

# Translation to Practice of an Intervention to Promote Colorectal Cancer Screening Among African Americans

Selina Smith, Ph.D., M.Div.<sup>1</sup>, Larry Johnson, M.P.H.<sup>2</sup>, Diane Wesley, M.P.H.<sup>2</sup>, Kim B. Turner, D.D.S.<sup>2</sup>, Gail McCray, M.A.<sup>1</sup>, Joyce Sheats, R.N.<sup>1</sup>, and Daniel Blumenthal, M.D., M.P.H.<sup>1</sup>

## Abstract

In a previous report, we demonstrated the efficacy of an intervention to promote colorectal cancer screening among African Americans in a controlled community intervention trial. Participants in the intervention, named EPICS (Educational Program to Increase Colorectal Cancer Screening), were twice as likely to be screened after six months as those in the control group. In the current project, we put the intervention into practice through an academic-health department partnership, and the intervention performed as well as it had in the controlled trial. This success may be due to the community-based participatory methods used in designing and testing the intervention. *Clin Trans Sci* 2012; Volume 5: 412–415

**Keywords:** colon cancer, community-based participatory research, screening, translational research

## Introduction

Concern that research findings are not translated quickly into practice led to the development of the Clinical and Translational Science Award (CTSA) program. Currently, NIH funds 60 academic health centers across the US to “reduce the time it takes for laboratory discoveries to become treatments for patients, engage communities in clinical research efforts, and train the next generation of clinical researchers.”<sup>1</sup> The widespread failure to implement evidence-based clinical practices is demonstrated by the fact that, for instance, only about 60% of heart attack victims receive beta-blockers,<sup>2</sup> only about 48% of individuals with elevated low-density lipoprotein cholesterol are treated for this condition,<sup>3</sup> and only about 65% of persons over age 65 have had an influenza immunization in the past year or a pneumonia immunization ever.<sup>4</sup>

Among the evidence-based clinical practices that have been inadequately implemented is colorectal cancer (CRC) screening. The original research underlying CRC screening tests was conducted long ago: Van Deen discovered in 1864 that guaiac could detect blood in stool samples;<sup>5</sup> fiberoptic colonoscopy was developed in the mid-1970s.<sup>6</sup> It has been estimated that attainment of goals for population colorectal cancer screening could save 18,800 lives per year.<sup>7</sup> However, only about 60% of persons over 50 years of age have been screened.<sup>8</sup>

CRC screening can be increased by educating, reminding, or motivating providers of care, consumers of care, or both. As discussed in the Guide to Community Preventive Services, provider-oriented interventions such as reminders have been shown to be efficacious,<sup>9</sup> but evidence for the efficacy of many interventions targeting consumers is lacking.<sup>10</sup> This is not to say that consumer-oriented interventions, such as education, have been shown to be inefficacious; it is only to say that evidence reviews have been inconclusive or have not found research on the topic.<sup>11</sup> The body of evidence has increased in recent years; small media, one-on-one education, client reminders, and reducing structural barriers have now all been classified as “recommended.”

An additional important consideration is the fact that intervention efficacy—a positive outcome in the ideal or research setting—often does not equal effectiveness, or a positive outcome

in practice.<sup>12</sup> Research projects are typically well-funded and well-staffed, so that the intervention to be tested can be conducted with rigor and follow-up can be thorough. By contrast, in the practice setting, without a research staff to insure quality control and follow-up, fidelity to the intervention protocol may be compromised and effectiveness may be reduced.

Strong evidence indicates that screening for CRC reduces the incidence of and mortality from the disease.<sup>13</sup> Failure to carry out recommended screening tests is one of several factors leading to health disparities. African Americans in particular suffer from these disparities, and this is certainly true in the case of colorectal cancer; African American men and women have both higher CRC incidence rates and CRC mortality rates than any other racial or ethnic group (*Table 1*). This is despite the fact that, according to the Behavioral Risk Factor Surveillance System maintained by the Centers for Disease Control, Blacks over age 49 are only slightly less likely than Whites to have had a colonoscopy (66.8% vs. 62.9% in 2010), and are slightly more likely to have had a fecal occult blood test within the past two years (19.8% vs. 17.2%).

