

# Targeted Intervention Strategies to Increase and Maintain Mammography Utilization Among African American Women

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For most cancers in the United States, African Americans have the highest death rate and shortest survival of any racial/ethnic group.<sup>1,2</sup> The most common cancer among African American women is breast cancer. Despite African American women having a lower incidence of breast cancer than White women have (117.6 vs 130.6 per 100 000), African American women have a higher breast cancer mortality rate than that of their White counterparts (33.5 vs 24.4/100 000).<sup>2</sup> From 2001 to 2005, African American women's breast cancer mortality rate was 37% higher than that of White women. For breast cancer diagnosed from 1996 through 2004, the 5-year relative survival rate among African American women was 77%, compared with 90% among White women.<sup>2</sup>

One reason for this poorer survival outcome is the stage of cancer at detection. Of all breast cancers diagnosed among African American women, 52% are diagnosed at a local stage (an invasive cancer confined entirely to the organ), compared with 62% of breast cancers among White women.<sup>2</sup> Barriers to screening, such as fear, lack of awareness, limited financial resources, limited access to care, differences in tumor biology, and social prejudices,<sup>3–6</sup> have been documented among African American women.

To create a model that addresses these barriers, in 1999 the Centers for Disease Control and Prevention (CDC) launched the Racial and Ethnic Approaches to Community Health (REACH 2010) demonstration project in response to Healthy People 2010's national goal of eliminating health disparities.<sup>7</sup> The CDC established cooperative agreements with more than 40 communities across the United States to close the health disparity gap among minority populations by reducing disparities in 6 health priority areas, including breast and cervical cancer screening and management.<sup>8</sup>

**Objectives.** We assessed the impact of a theory-based, culturally relevant intervention designed to increase mammography screening among African American women in 8 underserved counties in Alabama.

**Methods.** Using principles derived from the Stages of Change, Community Health Advisor, and Community Empowerment models, we developed strategies to increase mammography screening. Trained volunteers (N=143) provided tailored messages to encourage adoption and maintenance of mammography screening. We collected baseline and follow-up data on 1513 women in the communities targeted for the intervention. Our goal was to decrease the number of women in stage 1 (never screened) while increasing the number of women in stage 2 (infrequently screened) and stage 3 (regularly screened).

**Results.** At baseline, 14% (n=211) of the women were in stage 1, 16% (n=247) were in stage 2, and 70% (n=1055) were in stage 3. After the 2-year intervention, 4% (n=61) of the women remained in stage 1, 20% (n=306) were in stage 2, and 76% (n=1146) were in stage 3.

**Conclusions.** Tailored motivational messages and peer support can increase mammography screening rates for African American women. (*Am J Public Health.* 2010;100:2526–2531. doi:10.2105/AJPH.2009.167312)

To ensure a long-lasting impact in minority communities, the CDC funded proposals that integrated coalition-building activities, empowerment principles, and participatory, community-based approaches. The Alabama REACH 2010 Breast and Cervical Cancer Control Coalition, a diverse coalition founded with the goal of eliminating breast and cervical cancer disparities, applied these activities, principles, and approaches to build trust and establish partnerships between academic institutions and community organizations, engage community members in the design and conduct of the project, and demonstrate that the use of participatory and empowerment models can improve health outcomes.<sup>9,10</sup>

The Alabama REACH 2010 project was a multilevel intervention with activities directed at the individual, community, and organizational and policy levels.<sup>11,12</sup> We assessed the effectiveness of individual-level intervention activities implemented to encourage and support mammography screening among African American women.

## METHODS

Alabama REACH 2010 was a 2-phase demonstration project that consisted of a 12-month planning phase (1999–2000) and a 6-year implementation and evaluation phase (2001–2007). During phase 1, the project (1) established a diverse coalition including community, academic, state, private, and faith-based partners, as well as participants from health departments and the American Cancer Society; (2) conducted needs assessment and assets mapping; and (3) developed a multilevel community action plan based on the results of formative evaluation.

During phase 2, one facet of the multilevel community action plan focused on an individual-level intervention implemented by community health advisors (CHAs). Duties of these CHAs were to (1) recruit age-eligible African American women across 8 counties to participate in the project, (2) survey African American women at baseline to assess their behavior

related to Papanicolaou tests and mammography screening, (3) provide the women with tailored, stage-matched messages and support to overcome barriers and promote mammography or Papanicolaou test screening, and (4) conduct a 2-year follow-up survey to reassess mammography and Papanicolaou test screening behavior. Our study assessed only the breast cancer screening component of the individual-level intervention.

