Final Progress Report for Research Projects Funded by Health Research Grants

Instructions: Please complete all of the items as instructed. Do not delete instructions. Do not leave any items blank; responses must be provided for all items. If your response to an item is "None", please specify "None" as your response. "Not applicable" is not an acceptable response for any of the items. There is no limit to the length of your response to any question. Responses should be single-spaced, no smaller than 12-point type. The report **must be completed using MS Word**. Submitted reports must be Word documents; they should not be converted to pdf format. Questions? Contact Health Research Program staff at 717-783-2548.

1. **Grantee Institution:** Temple University of the Commonwealth System of Higher Education

2. **Reporting Period (start and end date of grant award period):** 01/01/2009 – 12/31/2012

3. **Grant Contact Person (First Name, M.I., Last Name, Degrees):** Germaine A Calicat, MLA

4. **Grant Contact Person's Telephone Number:** 215.204.7655

5. **Grant SAP Number:** 4100047651

6. **Project Number and Title of Research Project:** 24 - Defining a Typology of Low-Literacy African Americans for Colorectal Cancer Screening

7. **Start and End Date of Research Project:** 11/18/2009 – 6/30/2010

8. **Name of Principal Investigator for the Research Project:** Thomas F. Gordon, Ph.D.

9. **Research Project Expenses**.

   9(A) Please provide the total amount of health research grant funds spent on this project for the entire duration of the grant, including indirect costs and any interest earned that was spent:

   $ 48, 402.58

   9(B) Provide the last names (include first initial if multiple individuals with the same last name are listed) of **all** persons who worked on this research project and were supported with health research funds. Include position titles (Principal Investigator, Graduate Assistant, Post-doctoral Fellow, etc.), percent of effort on project and total health research funds expended for the position. For multiple year projects, if percent of effort varied from year to year, report in the % of Effort column the effort by year 1, 2, 3, etc. of the project (x% Yr 1; z% Yr 2-3).

Last Name	Position Title	% of Effort on Project	Cost
Gordon	Professor	15% yr-1	15,004.48
Rovito	RA	100%	14, 848.00
Wolak	RA	75%	11,136.00

9(C) Provide the names of **all** persons who worked on this research project, but who *were not* supported with health research funds. Include position titles (Research Assistant, Administrative Assistant, etc.) and percent of effort on project. For multiple year projects, if percent of effort varied from year to year, report in the % of Effort column the effort by year 1, 2, 3, etc. of the project (x% Yr 1; z% Yr 2-3).

Last Name	Position Title	% of Effort on Project
None		

9(D) Provide a list of **all** scientific equipment purchased as part of this research grant, a short description of the value (benefit) derived by the institution from this equipment, and the cost of the equipment.

Type of Scientific Equipment	Value Derived	Cost
None		

10. Co-funding of Research Project during Health Research Grant Award Period. Did this research project receive funding from any other source during the project period when it was supported by the health research grant?

Yes_____ No_____X_____

If yes, please indicate the source and amount of other funds:

11. Leveraging of Additional Funds

11(A) As a result of the health research funds provided for this research project, were you able to apply for and/or obtain funding from other sources to continue or expand the research?

Yes_____ No___X_____

If yes, please list the applications submitted (column A), the funding agency (National Institutes of Health—NIH, or other source in column B), the month and year when the application was submitted (column C), and the amount of funds requested (column D). If you have received a notice that the grant will be funded, please indicate the amount of funds to be awarded (column E). If the grant was not funded, insert "not funded" in column E.

Do not include funding from your own institution or from CURE (tobacco settlement funds). Do not include grants submitted prior to the start date of the grant as shown in Question 2. If you list grants submitted within 1-6 months of the start date of this grant, add a statement below the table indicating how the data/results from this project were used to secure that grant.

A. Title of research project on grant application	B. Funding agency (check those that apply)	C. Month and Year Submitted	D. Amount of funds requested:	E. Amount of funds to be awarded:
None	☐NIH ☐ Other federal (specify:_____) ☐ Nonfederal source (specify:_)		$	$

11(B) Are you planning to apply for additional funding in the future to continue or expand the research?

Yes_____ No____X_____

If yes, please describe your plans:

12. Future of Research Project. What are the future plans for this research project?

I (Thomas F. Gordon) have formally retired from Temple University -- Dr. Bass in the Department of Public Health may pursue the related research.

13. New Investigator Training and Development. Did students participate in project supported internships or graduate or post-graduate training for at least one semester or one summer?

Yes____X_____ No_____

If yes, how many students? Please specify in the tables below:

	Undergraduate	Masters	Pre-doc	Post-doc
Male			1	
Female			1	
Unknown				
Total			**2**	

	Undergraduate	Masters	Pre-doc	Post-doc
Hispanic				
Non-Hispanic			1	
Unknown			1	
Total			**2**	

	Undergraduate	Masters	Pre-doc	Post-doc
White			1	
Black			1	
Asian				
Other				
Unknown				
Total			**2**	

14. Recruitment of Out-of–State Researchers. Did you bring researchers into Pennsylvania to carry out this research project?

Yes_____ No____X_____

If yes, please list the name and degree of each researcher and his/her previous affiliation:

15. Impact on Research Capacity and Quality. Did the health research project enhance the quality and/or capacity of research at your institution?

Yes___X_____ No_____

If yes, describe how improvements in infrastructure, the addition of new investigators, and other resources have led to more and better research.

This grant allowed us to do refined analyses that produced a primary publication.

16. Collaboration, business and community involvement.

16(A) Did the health research funds lead to collaboration with research partners outside of your institution (e.g., entire university, entire hospital system)?

Yes_____ No____X_____

If yes, please describe the collaborations:

16(B) Did the research project result in commercial development of any research products?

Yes_____ No____X_____

If yes, please describe commercial development activities that resulted from the research project:

16(C) Did the research lead to new involvement with the community?

Yes_____ No___X_____

If yes, please describe involvement with community groups that resulted from the research project:

17. Progress in Achieving Research Goals, Objectives and Aims.

List the project goals, objectives and specific aims (as contained in the grant agreement). Summarize the progress made in achieving these goals, objectives and aims for the period that the project was funded (i.e., from project start date through end date). Indicate whether or not each goal/objective/aim was achieved; if something was not achieved, note the reasons why. Describe the methods used. If changes were made to the research goals/objectives/aims, methods, design or timeline since the original grant application was submitted, please describe the changes. Provide detailed results of the project. Include evidence of the data that was generated and analyzed, and provide tables, graphs, and figures of the data. List published abstracts, poster presentations and scientific meeting presentations at the end of the summary of progress; peer-reviewed publications should be listed under item 20.

This response should be a DETAILED report of the methods and findings. It is not sufficient to state that the work was completed. Insufficient information may result in an unfavorable performance review, which may jeopardize future funding. If research findings are pending publication you must still include enough detail for the expert peer reviewers to evaluate the progress during the course of the project.

Health research grants funded under the Tobacco Settlement Act will be evaluated via a performance review by an expert panel of researchers and clinicians who will assess project work using this Final Progress Report, all project Annual Reports and the project's strategic plan. After the final performance review of each project is complete, approximately 12-16 months after the end of the grant, this Final Progress Report, as well as the Final Performance Review Report containing the comments of the expert review panel, and the grantee's written response to the Final Performance Review Report, will be posted on the CURE Web site.

There is no limit to the length of your response. Responses must be single-spaced below, no smaller than 12-point type. If you cut and paste text from a publication, be sure symbols print properly, e.g., the Greek symbol for alpha (α) and beta (ß) should not print as boxes (□) and include the appropriate citation(s). DO NOT DELETE THESE INSTRUCTIONS.