We report here on the effectiveness in practice of an efficacious health promotion intervention to promote colorectal cancer screening among African Americans.

## Efficacy Trial

We reported previously on the efficacy of EPICS (Educational Program to Increase Colorectal Cancer Screening).<sup>14</sup> Briefly, in a community intervention trial using a community-based participatory research (CBPR) approach, we tested three types of intervention against a control group: reduced out-of-pocket expense, one-on-one education, and group education. These are three approaches that were listed as “inadequate evidence” in the Guide to Community Preventive Services at the time of the study (one-on-one education has since been listed as “recommended”).<sup>8</sup> All 645 research participants in our study were African American. Of these, 369 completed the intervention and we were able to follow up with 259 six months later. Of the three interventions, only group education was shown to be efficacious; at 6-month follow-up, 33.9% of intervention participants had been screened, as compared to 17.7% of control group participants ( $p = 0.039$ ).

<sup>1</sup>Morehouse School of Medicine, Community Health & Preventive Medicine, Georgia, USA; <sup>2</sup>Fulton County, Health and Wellness, Georgia, USA.  
Correspondence: Daniel Blumenthal (dblumenthal@msm.edu)

DOI: 10.1111/j.1752-8062.2012.00439.x

Race/Ethnicity	Incidence Rate*		Mortality Rate*	
	Male	Female	Male	Female
Black	62.0	47.1	29.1	19.7
White	51.5	38.5	19.5	13.7
Hispanic	44.8	32.6	14.6	10.1
Asian/PI	39.7	31.1	13.4	9.7
AI/AN	33.5	28.8	12.5	10.5

\*Rate per 100,000 persons age-adjusted to 2000 US Population. Data source: U.S. Cancer Statistics Working Group. *United States Cancer Statistics: 1999–2007 Incidence and Mortality Web-based Report*. Atlanta (GA): Department of Health and Human Services, Centers for Disease Control and Prevention, and National Cancer Institute; 2010. Available at [www.cdc.gov/uscs](http://www.cdc.gov/uscs). Accessed July 14, 2011.

**Table 1.** Colorectal cancer incidence and mortality rates by race/ethnicity and sex.

EPICS was developed using community-based participatory research principles.<sup>15</sup> We partnered with and received input from the Metropolitan Atlanta Coalition for Cancer Awareness (MACCA), a community coalition of advocates and agency staff, and the Community Coalition Board of the Morehouse Prevention Research Center (similar to a community advisory board). The former group participated in developing the interventions and the protocol and participated in carrying out the project. The latter group approved the protocol and assisted in recruiting participants as well as interpreting and disseminating results.

The intervention consisted of four 1-hour educational sessions delivered by a health educator to a group of 8–12 African American men and women over 49 years of age. There were two additional sessions: an initial meeting for consenting, randomization, and baseline knowledge/attitude/belief testing and a final meeting for posttest administration. The sessions were guided by an implementation manual and included slide presentations, written materials, and extensive discussion. The project was funded by a 1.4 million dollar (including indirect cost) 5-year federal cooperative agreement and employed a full-time staff of four in addition to the part-time leadership of the faculty principal and co-principal investigators and biostatistician and the federal project officer.

## Methods

Following the completion of the intervention trial, we collaborated with our county health department and a local job-training center to put the EPICS intervention into practice. We had partnered with both of these entities for many years on a variety of projects. It was, in fact, the health department Director who, upon learning of the outcome of the original intervention trial, suggested implementing the intervention through the health department. Four community health workers (CHWs) employed by the job-training center (but supervised by a Morehouse faculty member) and two of the county's health educators worked as a team to offer the intervention at the county government's 15 senior recreational centers ("senior centers"). The centers are open to all of the county's seniors, but approximately two-thirds of the client population is African American and approximately two-thirds is poor. The centers offer daily programming that includes recreational, avocational, and educational opportunities. Lunch is offered daily.