### Theoretical Framework

Efforts to eliminate cancer health disparities in underserved communities have had limited success.<sup>9,10</sup> The Alabama REACH 2010 coalition applied principles of Freire's Empowerment Theory<sup>13</sup> in conjunction with the CHA Model<sup>11,12,14,15</sup> in an effort to empower residents to address their own concerns and overcome barriers to mammography screening. Unlike traditional medical models, in which a research agenda is imposed upon a community, the Alabama REACH 2010 approach was based on academic and community partners sharing research responsibilities and ownership of the project. Thus, CHAs served in a leadership capacity as educators and navigators for a cohort of African American community women.

The Stages of Change Model provided the theoretical foundation for this demonstration project. An integral concept of the model is that the adoption of good practices involves movement through a series of stages: precontemplation (not even thinking about the new behavior), contemplation (currently not practicing the behavior but considering its adoption), action (adopting the behavior), maintenance (sustaining the behavior over time), and relapse (practicing the behavior but not consistently).<sup>16,17</sup> At each stage, individuals must deal with many challenges during the course of changing a behavior. Project partners used this model as they crafted culturally relevant, stage-matched, tailored messages to promote mammography adoption and maintenance among participants.

For the purposes of this project, the participants were staged into 3 groups. Stage 1 comprised women with no previous mammogram. Previous qualitative findings<sup>12</sup> have indicated that fear is a major barrier to screening; therefore, the tailored messages for this stage were designed to reduce fear and increase

awareness that early detection of breast cancer can save lives. Stage 2 comprised women who had had a previous mammogram but not in the past year. Tailored messages for this stage were designed to reduce fear and to motivate, remind, and support women in scheduling and keeping their mammography screening appointments. Stage 3 comprised women who had had a mammogram during the past year. Stage 3 women were commended for their efforts and were encouraged to maintain regular participation in annual mammography screenings.

### Target Population

The Alabama REACH 2010 project targeted 6 rural counties (Choctaw, Dallas, Lowndes, Macon, Marengo, and Sumter) and 2 urban counties (Montgomery and Tuscaloosa) in Alabama. The rural counties are located in the Black Belt region, which includes some of the poorest counties in the nation. Along with high rates of poverty, the Black Belt area has a declining population, lack of public transportation, high unemployment, and poor access to medical care.<sup>18,19</sup> The Black Belt counties have few physicians, nurses, and hospital beds. On average, among the targeted Black Belt counties, African Americans account for 64% of the population, the per capita income is \$13,540, and 27% of the population lives below the poverty level.<sup>20</sup>

### Community Health Advisor Recruitment, Training, and Maintenance

We recruited volunteers from the community to participate in the project as CHAs. Volunteers were eligible to participate as CHAs if they were residents of a target county, had no intentions to relocate during the project period, and were able to read, write, and give consent. Project staff identified and recruited CHAs by (1) conducting presentations at churches, schools, and civic organizations; (2) attending health fairs and town hall meetings; and (3) hosting REACH 2010 informational meetings 2 weeks prior to the beginning of CHA training. At those meetings and presentations, we presented an overview of the cancer burden in the African American community, a synopsis of the project, and an explanation of the role of CHAs. Consent forms were available for those who wanted to participate.

As described in Fouad et al.,<sup>11</sup> the CHA training curriculum was based on findings from phase 1 focus groups and interviews with community women in the target counties,<sup>12</sup> on a thorough literature review on the CHA Model,<sup>9–12</sup> on an assessment of other cancer awareness training manuals used to educate African American women,<sup>14</sup> and on principles of capacity building, coalition development,<sup>21</sup> and Freire's Empowerment Theory.<sup>13</sup> On the basis of this information, we developed a CHA training curriculum that involved 2 hours of training per week for 6 weeks.

The goal of the training was to provide CHAs with cancer education knowledge and skill-building opportunities. The 9-chapter curriculum contained information on breast and cervical cancer, ethical issues, the Belmont Report (a foundational document in the field of medical ethics that gives ethical guidelines for research involving human subjects),<sup>22</sup> and CHA roles and responsibilities. Each CHA received a manual, a pre-post skill-building test, and health publications. The training concluded with a graduation ceremony, and each participant received a \$50 gift card.

In an effort to make CHAs aware of project updates and guidelines for cancer screening and treatment, we held monthly maintenance meetings beginning at the completion of the 6-week training. During the monthly meetings, CHAs received additional leadership training and were engaged in skill-building activities. The monthly maintenance meetings also served as a source of support for CHAs, giving them an opportunity to network and to brainstorm project-specific issues with staff.