Introduction & Aims

The primary aim of this study was to apply sophisticated segmentation analyses to a sample of African American patients with low-literacy, to develop a typology of patients based on their orientation toward colorectal cancer (CRC). The sample consisted of 102 African American clinic patients between the ages of 50 and 74 with limited literacy. The subjects were patients from the General Internal Medicine Clinic at the Temple University Hospital, a sub-population known to have high rates of colorectal cancer and low rates of screening. Preventive screening orientation variables included the patients' responses to questions involving personal attitudes and preferences toward preventative screening and general health maintenance. A k-means cluster analysis procedure yielded three clusters of patients based on screening orientation: *1) Ready Screeners; 2) Cautious Screeners; and,* 3*) Fearful Avoiders,* reflecting their distinct attitudes and health maintenance preferences. The resulting typology clearly demonstrates that important subgroups based on preventive health practice perceptions exist within what is sometimes misperceived as a relatively homogeneous socio-demographic population. We propose that the development of a validated typology of patients based on preventive health perceptions could be applicable to a variety of health concerns. Such a typology would serve to standardize how populations are characterized, and would provide a more accurate view of their preventive health-related attitudes, values, concerns, preferences, and behaviors. Used with standardized assessment tools, it could also provide an empirical basis for the development of health messages and improve medical communication. Little research has used psycho-behavioral segmentation strategies to develop health messages designed to influence preventive health practices, particularly cancer screening behavior. The research reported here addresses this gap.

Methods

We recruited 102 African-American patients from a General Internal Medicine (GIM) Clinic in a large urban teaching hospital that only enrolls patients who have some form of health insurance (predominately Medicaid or Medicare or a private plan). In the 12 months prior to the study, GIM clinic records were reviewed in order to characterize the overall patient population. The results showed that patients were 64% female, 78% African American, and most were over the age of 50. The clinic population was widely regarded as comprised of patients with limited literacy. Pilot studies and focus groups were conducted prior to this research and they confirmed the low level of literacy in the clinic population (Bass, Gordon, Ruzek et al., 2011; Wolak, Ruzek, Bass & Gordon, 2009).

Enrollment in this study was limited to patients who were between the ages of 50 and 74, the age group regarded most appropriate for colonoscopy. Patients were selected from daily patient rosters by research assistants during regular clinic hours. Because the clinic population was disproportionately female, we recruited equal numbers of men and women to ensure gender balance for analyses.

Research assistants used scheduling records from the hospital clinic to determine eligibility and obtain a convenience sample of patients to participate in the study over an eight-week period in 2008. Patients were excluded if they were scheduled for a visit related to a serious, life-threatening or terminal condition that would make participation in a study inappropriate. These exclusions were made in consultation with each patient's physician prior to inviting patients on each day's clinic roster to participate in the study. Patients who were at the clinic for routine medical care were approached in the waiting room and asked if they would be

willing to participate. If willing, patients were consented and then evaluated for literacy and asked questions pertaining to CRC, CRC screening and general attitudes about medical care and screening. Interviews took place in a private office before or right after a medical appointment. The protocol took approximately 15 minutes to complete. All materials and procedures were approved by the Institutional Review Board.

Instruments

The research protocol included two instruments: the REALM-R to measure literacy level and a socio-demographic and patient segmentation survey designed to collect preventive health orientation and perceptions of colorectal cancer screening barriers and facilitators (for full survey, see http://chpsw.temple.edu/publichealth/research-centers-and-labs/risk-communication-laboratory-rcl).

REALM-R

Literacy level was established using the 8-item standardized *Rapid Estimate of Adult Literacy in Medicine –Revised* technique (REALM-R) (Davis, Crouch, Long et al., 1993). Patients are asked to pronounce up to 11 words, the first three of which are not scored. If the patient is unable to pronounce three or more words, the patient is classified as at risk of having very low literacy. Validation studies have shown scores at this level reflect patients being unable to read at a sixth grade level (Bass, Wilson, & Griffith, 2003). The test takes less than two minutes to administer and score.

SOCIO-DEMOGRAPHIC AND PATIENT SEGMENTATION SURVEY

Patients were first asked a series of socio-demographic questions, including the highest level of education they had completed and whether or not they had ever had a screening test for CRC. The patient segmentation questions were developed based on our prior work involving: (1) focus groups conducted with low-literacy African American patients (Bass, Gordon, Ruzek et al., 2011); (2) in-depth interviews with 30 third-year medical residents in internal medicine (Ward, Parameswaran, Bass et al., 2010); and (3) an extensive review of the available research literature on CRC screening (Ward, Lin, Meyer et al., 2008). The survey questions covered 1) Personal attitudes and preferences regarding preventive screening and health maintenance (11 questions); 2) Perceived barriers to having a colonoscopy (16 questions), and 3) Perceptions of colonoscopy (8 questions). [See Table 1 for survey questions.] Each question was written at or below a 6th grade reading/comprehension level and pilot tested on clinic patients. When administered, each question was read aloud by the research assistant who asked the patient to respond by pointing to a graphic scale that rated how much they agreed or disagreed with each of the statements in the Patient Segmentation Survey on a scale of 0 -10 (strongly disagree to strongly agree). The graphic scale is used widely in clinical settings to assess pain, particularly in populations with limited literacy (Wong & Baker, 1988; 2001). It consists of “faces” ranging from strongly frowning (0) to strongly smiling (10) at the major scale points. This scale was printed on an 8 ½” x 11” sheet and positioned so the participant could point to the “face” that best represented his/her response. If a participant needed clarification, the research assistant was trained to clarify without leading or potentially biasing the participant’s responses.

Segmentation Analysis

To establish the typology of patients’ CRC screening orientations based on a psycho-social segmentation analysis, a *k-means cluster analysis procedure* was used (SPSS statistical package version 17.0). The variables specified for clustering to identify patients’ screening orientation

were responses to the 11 questions involving personal attitudes and preferences toward preventative screening and general health maintenance (see Table 2). In cluster analysis, for both theoretical and practical reasons, it is important to use variables that will provide a meaningful foundation/explanation for why the groups differ on key outcomes (e.g., use of screening). After the patient typology subgroups were defined and named, descriptive statistics were computed for all other variables collected in the survey. We then conducted an analysis of variance (ANOVA) for the study variables comparing across the three subgroups. Significance tests were computed to assess the degree to which the three patient groups differed on key variables: 1) perceived barriers to colorectal cancer screening (Tables 2 and 3); and, 2) perceptions of colonoscopy (Table 4).

Results

Sample Characteristics

Participants self-identified as 94.9% African American and 5.1% Mixed race; 96% considered themselves to be Non-Hispanic, 3% Hispanic, and 1% were unsure. We stratified by gender to ensure having equal numbers of men (n=51) and women (n= 51), with a mean age of 69 (range: 50 to 74). This subset of clinic patients was similar in age and ethnicity to the total population of patients that utilize the GIM clinic.

Literacy Level

Although 52% of the 102 patients reported having graduated from high school or higher, 90% scored literacy levels on the REALM-R at or below a 6th grade reading level. Of these, 40% were unable to pronounce more than 3 out of 8 scored words on the REALM-R indicating very low literacy levels. Among the 10% (n=10) of patients who were able to pronounce more than six words, and thus classified as "literate", 70% reported graduating from high school, 20% had had some college, and 10% had graduated from college. Seven patients (6.8%) who completed the interview on perceptions of CRC screening declined to complete the REALM–R citing not having their glasses or not being able to see the text, both common indicators of an inability to read.

Patient Clusters Based on Preventive Orientation

The cluster analysis procedure was highly successful in producing segments that differed significantly across all of the clustering variables. Three distinct groupings of patients defined by their preventive orientations were found, characterized as: *1) Ready Screeners; 2) Cautious Screeners; and,* 3*) Fearful Avoiders,* reflecting their distinct attitudes and health maintenance preferences. The size of the clusters varied in the sample, with the *Ready Screeners* accounting for 50.0%, the *Fearful Avoiders* 30.4% and the *Cautious Screeners* 19.6% of the total sample. Figure 1 presents the mean values for the clusters in graphic form to aid comparison across the 11 cluster variables used to create the groupings. Table 2 then presents the mean values for each of the clustering variables across the three groups including the tests of statistical significance (p-values) from the ANOVA procedure.