Neither the CHWs nor the health department staff had participated in the community intervention trial, but they were trained to deliver the intervention by the research team. The health educator felt that delivering the intervention in four

sessions would be excessive and would lead many participants to drop out, so the intervention was shortened to three sessions with care taken to retain the core intervention elements. We identified five core elements:

1. **Theoretical Framework:** Social support theories, such as Social Ecological Theory<sup>16</sup> and Social Cognitive Theory,<sup>17</sup> constitute the theoretical framework for EPICS. These theories suggest that the informational and emotional support received by participants in a support network may buffer barriers related to cancer screening.
2. **Educational Content:** The core educational elements of EPICS include CRC description, guidelines for CRC screening tests, types of tests, CRC Risk Factors, and dietary and physical activity information.
3. **EPICS Sessions:** Multiple sessions (at least three) with 5–20 participants are essential, since this allows social relationships to form among participants in a manner consistent with the theoretical framework. An alternative, such as a single long session, would not retain this core element.
4. **Trained Facilitators:** The intervention can be delivered by community health educators—individuals with a college degree, and often a master's degree, in a related area—or community health workers, indigenous paraprofessionals who are often trained on the job. In either case, training is essential in order to maintain fidelity to the intervention protocol. We used both, generally working as a team.
5. **Community Settings:** Delivering the intervention at a site that offers comfort to the participants, such as churches, clinics, or community centers that are normally attended by the participants, facilitates the development of social networks.

Training of research staff during the efficacy trial focused on implementation of the research protocol. In translating the intervention to practice, we adapted the training to reflect the needs of nonresearch staff in a "real world" setting. With the input of the community health workers and the health department health educators, we developed a 1 day skill-based, highly participatory training workshop with didactic sessions and role playing. This training introduced basic vocabulary, concepts, and methods of community-based cancer control and instructional strategies for African Americans of varying health literacy. The final training protocol included three modules addressing knowledge of principles (e.g., conceptual framework, intervention overview and local/statewide demonstration projects); knowledge of procedure (e.g., how to implement the three EPICS sessions), and practical knowledge (e.g., how to market the program and complete the EPICS quality assurance measures).

In reducing the number of sessions from four to three, we limited focus on nutrition and physical activity. However, the session focusing on these modifiable risk factors had elicited the greatest participation during the efficacy trial. Hence, our rationale for maintaining this focus was in part to promote participant engagement, which also helped to ensure acceptability of CRC screening as an important component of cancer control.

We identified a theoretical framework emphasizing social support as an essential element because social support theories suggest integration within a support network and the informational and emotional support received may buffer barriers related to colorectal cancer screening.<sup>18</sup> In both the efficacy trial and the practice demonstration, some social networks already existed

in the settings where the intervention was conducted (churches and community centers in the efficacy trial; senior centers in the practice demonstration). This may have facilitated our ability to reduce the number of intervention sessions.

The intervention team utilized the approach normally employed by the county's health department staff when delivering an educational program in the community. Hence, participants were not asked to complete questionnaires that would have provided demographic and socioeconomic information, nor were they consented.

Members of the original research team assured fidelity in the delivery of the intervention by observing randomly selected sessions. A total of 15 (30%) of the 45 (three per senior citizen center) intervention sessions were observed. The purpose of this observation was both to assess adherence to the intervention curriculum and to determine the confidence of health educators and community health workers in delivering the intervention. Fidelity to core intervention elements was maintained throughout the course of the local practice demonstration by checking the approach and reporting any adaptation option(s) employed during the observations.

Approximately 3 months after the completion of the three intervention sessions at each senior center, the CHWs attempted to contact, by phone or in person at the center, those participants who had indicated that they had never been screened for CRC or were not up-to-date. The CHWs inquired whether the participants had been screened or, if not, whether they intended to be screened. They did not collect information on the type of screening test used.

## Results

As shown in *Table 2*, 554 individuals participated in the intervention sessions at the 15 centers, but 243 of these indicated that they were up-to-date on CRC screening. Of the 311 who needed screening at the time of the intervention, the CHWs were able to contact 260 (83.6%). One hundred sixteen participants (37.3% of the 311, using the conservative intention-to-treat principle) stated that they had been screened since receiving the intervention. An additional 105 (33.8% of the 311) participants stated that they had an appointment to be screened or intended to make an appointment.