### Intervention Baseline and Follow-Up Protocol

The goal of the CHA-led intervention, which took place from January 2001 through November 2005, was to encourage women to schedule and keep mammography appointments. CHAs sought to recruit and survey participants who met the project's inclusion criteria (African American women, aged 40 years or older, willing to give consent, able to read and write, and a resident of a target county). CHAs received a \$15 gift card for each eligible participant they surveyed at baseline. The "snowball" method (a recruitment method that relies on social networks to access specific

populations),<sup>23</sup> word of mouth, and presentations at community events were the primary recruitment strategies used by the CHAs. Once an eligible woman had consented to participate, the CHA began the intervention by providing an overview of the REACH 2010 project, explaining the CHA's role, and administering a 2-page demographic survey to assess the woman's breast cancer screening status.

This demographic survey prompted the CHA to ask whether the woman had had a mammogram in the past year. On the basis of the participant's response, the CHA administered 1 of 3 versions of the baseline survey, all of which were adapted from the Stages of Change Model.<sup>16,17,24</sup> The CHAs administered version 1 of the baseline survey if a participant indicated she had never had a mammogram, baseline version 2 if the participant had had a mammogram but not in the past year, and baseline version 3 if the participant had had a mammogram in the past year. As a quality assurance measure, the staff performed telephone reinterviews on a random sample of 10% of completed baseline surveys.

### Community Health Advisor Intervention Process

After a participant completed the baseline survey, a tracking card was generated for her. The front of the tracking card contained either a mammography appointment date based on the date of the participant's last screening (for women in stages 2 and 3) or a screening deadline of January 1 of the following year (for women in stage 1, who had never been screened). The front of the card also contained space to record the date, time, and mode of the reminder contact; whether the screening took place; reason(s) why the screening did not occur, if applicable; and whether a missed screening was rescheduled. The back of the tracking card contained tailored messages for each stage.

Each quarter, we sent CHAs the tracking cards for participants who had a screening due during that quarter. The CHAs contacted participants 1 month prior to the screening due date and again 2 days before the appointment to discuss barriers that might interfere with keeping the appointment. Plans of action to overcome these barriers were discussed and documented on the tracking card. The CHA

made a final call to the participant 2 days after the appointment to determine whether the appointment was kept. If the participant kept the appointment, the CHA documented this on the tracking card and returned it to project staff. If the participant did not keep the appointment, the CHA used the talking points on the back of the card to encourage the participant to reschedule during the postappointment phone call. The CHA returned the tracking card to staff after the rescheduled appointment was kept or after the CHA had made at least 3 unsuccessful attempts to reach the participant.

The stage-tailored talking points on the back of the card were used as guides to help reduce fear, provide peer support, and increase awareness. The talking points also provided information on available resources, such as the CDC-funded Breast and Cervical Cancer Early Detection Program, which screens eligible women at no cost. CHAs used these stage-tailored talking points not only during reminder calls but also throughout the entire intervention process.

Aside from following up with participants regarding their screening appointments, CHAs maintained monthly contact with their cohort of women by telephone, mail, or personal visits. Participants were also invited to REACH 2010 health fairs and town hall meetings.<sup>11,12</sup> Such monthly contacts were not recorded on the tracking cards.

### Statistical Analysis

We used participants' demographic characteristics to calculate basic descriptive statistics by stage, both for the original cohort ( $n=2333$ ) and for those women who participated in the 2-year follow-up survey ( $n=1513$ ). To determine whether women who completed the study ( $n=1513$ ) were demographically different from noncompleters ( $n=820$ ), we used the  $\chi^2$  statistic to compare the 2 groups' characteristics. To assess whether the proportion of women who made a positive change in stage was attributable to chance or secular trends (where improvement was possible, i.e., for women in stages 1 and 2 at baseline), we compared the proportion of all Alabama women aged 40 years and older who had not had a mammogram within the prior 2 years in 1998 (26.3%; proportion=0.263) to that of women meeting the

same description in 2006 (22.8%; proportion=0.228).<sup>25,26</sup> We took this difference of 3.5% (proportion=0.035) to represent the percentage of women who would have started getting mammograms during the time of our project, either because of chance or temporal trends, and we tested all positive change results from our study against this proportion. The aforementioned analyses were conducted for all participants with an opportunity for improvement. All analyses were conducted by using SAS version 9.1 (SAS Institute, Cary, NC).

## RESULTS

A total of 143 volunteers were trained as CHAs. Seventy-six percent of the volunteers were aged 40 to 69 years, 96% were African American, 32% had a high-school diploma or equivalent, and 28% were community-college graduates. Each CHA recruited an average of 16 eligible participants ( $n=2333$ ). Baseline data were collected on all 2333 women. Of these women, 1513 were followed throughout the multiyear intervention.