Ready Screeners (50.0%). This group has a positive orientation toward the medical establishment in general, and toward screening specifically. A majority (65%) self-report that they had had a colonoscopy (an outcome variable not used to create the clusters). In general, *Ready Screeners* are willing to go to the doctor, do not mind having preventive testing such as

colonoscopy, and feel that screening in general is a good way to find medical problems early, making screening "worth the effort". They believe that screening is a good way to stay healthy. This group also feels that if they had cancer they would want to know, and their fear of having cancer is not an impediment to being tested. They would readily be screened if a doctor recommended it, without being pushed by family or friends. At the same time, this cluster group agreed with the statement that if they got cancer it is "God's will", with a mean of 8.61 on the 10 point scale. Overall, the *Ready Screeners* reflect a high degree of self-control, are positive about the benefits of screening, and report fewer barriers to doing colonoscopy compared to the other patient-types.

Fearful Avoiders (30.4%). Almost a third of the sample (30.4%) was composed of *Fearful Avoiders*. This cluster distinctly differs from the first group in that their orientation toward doctors and medical procedures is negative. Only 24.3% of the group self-reported having had a colonoscopy. The *Fearful Avoiders* not only dislike organized medicine, they profess to trust their bodies to tell them if there is a problem, and feel that screening is unnecessary. Their trust in their own bodies appears to mask an overall fear of having medical tests and the potentially negative diagnosis that might result. The majority of *Fearful Avoiders* say they would rather not know if they have cancer. They did acknowledge that screening tests are "worth the effort" and that such tests should be done to stay healthy, especially if a doctor recommends the screening. However, as noted above, few of them have actually acted on that recommendation. Similar to the *Ready Screeners*, *Fearful Avoiders* believe that getting cancer is "God's will", with a mean of 8.39 on the 10 point scale.

Cautious Screeners (19.6%). This group's orientation is somewhat like the *Ready Screeners* but with some key differences. The majority of *Cautious Screeners* would rather know if they had cancer, than not know, and do not mind going to the doctor. They see the benefit in screening tests, feeling these tests are "worth the effort". They also strongly believe that screenings help a person "stay healthy". Over half the cluster group (57.6%) self-reported having had a colonoscopy. This group differs from the *Ready Screeners*, however, in that they would not feel overly influenced by a doctor's recommendation or pressure from family and friends to be screened. They are "cautious" in that they feel they want to make their own decisions regarding health issues. In addition, this cluster is the only group that disagreed with the statement "Getting cancer is God's will." [Mean of 3.15 on the 10 point scale; p‹.0000.]

Perceptions of Barriers to CRC Screening by Patient Cluster

Once participants had been classified as part of one of the three patient-types described above, the clusters were analyzed for similarities and/or differences in: 1) *perceptions of barriers and facilitators to screening;* and, 2) *perceptions of colonoscopy.* The variables related to these two aspects of patients' perceptions are summarized in Tables 3 and 4. These variables were not used to establish the cluster groupings.

Table 3 presents the means and significance tests across the patient-types for perceived barriers to colonoscopy. As shown, a number of variables were not significant barriers, including *cost of screening, having time off to get screened,* and *not having child or adult care. Cost of screening* is not seen as a prohibitive factor to being screened across all three types of patients. It should be noted, however, that *Fearful Avoiders* do rate cost as a concern significantly higher than do the other types of patients (3.2 v. 1.24 and 1.20; p=.018). Similarly, *transportation, taking time off from work, arranging childcare and/or care for older family*

members, are rated low as barriers to getting screened by all cluster types (<2.3 on the 0-10 scale).

There were nine perceived barriers to colonoscopy that did show significant differences between the clusters. The first four were specific to colonoscopy, including it being "too much bother", unfamiliar, embarrassing, and not the best method. In the case of it being "too much bother," *Fearful Avoiders* were significantly more likely to indicate this as a barrier than either *Ready Screeners* or *Cautious Screeners* (mean 4.13 vs. 2.49 and 2.50; p=.032). *Fearful Avoiders* were also significantly more likely to rate colonoscopy as too unfamiliar (mean 4.39 vs. 2.24 and 1.70; p=.010), embarrassing (mean 4.53 vs. 1.78 and 2.15; p=.001), and not the best method of screening (3.55 vs. 1.31 and 2.10; p=.001). Thus, these were not perceived barriers by the *Ready Screeners* and *Cautious Screeners* but were by the *Fearful Avoiders*, who comprised over one-third of the total sample.

The other five perceived barriers to colonoscopy included being "scared to know" if you had cancer, as well as worrying about both pain and complications. Differences were also seen in variables addressing being uncomfortable with the idea of having a probe inserted into the rectum and feeling that colonoscopy was "sexual". Fear of finding they might have cancer is not a barrier to screening for the *Ready Screeners* and the *Cautious Screeners* (means 1.98 and 1.65). However, this concern is significantly higher for the *Fearful Avoiders* (mean of 5.81; p=.000). The mean for *Fearful Avoiders* is also significantly higher for the "worry" variables related to pain (mean 6.35 vs. 2.69 and 3.60; p=000) and complications (mean 4.94 vs. 3.04 and 2.90; p=.018).

Finally, there were also significant differences related to having a probe inserted into the rectum and the idea that colonoscopy was "sexual". Again, *Fearful Avoiders* were most likely to indicate that fear of a rectal probe (mean of 5.48 vs. 2.12 and 2.50; p=.000) and the perception of the probe being "sexual" (mean of 2.70 vs. 0.34 and 0.50; p=.000) were barriers to colonoscopy.

Perceptions of Colonoscopy as a Method for CRC Screening

In this sample of African Americans with limited literacy, there is a high degree of agreement across all patient types that colonoscopy is the superior technique for colorectal cancer screening. All groups rated it highly as a form of screening, indicating it is the *most accurate, most effective at finding growths early and removing them, has to be done least often, is the most recommended by doctors, is covered by insurance, and produces the most peace of mind*. Table 4 presents the means and significance tests across the three patient clusters related to perceptions of colonoscopy as a method for CRC Screening. Comparing results for all 8 variables across the 3 patient clusters, there was a statistically significant difference on only one variable (colonoscopy being the most accurate). *Fearful Avoiders* rated this slightly lower (mean 8.29 vs. 9.41 and 9.05; p=.021). All patient types agreed that *being sedated during a colonoscopy is a plus*, with means of 8.55 to 9.33.

Discussion

The cluster analysis used to establish the typology of patients' orientation toward preventive health in this sample of 102 African Americans with limited literacy produced clear distinctions among patient types based on their attitudes and health maintenance preferences. As well, differences were evident in perceptions of barriers to screening and self-reported screening outcomes. The resulting typology clearly demonstrates that there are important subgroups

related to orientation toward preventive health within what is sometimes misperceived as a relatively homogeneous socio-demographic population. For example, on one extreme we see the *Ready Screeners* who have a positive orientation toward the medical establishment, see screening tests as well worth the effort, and would rather know, than not know, if they have cancer. This is validated by the fact that of the three groups identified, the *Ready Screeners* have the highest percentage of individuals who have already had a colonoscopy (65%). On the other extreme, the *Fearful Avoiders, who have a negative orientation,* score lower on these attributes and are the least likely to have had a colonoscopy (24.3%). Falling between these extremes are the *Cautious Screeners* who are relatively neutral about going to see their doctor and of all the groups, they are least likely to be screened just because their doctor recommends it. Yet, 57.6% self-report having had a colonoscopy.