Considering only the 260 individuals that the CHWs were able to contact, the 116 who were screened represent a 44.6% screening rate and those who had or intended to make an appointment represent 40.4%

Although no demographic information on the participants was available, they reflected the demography of the persons who attend the county's senior centers, the vast majority of whom are African American and of moderate to low income.

## Discussion

The success rate of EPICS in the original research project—33.9% of participants screened at follow-up—is similar to the success rate in research involving CRC screening interventions in other ethnic groups.<sup>19-21</sup> While one would hope for a greater degree of success from an intervention, few behavior-modification interventions perform better.

We anticipated that EPICS would not perform as well in practice as it had in the research setting of the intervention trial. The intervention had been longer in the trial: four sessions instead of three, not counting the additional two sessions in the research project that had been devoted to explaining the research, obtaining

Status	Percent of those needing screening	Number
Persons receiving intervention		554
Current on screening		243
Need screening		311
Received screening after session	37.3%	116
Have appointments/intend to make appointments	33.8%	105
Refused/feel no need for screening	12.5%	39
Could not reach (no reliable phone number/not present at facility)	16.4%	51
Total	100.0%	554

**Table 2.** Outcome of colorectal cancer screening intervention, Fulton County Senior Recreational & Residential Facilities.

informed consent, conducting tests of knowledge, attitudes and beliefs, and other research-related activities. These activities, while not intended to lead to behavior change, might have added to the effect of the intervention.

Moreover, participants in the research project were volunteers who participated only after at least a brief explanation of what was to come. On the other hand, many of the individuals in the senior centers came to the centers on a daily basis and participated in whatever activities the centers had to offer; they took part in EPICS simply because it was on the day's agenda. While this was a strength of the project—it was clearly “real-world” rather than an artificial research setting—the participants were likely less interested initially in colorectal cancer screening than were those in the research study and therefore might be expected to be less likely to seek screening postintervention.

Despite these barriers, EPICS performed at least as well when implemented in practice as it had in the research setting. There are several factors that might have contributed to this success, and these are the “lessons learned” from this project. They include the fact that first, in reducing the number of sessions from four to three, we took care to retain the intervention's core elements. Second, the intervention had been designed with significant input from persons similar (in age, race, education, and socioeconomic status) to the participants both in the research project and in the practice demonstration. Hence, it was a “culturally competent” intervention designed using community-based participatory research principles. Third, the intervention team of the health department's health educators and the CHWs strove to conduct the intervention with fidelity to its original design.

The cost of the intervention, once the staff was trained, was primarily the cost of the salaries involved, plus a small amount for supplies, transportation, and incidentals. This came to about \$40/hour, or \$120 to deliver all three sessions. Since the intervention was delivered at 15 centers (45 sessions) to 554 individuals, the cost per person reached was approximately  $\$40 \times 45/554$ , or \$3.25 per person reached. If one were to consider only the 311 persons who were due for screening, the cost was about \$5.80 per person. And if only the 116 persons who were screened postintervention were considered, the cost was about \$15.50 per person screened.

The evaluation of this project relied on self-reports of CRC screening. The results of studies of the validity of such self-reports have varied but in general have shown self-reports to

be reasonably valid. For instance, Vernon et al.<sup>22</sup> found that concordance between medical record and self-reported CRC screening was 85% for fecal occult blood testing (FOBT), 91% for colonoscopy, 85% for sigmoidoscopy, and 92% for barium enema. Baier et al.,<sup>23</sup> studying a Kaiser-Permanente population, found that the sensitivity of self-reported screening was 96.2% for the FOBT and 96.2% for endoscopy; the specificity of self-reported screening was 85.9% for the FOBT and 92.0% for endoscopy. Schenk et al. found that it was difficult to validate self-reports, noting that reporting of FOBT use in the prior year in medical records and Medicare claims agreed only 82% of the time.<sup>24</sup> They concluded that validation was more accurate in a closed population, such as Kaiser-Permanente, than among patients who may have visited several physicians, leading to the possibility that reviewers would check the “wrong” medical record.