Table 1 presents demographic characteristics of the baseline and follow-up survey participants, categorized by mammography screening status. The baseline and follow-up cohorts were similar in terms of demographic characteristics. However, a notable difference was observed among stage 1 women: 49% were married at baseline, as opposed to 34% who were married at follow-up.

Approximately 383 tracking cards were sent to CHAs every 3 months across the 8 counties. This protocol tracked 100% of participants. Phone calls were the CHAs' preferred tracking method. On a monthly basis, CHAs made at least 1 to 3 contacts with participants.

As described in the Methods section, baseline and follow-up surveys were conducted to assess changes in mammography screening behavior. Movement between stages was defined as keeping a mammogram appointment. Results from the self-reported mammography survey revealed that more women received mammography screenings after participating in the intervention: the number of women in stage 1 (never screened) decreased, and the numbers of women in stage 2 (infrequently screened) and stage 3 (regularly screened) increased.

**TABLE 1—Demographic Characteristics of African American Women, by Mammogram Screening Stage: REACH 2010, Alabama, January 2001–November 2005**

	Original Sample (n = 2333)			Participants Surveyed at 2-Year Follow-up: Baseline Data (n = 1513)			Participants Surveyed at 2-Year Follow-up: Follow-up Data (n = 1513)		
	Stage 1 (n = 346)	Stage 2 (n = 424)	Stage 3 (n = 1563)	Stage 1 (n = 211)	Stage 2 (n = 247)	Stage 3 (n = 1055)	Stage 1 (n = 61)	Stage 2 (n = 306)	Stage 3 (n = 1146)
High school diploma/GED	45%	30%	35%	48%	30%	35%	43%	39%	35%
Employed	53%	54%	55%	47%	47%	50%	47%	43%	51%
Married	45%	42%	47%	49%	45%	50%	34%	47%	50%
Private insurance/HMO	26%	33%	40%	25%	42%	53%	22%	38%	52%
Medicare/Medicaid	29%	30%	28%	33%	38%	33%	38%	38%	34%

Note. GED = General Educational Development; HMO = health maintenance organization; REACH = Racial and Ethnic Approaches to Community Health. Stage 1 women had no previous mammogram; stage 2 women had a previous mammogram but not in the past year, and stage 3 women had a mammogram in the past year.

At baseline, 14% (n=211) of the women were in stage 1, 16% (n=247) were in stage 2, and 70% (n=1055) were in stage 3. After the 2-year intervention, 4% (n=61) were in stage 1, 20% (n=306) were in stage 2, and 76% (n=1146) were in stage 3. Participants' movement between stages is presented in Table 2. Stage 1 women experienced the most change, with 71% moving out of this stage: 23% of these women (n=48) moved to stage 2, and 48% (n=102) moved to stage 3. Stage 2 women became more compliant with screening, with 59% (n=146) moving to stage 3. Stage 3 women experienced some change as well, with 15% (n=157) becoming less compliant and moving to stage 2.

The reasons reported for change or no change from one stage to another were documented in the surveys. Stage 1 women were more likely to indicate fear of finding cancer as the reason for not getting a mammogram (11% at baseline; 22% at follow-up).

Women at stages 2 and 3 were more likely to report trying to stay healthy and save their lives as reasons for either having had a mammogram or continuing to have mammograms (stage 2: 21% at baseline, 28% at follow-up; stage 3: 28% at baseline, 37% at follow-up). Women at stages 1 and 2 were more likely to report needing information from their physicians before getting a mammogram.

Stage 3 women reported more confidence in making independent decisions about their health, whereas stage 1 and 2 women were more likely to depend on the advice of their physicians and others about mammograms. Stage 2 and stage 3 women reported that REACH was important in their decisions to get a mammogram (stage 2: 11% at baseline, 29% at follow-up; stage 3: 18% at baseline, 31% at follow-up). Notably 15% of the women in stage 3 had moved back to stage 2 at follow-up. According to data collected from tracking cards, this movement can be attributed to

factors such as participants changing doctors or rescheduling appointments because of difficulties with transportation, child care, finances, and work-related issues.

Analyses comparing completers (n=1513) and noncompleters (n=820) found that there were no significant differences in educational attainment ( $P=.21$ ), insurance status ( $P=.09$ ), or perceived health status ( $P=.08$ ; results not shown). Some differences were noted in employment and marital status, with non-completers more likely than completers to be employed (62.8% vs 49.3%;  $P<.001$ ) and less likely to be married (40.1% vs 49.9%;  $P<.001$ ).