One of the most striking findings from the typology is the existence and size of the *Fearful Avoider* group. This group differed significantly from the *Ready Screeners* and *Cautious Screeners* in their perceptions of the medical establishment, their hesitancy to be screened, their belief that if they get sick it is "God's will," and if they get cancer, they would "rather not know." Because the *Fearful Avoiders* constituted 30.4% of the sample, they represent a very important target group for preventive screening messages. If public health campaigns and clinical health education methods could be focused on getting this group to be screened, the very low rates of screening might be reversed. In addition, reversing what has become a stereotypical view of African Americans as being disinterested in preventive health practices, CRC screening in particular, could alter physicians' assumptions about how to communicate effectively with the two-thirds of this population that has a more positive orientation toward being screened. Taken together, these changes in understanding could be used to increase screening rates in all groups and could have a dramatic impact on the burden of colorectal cancer in the African American community.

This segmentation analysis also allowed for further elucidation of barriers to CRC screening and colonoscopy. While other studies have looked at CRC screening barriers in overall African American populations, this analysis showed that barriers were different for different clusters of patients and that some barriers that are widely believed to pertain to African Americans as a group were not issues for many in the *Ready* and *Cautious Screener* groups. For example, studies have indicated that lack of trust in the health care system and health providers is a significant barrier for African Americans in pursuing preventive health care, such as CRC screening ((Carcaise-Edinboro & Bradley, 2008; Greiner, Born, Nollen, & Ahluwalia, 2005; James, Campbell, & Hudson, 2002; Katz et al., 2004). This cluster analysis clearly shows that over 50% of the total sample, the *Ready Screeners*, were quite trustful of their doctors and highly regarded their advice on screening. Also, though both the *Ready Screeners* and *Fearful Avoiders* indicated that getting cancer was "God's will", it was only significantly associated with CRC screening in the *Fearful Avoider*'s group, despite other studies indicating African Americans have fatalistic beliefs regarding whether screening is needed because the future is in "God's hands" " (Green & Kelly, 2004; Greiner et al., 2005). Assumptions about the pervasiveness of fatalism as a barrier to preventive care may inadvertently lead to lower investment in enrolling African Americans in screening programs.

Likewise, studies have indicated that African Americans do not get screened for CRC because it is "embarrassing" (Greiner et al., 2005; McAlearney et al., 2008). In our study this

was only a significant barrier for *Fearful Avoiders*, again indicating that a majority of African Americans in this study did not find being embarrassed a significant barrier to CRC screening. Finally, many studies have indicated that cost is a significant barrier in African American populations (Peterson et al., 2008; Taylor, Lessler, Mertens, Tu, Hart, Chan, Shu et al., 2003). This was not seen as a significant barrier in any of the groups in this study, likely a reflection of recent changes to Medicare/Medicaid reimbursement of colonoscopy. In a sample where patients are uninsured, results are likely to be different.

A major goal of this research was to demonstrate the value of having a well-defined typology of a public health target audience based on preventive orientation. The typology reported here is valuable in that it: (1) verifies that *important subgroups exist within populations* that are assumed to be or that appear to be relatively homogeneous; (2) provides *rich profiles of each type of individual*, revealing useful comparisons and a better understanding of important differences that exist across types of individuals; (3) makes *tailoring of communication strategies* for each sub-type feasible and potentially more accurate; (4) makes it possible to *identify and better understand the most vulnerable types of individuals*, allowing resources to be focused effectively; and 5) reduces potential stereotyping of all African Americans based on findings specific only to a sub-group. Overall, results from this typology of patients has implications for clinicians' assumptions about their African American patients. Clinicians need to exercise caution in the development of clinical materials/information and take care in targeting those to communications to the appropriate patient-type.

Given the nature of the variables used to define the clusters of patients based on their orientations toward preventive health in this study, general attitudes toward the medical establishment and personal preferences regarding health maintenance, the typology established here has potential application across a variety of preventive health areas. These variables might produce similar patient clusters in studies designed to understand patients' orientations towards screening for heart disease, various cancers, and hypertension among others. The implications of such an extension are far-reaching.

The results of this research raise important questions about the way in which we approach the task of increasing screening rates in vulnerable populations through community health campaigns or health education. If orientation toward preventive health care is a strong predictor of actual behavior, our strategies might shift from a focus on targeting screening for individual diseases to broader health campaigns designed to change beliefs, values, and perceptions of medical care, and preventive care in general. To do this would also require a commitment to removing the types of system barriers that may be at the root of many *Fearful Avoiders'* reluctance to embrace preventive health practices.

Limitations

This study used a convenience sample of 102 50-74 year old African American men and women for whom their usual source of care is a large, urban, hospital clinic. All had some form of insurance, predominately Medicare and/or Medicaid. As such, our results cannot be generalized beyond this study population. Interviewing was done in an available room within the clinic; as such, it is possible that being in the clinic setting, while judging medical services and screening options, could potentially have biased their responses towards a more positive orientation than had the study been done in a community setting. At the same time, the clinic is a

familiar setting to this sample of patients and one with which they are very familiar and accustomed to addressing health-related issues.

In testing the literacy level of each patient, we were aware that participants might be uncomfortable about being asked to read the 11 words on the REALM-R literacy instrument. Following standard procedure, we stopped asking patients to read after a second word could not be read. It is possible, however, that difficulty with this task could have put some participants into a defensive or negative frame of mind that could have biased some of their responses on the survey instrument. However, to minimize their discomfort if they could not pronounce or did not know the words on the REALM-R, we framed the literacy testing by saying we understood that people have difficulty with medical language and that we were trying to understand with which words people had difficulty.

Conclusions

Overall, this project successfully defined a typology of African American patients with limited literacy based on their attitudes and preferences regarding preventative screening and health maintenance -- rather than on their socio-demographic characteristics. The three resulting types of patients were then profiled on their perceptions of barriers to CRC screening, and perceptions of colonoscopy as a specific method for colorectal cancer screening. The *k-means clustering* procedure used to develop the typology of participants was sensitive enough to distinguish among the participants' attitudes and health-maintenance orientations and preferences such that the resulting groupings were conceptually meaningful and the size of each group was not numerically unbalanced, which would have produced groups that were too small to be statistically stable.

Because the clustering variables in this study dealt with the African American patients' general attitudes toward the medical establishment and toward screening in general, this typology potentially could be applied to other health-related areas where screening is encouraged. Having such a tool would facilitate assessments within these areas of study while simultaneously enhancing cross-study comparisons. In addition, segmentation would allow for more uniquely targeted and tailored health messages. The development of a validated typology of patient orientations constructed to be applicable to a variety of health conditions would thus serve to standardize how selected populations are characterized, and would detail their health-related attitudes, values, concerns, preferences, and behaviors. Having such a typology, used with standardized assessment tools or as a basis for development of health messages, could dramatically enhance the ability of clinicians to communicate with their patients and would permit public health practitioners to better target and tailor materials for the public.

A standardized typology could also help guide the development of larger scale communication campaigns, allowing for tracking of perceptions by sub-types across time, across geographic regions, and across socio-economic contexts. This would be invaluable for understanding changing perceptions regarding health-protecting behaviors such as CRC screening and allow for refinement of messages across a variety of socio-demographic groups. This approach would provide a classic example of how population health knowledge can be refined to generate more personalized health care.

In conclusion, this study strongly supports the argument that understanding the heterogeneity that exists within seemingly homogenous socio-demographic subgroups can provide a broader canvas on which to paint more effective health messages. As well, it can provide healthcare clinicians and public health practitioners with valuable insights into the motivations and behaviors of at-risk populations.