In conducting this research-to-practice demonstration, we were able to achieve one of the overriding goals of the CTSA program: the rapid translation of discovery into practice. This was achieved at the far end of the bench-to bedside-to-community translational research spectrum—sometimes designated “T4”—demonstrating the value of community engagement to the CTSA program.

### Limitations

Since we collected no demographic information on the participants, we are not able to say if participants reflected the demography of persons attending the senior centers. For instance, participants might have had a higher mean income than senior center attendees overall. However, our intention was not to reach a particular socioeconomic group. Also, we do not have data on how attendance at EPICS sessions compared with other activities the senior centers offered. We can say that nearly all persons present in the centers when the sessions were offered did attend, since there were generally no other activities competing for the same time slot.

### Conclusion

This project demonstrates the feasibility of accelerating the bench-to bedside-to-community translation of discovery into practice. The discoveries in this case were the methods of screening for colorectal cancer: primarily the tests for fecal occult blood (guaiac and immunochemical) and fiberoptic colonoscopy. As pointed out earlier, one of these discoveries was made nearly 150 years ago and the other nearly 40 years ago. Although both tests have been shown to be capable of reducing CRC mortality, only about 60% of individuals for whom screening is indicated have ever been screened. EPICS is a relatively simple, theory-based educational intervention that has been shown to be efficacious in a controlled community trial and has now been shown to be effective in local health department practice. It has been included in RTIPs (Research-Tested Intervention Programs),<sup>25</sup> the National Cancer Institute’s web-based searchable database of cancer control interventions and program materials intended for program planners and health educators. Over the next 5 years, it will be further disseminated both in the metro Atlanta area and nationally with funding support from the National Cancer Institute.

### Acknowledgments

This project was supported in part by PHS grant UL1 RR025008 from the Clinical and Translational Science Award program, National Institutes of Health, National Center for Research Resources;

5U48DP001907, Prevention Research Centers, from the Centers for Disease Control and Prevention; 1U01CA114625, National Black Leadership Initiative on Cancer III: Community Networks Program and U54CA 118638, Comprehensive Partnerships for Reducing Cancer Disparities, from the National Cancer Institute.