## DISCUSSION

The multilevel Alabama REACH 2010 demonstration project included an individual-level, CHA-led intervention designed to encourage and support mammography screening among African American women by using tailored, stage-matched messages based on the Stages of Change Model. The CHAs played a pivotal role in assessing each participant's status with regard to screening, and the CHAs administered a stage-specific baseline survey with targeted questions. The CHAs then worked with each participant to encourage her to adopt or maintain mammography screening, in accordance with the participant's readiness for screening. Therefore, changes in self-reported screening status from baseline to follow-up may be attributed in large part to the frequent interactions between CHAs and

**TABLE 2—Matrix of African American Women's Movement Between Mammogram Screening Stages: REACH 2010, Alabama, January 2001–November 2005**

	Baseline Participants in Stage 1 at Follow-up	Baseline Participants in Stage 2 at Follow-up	Baseline Participants in Stage 3 at Follow-up
Baseline stage 1: 211 (14%)	61	48	102
Baseline stage 2: 247 (16%)	0	101	146
Baseline stage 3: 1055 (70%)	0	157	898
	Total: 61 (4%)	Total: 306 (20%)	Total: 1146 (76%)

Note. REACH = Racial and Ethnic Approaches to Community Health. Stage 1 women had no previous mammogram, stage 2 women had a previous mammogram but not in the past year, and stage 3 women had a mammogram in the past year.

survey participants, during which stage-specific supportive messages were provided. Our results show forward progression in stages, suggesting that the CHA-based model, which uses trusted sources of community support and information, can be an effective intervention strategy.<sup>27</sup> Furthermore, our statistical analyses show that the proportion of women who made a positive change in stage (among those who could improve) was not attributable to chance.

Despite positive stage movement by a majority of participants, 15% of women in stage 3 relapsed back to stage 2 at follow-up. This movement may have been caused by a number of factors. First, the follow-up survey protocol only asked participants to report whether they had been screened during a certain time frame; it did not take into consideration extraneous factors that may have prohibited the participants from being screened. Data collected from tracking cards indicated that some participants had intended to keep their mammogram appointments but did not get screened at the specified time because they had changed doctors or had rescheduled appointments. Second, it is also possible that some stage 3 women did not intend to be screened and thus actually relapsed. According to the Stages of Change Theory, relapses are common occurrences caused by various triggers. Therefore, despite a woman's past participation in regular screenings, it is still vital for CHAs to constantly evaluate triggers for relapse, reassess motivation and barriers, and plan stronger coping strategies.<sup>16,24</sup>

Given the nature, sample size, research protocol, and design of this demonstration project, our findings should be interpreted with several limitations in mind. First, multivariable modeling was not planned a priori to test the theoretical pathway associated with participation in screening; therefore, the use of complex modeling strategies is outside the scope of this paper. Second, the pre-post study design allows for the possibility that a factor other than the CHA-led intervention may have affected the reported screening rates. However, to our knowledge no cancer awareness activities other than the REACH 2010 project and its partnerships were carried out in any of the 8 counties during the intervention period.

Third, use of self-reported data is problematic because participants may recall having had tests more recently than they actually did and may overreport health behaviors. Fourth, there may have been variability in the extent to which the CHAs implemented the intervention protocol. The study relied on reports and documentation from the CHAs regarding their activities; we can only infer that their reports are accurate accounts.

The outcomes of the Alabama REACH 2010 demonstration project have several implications for public health efforts to eliminate health disparities. First, the project demonstrated the value of a nonrandomized, controlled trial design in a community setting. In this case, the compromise in internal validity was heavily outweighed by gains in external validity. Second, we learned much about the importance of being willing to change a protocol to increase feasibility and fidelity. Third, we learned that building community capacity and partnering with community members can enable the creation of a relevant and effective intervention to promote mammography screening.

In conclusion, by enlisting the expertise of trained CHAs we were able to understand the barriers associated with participation in mammography screening from the target population's perspective, and we devised viable action plans to overcome those barriers, which resulted in increased rates of mammography utilization. ■

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#### Contributors

M.N. Fouad conceptualized the study, supervised all aspects of implementation, and led the writing. E. Partridge, M. Dignan, C. Nagy, and I. Scarinci contributed to design, implementation, and evaluation of the study. T. Wynn led study implementation. S. Person completed the analyses. R. Johnson oversaw CHA training and intervention. C. Holt interpreted project findings. All authors participated in the writing and reviewed drafts of the article.

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#### Human Participant Protection

This study protocol was approved by the institutional review board of the University of Alabama at Birmingham.

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