Table 1. Survey Items by Question Theme

Theme One – Overall Screening and Health Attitudes/Behaviors
1. Don't go to doctor unless needed
2. Trust body to tell if testing is needed
3. Don't get tested unless feel something is wrong
4. Rather not know about cancer
5. Fear of cancer keep from testing
6. Cancer is God's will
7. Screening tests not good at finding problems
8. Get colonoscopy only if family/friends recommended
9. Get colonoscopy if trusted doctor recommended
10. Feel uncomfortable and embarrassed
11. Colonoscopy is worth effort
12. Screening tests done as way of not getting sick
Theme Two – Perceived Barriers to Colonoscopy
1. Cost is prohibitive
2. No transportation
3. No time off
4. No child care
5. No adult care
6. Too much bother
7. Too unfamiliar
8. Embarrassing
9. Not the best method
10. Scared to know
11. Worry about sedation
12. Worry about pain
13. Worry about complications
14. Women more willing
15. Don't want rectum probed
16. Seems sexual
Theme Three – Perceived Facilitators of Colonoscopy
1. Most accurate
2. Finds problems early
3. Can remove growths
4. Not done often
5. Provides peace of mind
6. Recommended by doctors
7. If insurance covers, I'll do it
8. Being sedated is good

Figure 1. Patient Typology by Cluster Variables

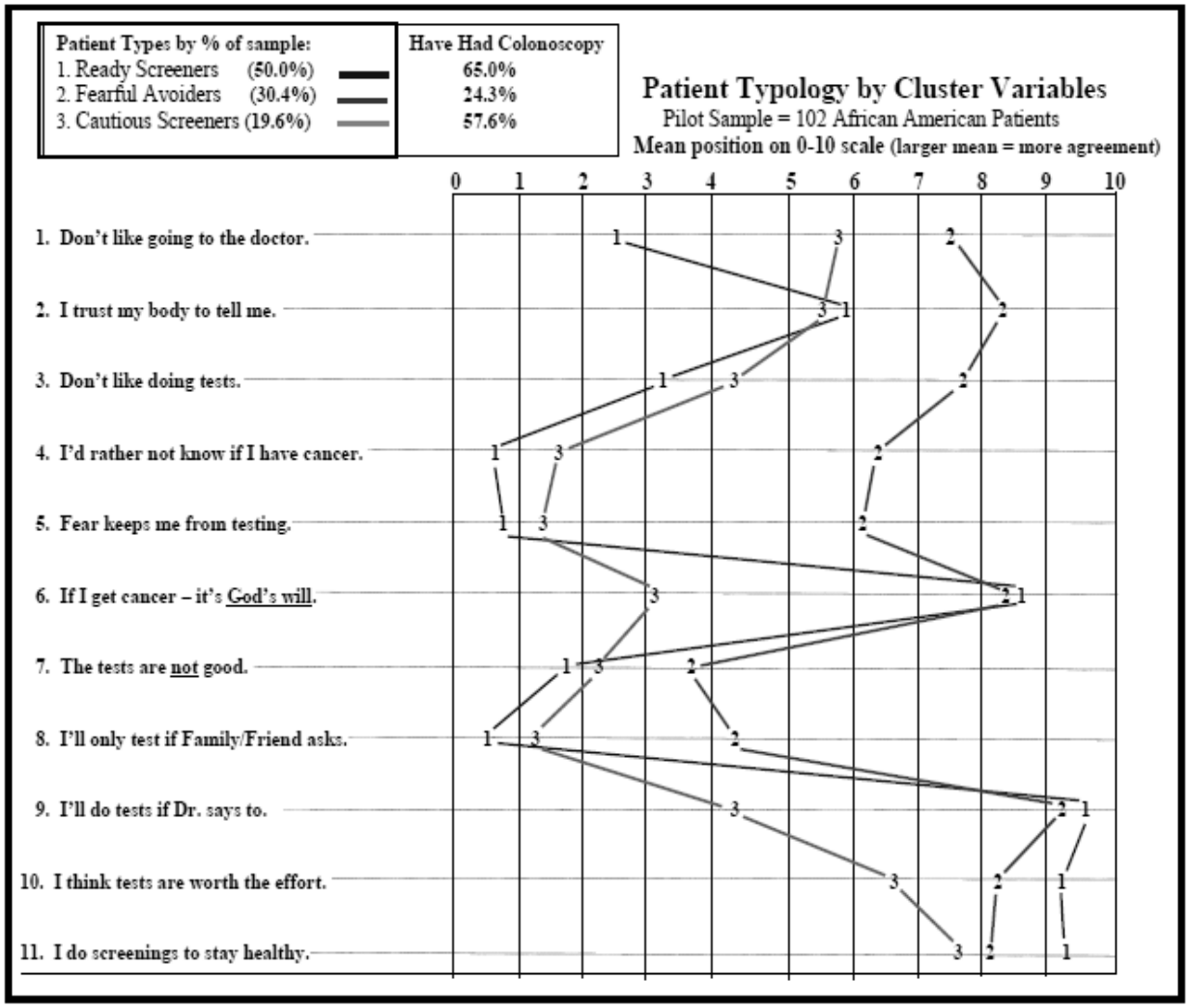

Table 2
Personal Health Attitudes & Behaviors by Patient Cluster
Mean Values (variables used for clustering), N, and SD
(Scale base = 0-10, the larger the values, the more agreement with the statement)

	Cluster 1			Cluster 2			Cluster 3			Sig.*
	Ready Screeners			**Fearful Avoiders**			**Cautious Screeners**			
ITEMS:	n	Mean	SD	n	Mean	SD	n	Mean	SD	
1) Don't Go to Docs		**2.45**			**7.65**			**5.85**		**.000**
I'm the kind of person who doesn't go to the doctor unless I really need to.	51		3.04	31		2.40	20		3.59	
2) I Trust My Body		**5.94**			**8.23**			**5.65**		**.002**
I trust that my body will let me know when I need to be tested for something.	51		3.36	31		1.82	20		3.69	
3) Don't Like Tests		**3.22**			**7.81**			**4.30**		**.000**
In general, I don't like to have tests, unless I feel something is wrong.	51		3.38	31		2.20	20		3.21	
4) Rather Not Know		**0.57**			**6.32**			**1.55**		**.000**
I'd rather not know if I have cancer.	51		1.65	31		3.82	20		2.65	
5) Fear Cancer		**0.82**			**6.03**			**1.45**		**.000**
My fear of cancer keeps me from getting the tests my doctor recommends.	51		1.87	30		3.32	20		2.59	
6) God's Will		**8.61**			**8.39**			**3.15**		**.000**
If I get cancer, I accept that it is God's will.	51		3.18	31		3.03	20		3.47	
7) Tests Are Not Good		**1.78**			**3.74**			**2.25**		**.001**
I feel many of the screening tests are not very good at finding problems.	51		1.98	31		2.73	20		2.25	
8) Only if Family–Friends Rec.		**0.45**			**4.29**			**1.20**		**.000**
I would only have a colonoscopy if a family member or friend told me to.	51		1.67	31		3.95	20		1.77	
9) Only if Doc Recommends		**9.65**			**9.10**			**4.45**		**.000**
I would only have a colonoscopy if a doctor I trusted told me to have it.	51		1.48	31		1.76	20		4.38	
10) Worth the Effort		**9.25**			**8.19**			**6.70**		**.000**
Although it may be hard to take the time-off and make the arrangements to do a colonoscopy, I think it is well worth the effort.	51		1.32	31		2.72	20		3.64	
11) I Do Screening		**9.29**			**8.06**			**7.65**		**.001**
I like to avoid getting sick, so I try to do screening tests.	51		1.12	31		1.93	20		3.05	

**P-value for ANOVA test of mean differences across types of patients.*

Table 3
Perceived Barriers to Colorectal Cancer Screening by Patient Cluster

Mean Values for Cluster Types, with N, SD
(Scale base = 0-10, the larger the mean value, the more agreement with the statement)

