies. Key messages with cognitive (e.g., “Being age 50 or older increases your risk of getting colon cancer.”) and affective (e.g., “Do what is good for you and your family, too.”) factors, as well as destination (e.g., “Please get your cancer screening.”), were developed and utilized in the letter, website, and counseling to motivate screening.

The primary purpose for the letter was an initial stimulus to screen, and the letter gave a link to a website for additional information. The website included 3 webpages. The main page included promotion of screening and included links about how and where to screen. From the main page, there were two additional pages, one explaining breast cancer screening and one explaining colorectal cancer screening. Although an estimated 30% of rural West Virginians do not have broadband access, we utilized a letter and website first, as it was a relatively inexpensive way to reach a large number of people (Federal Communications Commission, 2017).

The telephone counseling intervention was designed as a more intensive intervention for those who did not respond to the minimal letter and website intervention. Telephone counseling sessions were conducted by case managers who culturally matched insurance plan members. Individualized telephone counseling sessions included branched-point decision-making that were tailored to each individual. Question prompts were included in SurveyMonkey and responses were logged by case managers. Demographics including age, race, and ethnicity were followed by whether members had received the letter mailed from Coventry and if they were up to date on cancer screening (by self-report). Then, a series of questions assessed their plans with regards to screening consistent with the Stage of Change Model: if they had thought about mammogram/colorectal screening, if they planned to have a mammogram/colorectal screening in the next 6 months, if they planned to have a mammogram/colorectal screening in the next 30 days, or if they had scheduled a mammogram/colorectal screening. Insurance plan patients were also asked about their most important barrier to having mammogram/colorectal cancer screening, and a booklet for use by case managers included responses to common barriers to screening. After barriers counseling, insurance plan patients were again asked their plans with regard to cancer screening. Members of the research team alpha tested the website and the Survey Monkey-guided counseling to ensure functionality. For the website, this meant that hyperlinks functioned properly. For the counseling, this meant that questions followed in proper order and that information was provided at the appropriate time.

Results

Key Informant Letter and Website Interview

Key informant interviews included members of Cancer Prevention and Control (*n* = 2), representatives at Coventry (*n* = 5), and individuals in the community representative of the relevant Coventry population (*n* = 14). The mean age for key informants was 52.5 years; however, among community members, ages ranged from 49-77 years. Most were white women, with community members including 3 men and 4 African-Americans. All had completed 12 years of education or more. The letter was rated favorably (Attention: *M* = 5.0, Liking: *M* = 4.6, Comprehension: *M* = 6.2, *M* = Intention: 6.9), as was the website (Attention: *M* = 5.5, Liking: *M* = 5.9, Comprehension: *M* = 6.3, *M* = Intention: 6.3). Worry levels were low for the letter (breast cancer: *M* = 1.3, colorectal cancer: *M* = 1.1) and website (breast cancer: *M* = 1.3, colorectal cancer: *M* = 1.1). Perceived risk of cancer most closely resembled 'same as the general population' in response to the letter (breast: *M* = 2.2, colorectal: *M* = 2.2) and website (breast: *M* = 2.0, colorectal: *M* = 2.3). The most difficult terminology for community members was "covered benefit," meaning that their insurance would pay for cancer screening. Although easy to read, some felt the letter was bland. Reorganization of the website was needed, with bullet points and hyperlinks.

Screening Rates at 6 Months

The insurance company record review indicated that of 232 women (from 365) sent breast screening letters, 8 had breast cancer screening (.3%). Of 324 patients (from 598) sent colorectal screening letters, 5 had colon cancer screening (.2%).

Telephone Counseling Intervention

Case managers (*n* = 5) requested an easy protocol to administer the telephone counseling intervention, and a computer-assisted, insurance member-tailored intervention was developed and beta tested. Key barriers to screening were discussed, and a flipbook of responses to barriers was developed for counseling. Of the single attempt calls from case managers, 49 received counseling: 45% (*n* = 22) were female and 55% (*n* = 27) were male. Of those responding, 20% (*n* = 10) self-reported they received the letter sent to participants, while 71% (*n* = 35) indicated not receiving the letter, with the remainder uncertain. Of the women receiving counseling (*n* = 22), 64% (*n* = 14) self-reported completing breast cancer screening by having a mammogram. Of the participants not reporting a mammogram (*n* = 8), 50% (*n* = 4) had thought about it, whereas 25% (*n* = 2) were uncertain about receiving a mammogram. Of those considering screening, 38% (*n* = 3) planned on having screening in the next 6 months, while one respondent planned to have a mammogram in the next 30 days and was scheduled to do so.

Among the respondents who received telephone counseling, 45% (*n* = 22) self-reported completing colon cancer screening. Of those who received colorectal cancer screening, 91% (*n* = 20) reported receiving a colonoscopy and 9% (*n* = 2) reported receiving FOBT/FIT. Of those who had not reporting screening (n = 27), 52% (*n* = 14) had considered it and 64% (*n* = 9) responded that they planned to have screening in the next 6 months. Of those who planned to receive screening in 6 months, 44% (*n* = 4) planned to have screening in the next 30 days, and 33% (*n* = 3) self-reported being scheduled to receive screening. When asked about his knowledge of colon cancer, one participant responded that it was treatable if detected early, while another was aware that screening was recommended for those over the age of 50. Among the participants who were not within colorectal cancer screening guidelines (*n* = 28), 25% (*n* = 7) reported that they planned to have colorectal cancer screening after completing the survey. Of those planning to have screening, 29% (*n* = 2) had not previously thought about colorectal cancer screening, and 29% (*n* = 2) had thought about it but were uncertain about having the screening in the next 6 months.