### References

1. Available at: [http://www.nccr.nih.gov/about\\_us/program\\_overview/](http://www.nccr.nih.gov/about_us/program_overview/). Accessed April 1, 2012.
2. Bradley EH, Herrin J, Mattern JA, Holmboe ES, Wang Y, Frederick P, Roumanis SA, Radford MJ, Krumholz HM. Quality improvement efforts and hospital performance: rates of beta-blocker prescription after acute myocardial infarction. *Med Care*. 2005; 43: 282–292.
3. Vital signs: prevalence, treatment, and control of high levels of low-density lipoprotein cholesterol — United States, 1999–2002 and 2005–2008. *MMWR Morb Mortal Wkly Rep*. 2011; 60(4): 109–114.
4. Centers for Disease Control and Prevention Behavioral Risk Factor Surveillance System 2010. Available at: <http://apps.nccd.cdc.gov/brfss/page.asp?yr=2010&state=All&cat=IM&num;IM>. Accessed March 4, 2012.
5. Moeller DD. The odyssey of guaiac. *Am J Gastroenterol*. 1984; 79: 236–237.
6. Marks G. Flexible Fiberoptic Colonoscopy: a Guide for Its Use in the Management of Diseases of the Colon. *JAMA*. 1974; 228: 1411–1413.
7. Maciosek MV, Solberg LI, Coffield AB, Edwards NM, Goodman MJ. Colorectal cancer screening: health impact and cost effectiveness. *Am J Prev Med* 2006; 31: 80–89.
8. Centers for Disease Control and Prevention Behavioral Risk Factor Surveillance System 2008. Available at: <http://apps.nccd.cdc.gov/BRFSS/display.asp?cat=CC&yr=2008&qkey=4425&state=US>. Accessed February 9, 2011.
9. The Guide to Community Preventive Services: Cancer Prevention & Control: Provider-Oriented Screening Interventions. Available at: <http://www.thecommunityguide.org/cancer/screening/provider-oriented/index.html>. Accessed March 4, 2012.
10. The Guide to Community Preventive Services: Cancer Prevention & Control: Client-Oriented Screening Interventions. Available at: <http://www.thecommunityguide.org/cancer/screening/client-oriented/index.html>. Accessed March 4, 2012.
11. The Guide to Community Preventive services: systematic review methods. Available at: <http://www.thecommunityguide.org/about/methods.html>. Accessed March 4, 2012.
12. Sung NS, Crowley WF Jr, Genel M, et al. Central challenges facing the national clinical research enterprise. *JAMA*. 2003; 289: 1278–1287.
13. US Preventive Services Task Force. *Screening for Colorectal Cancer*. Rockville, MD: Agency for Healthcare Research and Quality; 2008. Available at: <http://www.uspreventiveservicestaskforce.org/uspstf/uspcolohm.htm>. Accessed Feb 15, 2012.
14. Blumenthal DS, Smith SA, Majett DC, Alema-Mensah, E. A trial of 3 interventions to promote colorectal cancer screening in African Americans. *Cancer*. 2010; 116: 922–929.
15. Israel BA, Schulz AJ, Parker EA, Becker AB. Review of community-based research: assessing partnership approaches to improve public health. *Annu Rev Public Health*. 1998; 19: 173–202.
16. Breslow L. Social ecological strategies for promoting health lifestyles. *Am J Health Promotion*. 1996; 10: 253–257.
17. Bandura, L. *Social Foundations of Thought and Action: A Social Cognitive Theory*. Englewood Cliffs, NJ, US: Prentice-Hall, Inc., 1986.
18. Gregory TA, Wilson C, Duncan A, Turnbull D, Cole SR, Young G. Demographic, social cognitive and social ecological predictors of intention and participation in screening for colorectal cancer. *BMC Public Health*. 2011; 11: 38. Available at: <http://www.biomedcentral.com/1471-2458/11/38>
19. Lasser KE, Murillo J, Lisboa S, Casimir AN, Valley-Shah L, Emmons KM, Fletcher RH, Ayanian JZ. Colorectal cancer screening among ethnically diverse, low-income patients: a randomized controlled trial. *Arch Intern Med*. 2011; 171: 906–912.
20. Coronado GD, Golovaty I, Longton G, Levy L, Jimenez R. Effectiveness of a clinic-based colorectal cancer screening promotion program for underserved Hispanics. *Cancer*. 2011; 117: 1745–1754.
21. Maxwell AE, Bastani R, Danao LL, Antonio C, Garcia GM, Crespi CM. Results of a community-based randomized trial to increase colorectal cancer screening among Filipino Americans. *Am J Public Health*. 2010; 100: 228–234.
22. Vernon SW, Abotchie PN, McQueen A, White A, Eberth JM, Coan SP. Is the accuracy of self-reported colorectal cancer screening associated with social desirability? *Cancer Epidemiol Biomarkers Prev*. 2012; 21(1): 61–65.
23. Baier M, Calonge N, Cutter G, McClatchey M, Schoentgen S, Hines S, Marcus A, Ahnen D. Validity of self-reported colorectal cancer screening behavior. *Cancer Epidemiol Biomarkers Prev* 2000; 9: 229–232.
24. Schenck AP, Klabunde CN, Warren JL, Peacock S, Davis WW, Hawley ST, Pignone M, Ransohoff DF. Evaluation of claims, medical records, and self-report for measuring fecal occult blood testing among medicare enrollees in fee for service. *Cancer Epidemiol Biomarkers Prev*. 2008; 17(4): 799–804.
25. National Cancer Institute Research-Tested Intervention Programs (RTIPs). Colorectal Cancer Screening Intervention Project (CCSIP). Available at: <http://rtips.cancer.gov/rtips/programDetails.do?programId=1124686>. Accessed July 7, 2012. <http://rtips.cancer.gov/rtips/index.do>.