	Cluster1 **Ready Screeners**			Cluster2 **Fearful Avoiders**			Cluster3 **Cautious Screeners**			Sig*
ITEMS:	n	Mean	SD	n	Mean	SD	n	Mean	SD	
1) Cost is Prohibitive The cost of having a colon screening tests keeps me form getting one.	50	**1.24**	2.81	29	**3.21**	4.03	20	**1.20**	1.99	**.018**
2) No Transportation It would be hard getting someone to take me to and from the testing location	51	**2.08**	3.22	31	**1.61**	2.35	20	**1.50**	2.50	.660
3) No Time Off It would be hard taking time off from work to get screened.	51	**0.20**	0.69	31	**1.90**	3.15	20	**0.45**	0.83	**.000**
4) No Child Care It would be hard finding someone to care for my children.	51	**1.02**	2.34	31	**2.19**	3.28	20	**0.55**	1.10	**.045**
5) No Adult Care It would be hard finding someone to care for adults I take care of.	51	**0.76**	2.00	31	**2.26**	3.38	20	**0.90**	1.55	**.024**
6) Too Much Bother For me, preparing for the test is too much bother.	51	**2.49**	2.88	31	**4.13**	2.96	20	**2.50**	2.56	**.032**
7) Too Unfamiliar For me, the whole screening process is so unfamiliar, I don't want to do it.	51	**2.24**	3.47	31	**4.39**	3.73	20	**1.70**	3.20	**.010**
8) Embarrassing I would find the screening test to be too embarrassing.	51	**1.78**	3.10	30	**4.53**	3.63	20	**2.15**	3.12	**.001**
9) Not Best Method I don't think colonoscopy is the best method for detecting colon problems.	51	**1.31**	1.58	31	**3.55**	3.48	20	**2.10**	2.38	**.001**

Table 3 (Cont.)
Perceived Barriers to Colorectal Cancer Screening by Patient Cluster

Mean Values for Cluster Types, with N, SD
(Scale base = 0-10, the larger the mean value, the more agreement with the statement)

ITEMS:	Cluster1 **Ready Screeners**			Cluster2 **Fearful Avoiders**			Cluster3 **Cautious Screeners**			Sig*
	n	Mean	SD	n	Mean	SD	n	Mean	SD	
10) Scared To Know It scares me to think that I might find out I have cancer and this keeps me from having a colon screening test.	51	**1.98**	2.71	31	**5.81**	3.66	20	**1.65**	3.00	**.000**
11) Worry About Sedation I worry about getting medicine to make me sleepy to have the colonoscopy test.	51	**1.41**	2.72	31	**1.97**	3.14	20	**2.10**	3.21	.577
12) Worry About Pain I'm concerned that the screening test might be painful.	51	**2.69**	3.64	31	**6.35**	3.56	20	**3.60**	3.65	**.000**
13) Worry About Complications Although I know it is very rare, I am worried that I could have a serious complication.	51	**3.04**	3.27	31	**4.94**	2.86	20	**2.90**	3.08	**.018**
14) Women More Willing In general, I think women are more willing than men to have a colonoscopy.	51	**7.37**	3.62	30	**7.60**	3.49	20	**7.70**	3.51	.927
15) Don't Want Rectum Probe I wouldn't want to have a colonoscopy because they would be putting something in my rectum.	51	**2.12**	3.51	31	**5.48**	4.13	20	**2.50**	3.55	**.000**
16) Seems Sexual Having a colonoscopy seems sexual.	50	**0.34**	1.64	30	**2.70**	3.70	20	**0.50**	1.10	**.000**

**P-value for ANOVA test of mean differences across types of patients.*

Table 4
Perceptions of Colonoscopy by Patient Cluster

Mean Values for Cluster Types, with N, SD
(Scale base = 0-10 the larger the mean, the more agreement with the statement)

ITEMS:	Cluster1 **Ready Screeners** n	Mean	SD	Cluster2 **Fearful Avoiders** n	Mean	SD	Cluster3 **Cautious Screeners** n	Mean	SD	Sig*
1) Most Accurate Colonoscopy is the most accurate way to check for colon or rectal cancer	49	**9.41**	1.58	28	**8.29**	1.84	20	**9.05**	1.64	**.021**
2) Finds Problems Early Having the test is a good way to find colon or rectal cancer very early	49	**9.14**	1.68	28	**8.50**	1.97	20	**8.80**	1.64	.301
3) Can Remove Growths During the test the doctor can remove growths before they become cancer.	49	**8.80**	1.73	28	**8.04**	1.86	20	**8.15**	2.06	.164
4) Not Done Often A colonoscopy doesn't have to be done as often as other screenings.	49	**7.43**	2.26	28	**6.57**	2.28	20	**7.05**	2.69	.311
5) Provides Peace Mind For me, the peace of mind that comes with knowing about my health is a good reason for having the test.	49	**9.51**	1.39	28	**9.23**	1.52	20	**9.00**	2.18	.462
6) Recommended By Docs I like the fact that the test is recommended by most doctors.	49	**9.43**	1.47	28	**8.93**	1.55	20	**8.80**	1.85	.220
7) If Insurance Covers, I'll Do It If my health insurance covers the cost of the test, I feel I should have one.	49	**8.86**	1.86	28	**8.83**	1.93	20	**9.30**	1.22	.597
8) Being Sedated Good I think getting medicine to make me sleepy and not feel uncomfortable during the colonoscopy test is a plus.	49	**9.33**	1.93	28	**9.27**	1.31	20	**8.55**	1.93	.237

**P-value for ANOVA test of mean differences across types of patients.*

References

American Cancer Society. (2010a). Colorectal Cancer Facts & Figures 2008-2010 [Internet]. Retrieved March 17, 2010, from: http://www.cancer.org/downloads/STT/F861708_finalforweb.pdf

American Cancer Society (2011). *Cancer Facts and Figures 2011*. Atlanta, GA: American Cancer Society. Retrieved April 22, 2012.

Agrawal S, Bhupinderjit A, Bhutani MS, Boardman L, Nguyen C, Romero Y, et al. Colorectal Cancer in African Americans. Am J Gastroenterol 2005; 100:515-523.

Albrecht, T. L. & Bryant, C. (1996). Advances in segmentation modeling for health communication andsocial marketing campaigns. Journal of Health Communication, 1, pp. 656-80.

Bass, SB, Gordon, TF, Ruzek, SR, Wolak, C, Ward, S, Paranjape, A, Lin, K, Meyer, B, Ruggieri, D. (2011). Perceptions of colorectal cancer screening in urban African American Clinic patients: Differences by gender and screening status. Journal of Cancer Education, 26(1), 121-8.

Bass PF, Wilson JF, Griffith CH. A shortened instrument for literacy screening. *Journal of General Internal Medicine.* 2003; 18:1036-1038.

Boslaugh, S.E., Kreuter, M. W., Nicholson, R. A. & Naleid, K. (2005). Comparing demographic, health status and psychosocial strategies of audience segmentation to promote physical activity. Health Education Research, 20(4), pp. 430-38.

Bull, F.C., Kreuter, M.W., & Scharff, D.P. (1999). Effects of tailored, personalized, and general health messages on physician activity. *Patient Education and Counseling*, 36, 181-192.

Carcaise-Edinboro P., Bradley C.J. (2008) Influence of patient-provider communication on colorectal cancer screening. *Medical Care*, 46(7), 738-745.

Carey, M. P., Vanable, P. A., Senn, T. E., Coury-Doniger, P., Urban, M. A. (2008). Evaluating a two-step approach to sexual risk reduction in a publically-funded STI clinic: Rationale, design, and baseline data from the Health Improvement Project – Rochester (HIP-R). Contemporary Clinical Trials, Jul; Vol. 29 (4), pp. 569-86.