Patient Post-telephone Counseling Interview

Post-telephone counseling interviews were completed with a subset of men (*n* = 7) and women (*n* = 5) receiving telephone counseling to determine their satisfaction with the intervention. Few (*n* = 3) self-reported receiving the letter, and none had reported viewing the website, with many (*n* = 5) reporting no Internet access. Responses to the telephone counseling were very positive. Attention (*M* = 5.7), liking (*M* = 6.2), comprehension (*M* = 6.7), and intentions (*M* = 6.3) were high. One respondent commented that the part he liked the most was that “someone cares about the well-being of others.” All participants comprehended that the counselling was asking them to get screened for breast and/or colorectal cancer, and all believed the information presented was correct.

Screening Rates at 12 Months

In the final record review conducted after 6 months, 38 (letter/website *n* = 8; +telephone counseling *n* = 31) of 232 women had breast cancer screening (16.8%), and 18 (letter/website *n* = 5; +telephone counseling *n* = 13) of the remaining 324 had colorectal cancer screening (5.5%).

Discussion

The current study sought to increase health equity in the rural, Appalachian population by utilizing a Dynamic Communication Model to motivate individuals to engage in breast and colorectal cancer screening. Cognizant of structural barriers and feelings of lack of agency, this university-insurance company partnership endeavored to overcome a number of challenges to health equity by utilizing: (1) a team of insurer-university sources; (2) a diversity of channels to overcome challenges to health literacy and the digital divide: mail, website, and case manager; and (3) a counseling approach tailored to the receiver (cognitive and affective messages, barriers counseling). Thus, we utilized our model-driven approach to address health inequities in the Appalachian population.

Our initial review of the letter and website indicated that they caught individuals' attention, were liked, were well-understood, and encouraged people to intend to have screening. The most common concern about the letter was that it did not catch peoples' attention, while the most common concern about the website was its informational content and organization. Most of these were actionable items and led to improvements in the letter and website. Considerable attention was paid to the development of the letter and website; however, ultimately, they appeared to have little impact. In our initial 6-month post-letter and website record review, virtually none of those receiving letters used the website, and neither appeared to have a substantial impact on screening rates, indicating that written communication may not be helpful to address health inequities in our circumstance and may not be helpful for other populations with lower health literacy. This may be due in part to inundation with advertising and other forms of irrelevant mail, a particular challenge for those with lower literacy who may not be able to filter relevant materials.

Counseling appeared to have a greater impact on screening rates than the website and letter. Patients responded well to counseling and appeared to have more favorable attitudes about screening in response. Few of those receiving counseling appeared to have seen the letter. Yet, it could be that the combination of letter and counseling had a greater response or that our initial 6 month waiting period was not long enough to see an impact in screening, particularly among those who desired a colonoscopy, which can have considerable wait times. Meeting with case managers before finalizing the telephone counseling sessions was integral to gaining buy-in and providing information in a case manager-friendly manner. Perhaps along with our specific intervention, greater salience of cancer screening among case managers and additional tools for patient counseling were critical, and these new resources could have long-term impact on case management among these case managers and within the insurance company more broadly. Based on these results, we advocate for a more personalized counseling approach for populations with lower health literacy. However, in spite of these gains in screening, screening rates remained low in this predominantly rural, insured but medically-underserved population.

A number of challenges in our study may resonate with others working with medically-underserved populations in the areas of cancer screening awareness, early diagnosis, and prevention. To begin, many of these patients had not had screening, in spite of being eligible for 5 years; thus, we may be tapping into a participant pool with considerable barriers. As a corollary, these Medicaid patients may have had severe chronic diseases that may have made cancer screening less salient and may have taken precedence over cancer screening. Second and most importantly, we noted that upon telephone counseling with the case managers, 14 patients reported having breast cancer screening, and 22 reported colorectal screening. Others were scheduled to screen. This appears higher than captured by the insurance record data and likely indicates greater impact of our intervention or that women needing mammograms may have had colorectal cancer screening already. Working with de-identified insurance company data, it is difficult to track these patients and determine whether our interviews prompted some to screen.

A key challenge was the changing membership in insurance plans and eligibility in the context of the Medicaid expansion. From an initial 365 women needing breast cancer screening at baseline and receiving letters, only 232 were still members at the time of final assessment 12 months later. Of 598 individuals receiving letters for colorectal cancer screening, only 324 remained in the sample 12 months later. Thus, nearly half of the population was in flux, and this challenge was not noted in interventions instituted before the Affordable Care Act in other populations. In addition, some self-reported screening was not captured by insurance company data; some men and women may have had screening before being insured by Coventry. Further, 12 months may not have been adequate time to see improvements in screening rates, particularly among those desiring colonoscopies after counseling, especially in a disproportionately rural, medically-underserved population.

In spite of these limitations, our pilot university-insurer partnership intervention resulted in at least 56 individuals receiving breast and colorectal cancer screening among a Medicaid-insured population in a rural, mountainous region. One implication of this study is that letters and websites may not be as cost-effective as personal counseling for cancer screening in medically-underserved populations. Longer-term stability of insurance care may play a critical role in initiation and maintenance of cancer screening, and future policy could help to ameliorate the negative impact of changing health insurance membership on preventive care services.

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