Centers for Disease Control and Prevention. (2012). Cancer screening – United States, 2010. Morbidity and Mortality Weekly Report, 61(03), 41-45. Retrieved April 22, 2012: http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6103a1.htm

Davis TC, Crouch MA, Long SW, et al. Rapid assessment literacy levels in adult primary care patients. *Family Medicine.* 1991; 23:433-435.

Dawson, S. (1989), Health care consumption and consumer social class: A different look at the patient. Journal of Health Care Marketing, 9, pp. 15-25.

Della, L.J., DeJoy, D.M., & Lance, C.E. (2009). Explaining fruit and vegetable intake using a consumer marketing tool. *Health Education & Behavior*, 36, 895-914.

Dexter, F., Wachtel, R. E., Sohn, M. W., Ledolter, J., Dexter, E. U., Macario, A. (2005). Quantifying effect of a hospital's caseload for a surgical specialty on that of another hospital using multi-attribute market segments. Health Care Management Science, May; Vol. 8 (2), pp. 121-31.

Dolinsky, A. L. & Stinerock, R. (1998). Cultural affiliation and the importance of health care Attributes: Marketers can develop segmentation strategies for targeted patient groups. Marketing Health Services, Spring, 18(1), pp. 28-37.

Endersen, K. W. (1988). Psychographic segmentation for marketing success: Health-related attitudes and lifestyles are the key. Healthcare Executive, 3 (2), pp. 26-9.

Gehrt, K. C. & Pinto, M. B. (1990). An exploration of the applicability of situational segmentation in the health care marketL Development of a situational taxonomy. Health Marketing Quarterly, 7 (1-2), pp. 115-130.

Gehrt, K. C. & Pinto, M. B. (1991). The impact ofsituational factors on health care preferencesL Exploring the prospect of situationally based segmentation. Journal of Health Care Marketing, Jun; Vol. 11 (2), pp. 41-52.

Gehrt, K. C. & Pinto, M. B. (1992). Assessing the viability of situationally driven segmentation opportunities in the health care market. Hospital & Health Care Management Review, Spring; Vol. 17 (2), pp. 243-65.

Green, P. M., & Kelly, B. A. (2004). Colorectal cancer knowledge, perceptions, and behaviors in African Americans. *Cancer Nursing, 27*(3), 206-215.

Greiner K.A., Born W., Nollen N., Ahluwalia J.S. (2005). Knowledge and Perceptions of Colorectal Cancer Screening Among Urban African Americans. *Journal of General Internal Medicine*, 20(11), 977-983.

Hemple, S. & Lapin, R. (1994). Marketing health care: Operation segmentation. Marketing Tools, 1 (6).

James A.S, Campbell M.K, Hudson M.A. (2002) Perceived barriers and benefits to colon cancer screening among African Americans in North Carolina: How does perception relate to screening behavior? *Cancer Epidemiol Biomarkers & Prevention,* 11(6), 529-534.

Katz, M. L., James, A. S., Pignone, M. P., Hudson, M. A., Jackson, E., Oates, V., & Campbell, M. K. (2004). Colorectal cancer screening among African American church members: A qualitative and quantitative study of patient-provider communication. *BMC Public Health*, 462-468

Krisjanous, J., (2004). Segmentation of the maternity market using a healthcaremarketing approach. New Zealand College of Midwives 8th Biennial National Conference, pp. 16-18 September.

Liu, S. S. & Chen, J. (2009). Using data mining to segment healthcare markets from patient's preference perspectives. International Journal of Health Care Quality Assurance, 22 (2), pp. 117-34.

Maibach, E.W., Weber, D., Massett, H., Hancock, G.R., & Price, S. (2006). Understanding consumers' health information preferences: Development and validation of a brief screening instrument, *Journal of Health Communication*, 11 (8), 717-736.

Marchack, B. W. (1995). Market segmentation and service: A strategy for success. The Journal of Prosthetic Dentistry, Mar: vol. 73 (3), pp. 311-5.

McAlearney, A. S., Reeves, K. W., Dickinson, S. L., Kimberly M. Kelly, Tatum, C., Katz, M. L., et al. (2008). Racial differences in colorectal cancer screening practices and knowledge within a low-income population. *Cancer, 112*(2), 391-398.

Morris, L.A., Tabak, E., Olins, N.J. (1992). A segmentation analysis of prescription drug information seeking motives among the elderly. *Journal of Public Policy and Marketing*, 11 (2), 115-125.

Palmer, R.C., Midgette, L.A. & Buadoo, I. (2008). Colorectal cancer screening and African Americans: Findings from a qualitative study. *Cancer Control, 15,* 72-9.

Peltier, J. W., Scovotti, C. (2004). Relationship marketing and disadvantaged health care segments: Using internal marketing to improve the vocational rehabilitation process. Health Marketing Quarterly; Vol. 22 Issue 2, pp. 69-90.

Peterson N.B., Murff H.J., Fowke J.H., Cui Y., Hargreaves M., Signorello L.B., Blot W.J. (2008). Use of colonoscopy and flexible sigmoidoscopy among African Americans and Whites in a low-income population, *Preventing Chronic Disease*. 5(1),1-4.

Risker, D. C. (1995). A segmentation analysis of consumer uses of health information. Health Marketing Quarterly, Vol. 12 (4), pp. 39-48.

Rose, J.S., Chassin., L., Presson, C., Sherman, S.J., Stein, M.D., & Col, N. (2007). A latent class typology of young women smokers, *Addiction*. 102, 1310-1319.

Ross, C.K., Steward, C.A. and Sinacore, J.M. (1993). The importance of patient preferences in the measurement of health care satisfaction, Medical Care, Vol. 31 No. 12, pp. 1138-49.

Slater, M. D. & Flora, J. A. (1991). Health lifestyles audience segmentation analysis for public health interventions. Health Education Quarterly, Summer; Vol. 18 (2), pp. 221-33.

Slater, M.D., Basil, M.D., & Maibach, E.W. (1999). A cluster analysis of alcohol-related attitudes and behaviors in the general population. *Journal of Studies on Alcohol & Drugs*, 60, 667-74.

Taylor R. J., Chatters L. M., Jackson J. S. (2007). Religious and spiritual involvement among older African Americans, Caribbean blacks, and non-Hispanic whites: Findings from the national survey of American life. J Gerontol B Psychol Sci Soc Sci, *62:* S238–S250.

Taylor V., Lessler D., Mertens K., Tu S., Hart A., Chan N., Shu J., Thompson B. (2003) Colorectal cancer screening among African Americans: the importance of physician recommendation, *Journal of the National Medical Association.* 95(9), 806-812.

U.S. Preventive Services Task Force. Screening for Colorectal Cancer: Recommendations and Rationale [on-line]. 2002. Accessed at the Agency for Healthcare Research and Quality at www.ahrq.gov/clinic/3rduspstf/colorectal/colorr.htm on 31 January 2007.

Ward. S.H,, Lin, K., Meyer, B., Bass, S.B., Parameswaran, L., Gordon, T.F. & Ruzek, S.B. (2008). Increasing colorectal cancer screening among African Americans, linking risk perception to interventions targeting patients, communities and clinicians. *Journal of the National Medical Association*,*100(6),* 748-58.

Ward, S. H., Parameswaran, L., Bass, S. B., Paranjape, A., Gordon, T. F., & Ruzek, S. B. (2010). Resident Physicians' Perceptions of Barriers and Facilitators to Colorectal Cancer Screening for African Americans. *Journal of the National Medical Association, 102*(4), 303-311.

Weber. D., Wolff, L.S., Orleans, T., Mockenhaupt, R.E., Massett, H.A., & Vose, K.K. (2007). Smokers' attitudes and behaviors related to consumer demand for cessation counseling in the medical care setting, *Nicotine & Tobacco Research*, 9 (5), 571-580.

Williams, J.E., Flora, J.A. (1995). Health behavior segmentation and campaign planning to reduce cardiovascular disease risk among Hispanics. *Health Education Quarterly*, 22, 36-48.

Winawer, S., Fletcher, R., Rex, D., Bond, J., Bur, R., Ferrucci, J., et al. (2003). Colorectal cancer screening and surveillance: Clinical guidelines and rationale – update based on new evidence. *Gastroenterology*, 124, 544-60.

Wolak, CN, Ruzek, SB, Bass, SB & Gordon, TF. (2009). Assessing literacy in a low-income African American clinic population to facilitate improving health education interventions. Presentation, National Health Literacy Conference. October, Washington, D.C.

Wong DL, Baker CM. (1988). Pain in children: Comparison of assessment scales. *Pediatric Nursing*, 14, 9-17.

Wong DL, Baker CM. (2001). Smiling face as anchor for pain intensity scales. *Pain*, 89(2-3), 295-297.

Woodside, A.G., Nielsen, R.L., Walters, F. and Muller, G.D. (1988). Preference segmentation of health care services: the old-fashioneds, value conscious, affluents, and professional want-it-alls, Journal of Health Care Marketing, Vol. 8 No. 2, pp. 14-24.

18. Extent of Clinical Activities Initiated and Completed. Items 18(A) and 18(B) should be completed for all research projects. If the project was restricted to secondary analysis of clinical data or data analysis of clinical research, then responses to 18(A) and 18(B) should be "No."

18(A) Did you initiate a study that involved the testing of treatment, prevention or diagnostic procedures on human subjects?

_____Yes
___X__No

18(B) Did you complete a study that involved the testing of treatment, prevention or diagnostic procedures on human subjects?

_____Yes
___X__No

If "Yes" to either 18(A) or 18(B), items 18(C) – (F) must also be completed. (Do NOT complete 18(C-F) if 18(A) and 18(B) are both "No.")

18(C) How many hospital and health care professionals were involved in the research project?

_____Number of hospital and health care professionals involved in the research project

18(D) How many subjects were included in the study compared to targeted goals?

_____Number of subjects originally targeted to be included in the study
_____Number of subjects enrolled in the study

Note: Studies that fall dramatically short on recruitment are encouraged to provide the details of their recruitment efforts in Item 17, Progress in Achieving Research Goals, Objectives and Aims. For example, the number of eligible subjects approached, the number that refused to participate and the reasons for

refusal. Without this information it is difficult to discern whether eligibility criteria were too restrictive or the study simply did not appeal to subjects.

18(E) How many subjects were enrolled in the study by gender, ethnicity and race?

Gender:
____Males
____Females
____Unknown

Ethnicity:
____Latinos or Hispanics
_X_Not Latinos or Hispanics
____Unknown

Race:
____American Indian or Alaska Native
____Asian
____Blacks or African American
____Native Hawaiian or Other Pacific Islander
____White
____Other, specify:_____
____Unknown

18(F) Where was the research study conducted? (List the county where the research study was conducted. If the treatment, prevention and diagnostic tests were offered in more than one county, list all of the counties where the research study was conducted.)

19. Human Embryonic Stem Cell Research. Item 19(A) should be completed for all research projects. If the research project involved human embryonic stem cells, items 19(B) and 19(C) must also be completed.

19(A) Did this project involve, in any capacity, human embryonic stem cells?
_____Yes
_X___ No

19(B) Were these stem cell lines NIH-approved lines that were derived outside of Pennsylvania?
_____Yes
_____ No

19(C) Please describe how this project involved human embryonic stem cells:

20. Articles Submitted to Peer-Reviewed Publications.

20(A) Identify all publications that resulted from the research performed during the funding period and that have been submitted to peer-reviewed publications. Do not list journal abstracts or presentations at professional meetings; abstract and meeting presentations should be listed at the end of item 17. **Include only those publications that acknowledge the Pennsylvania Department of Health as a funding source** (as required in the grant agreement). List the title of the journal article, the authors, the name of the peer-reviewed publication, the month and year when it was submitted, and the status of publication (submitted for publication, accepted for publication or published.). Submit an electronic copy of each publication or paper submitted for publication, listed in the table, in a PDF version 5.0.5 (or greater) format, 1,200 dpi. Filenames for each publication should include the number of the research project, the last name of the PI, the number of the publication and an abbreviated research project title. For example, if you submit two publications for PI Smith for the "Cognition and MRI in Older Adults" research project (Project 1), and two publications for PI Zhang for the "Lung Cancer" research project (Project 3), the filenames should be:

Project 1 – Smith – Publication 1 – Cognition and MRI
Project 1 – Smith – Publication 2 – Cognition and MRI
Project 3 – Zhang – Publication 1 – Lung Cancer
Project 3 – Zhang – Publication 2 – Lung Cancer

If the publication is not available electronically, provide 5 paper copies of the publication.

Note: The grant agreement requires that recipients acknowledge the Pennsylvania Department of Health funding in all publications. Please ensure that all publications listed acknowledge the Department of Health funding. If a publication does not acknowledge the funding from the Commonwealth, do not list the publication.

Title of Journal Article:	Authors:	Name of Peer-reviewed Publication:	Month and Year Submitted:	Publication Status (check appropriate box below):
1. Developing a Typology of African Americans with Limited Literacy Based on Preventive Health Practice Orientation: Implications for Colorectal Cancer Screening Strategies	Gordon, T.F., Bass, S.B.; Ruzek, S.B.; Wolak, C.; Rovito, M.J.; Ruggieri, D.G.; Ward, S.; Paranjape, A; Greener, J.	Journal of Health Communication	April 2013	☐Submitted XAccepted ☐Published

20(B) Based on this project, are you planning to submit articles to peer-reviewed publications in the future?

Yes_____ No____X_____

If yes, please describe your plans:

21. Changes in Outcome, Impact and Effectiveness Attributable to the Research Project. Describe the outcome, impact, and effectiveness of the research project by summarizing its impact on the incidence of disease, death from disease, stage of disease at time of diagnosis, or other relevant measures of outcome, impact or effectiveness of the research project. If there were no changes, insert "None"; do not use "Not applicable." Responses must be single-spaced below, and no smaller than 12-point type. DO NOT DELETE THESE INSTRUCTIONS. There is no limit to the length of your response.

This project produced a major peer-reviewed publication in a major national research journal in the field of health communication. As such, it reflects an important contribution to the literature of the field.

22. Major Discoveries, New Drugs, and New Approaches for Prevention Diagnosis and Treatment. Describe major discoveries, new drugs, and new approaches for prevention, diagnosis and treatment that are attributable to the completed research project. If there were no major discoveries, drugs or approaches, insert "None"; do not use "Not applicable." Responses must be single-spaced below, and no smaller than 12-point type. DO NOT DELETE THESE INSTRUCTIONS. There is no limit to the length of your response.

The results of this research defines a typology of African Americans with low-literacy and profiles their attitudes toward the medical establishment in general and, more specifically details their attitudes toward the use of colonoscopy as a screening technique for colorectal cancer. The typology will allow future researchers and educators to more specifically target promotional messages to each of the three types of patients identified, given that their attitudes and likely behaviors differed.

23. Inventions, Patents and Commercial Development Opportunities.

23(A) Were any inventions, which may be patentable or otherwise protectable under Title 35 of the United States Code, conceived or first actually reduced to practice in the performance of work under this health research grant? Yes_____ No___X____

If "Yes" to 23(A), complete items a – g below for each invention. (Do NOT complete items a - g if 23(A) is "No.")

a. Title of Invention:

b. Name of Inventor(s):

c. Technical Description of Invention (describe nature, purpose, operation and physical, chemical, biological or electrical characteristics of the invention):

d. Was a patent filed for the invention conceived or first actually reduced to practice in the performance of work under this health research grant?
Yes_____ No___

If yes, indicate date patent was filed:

e. Was a patent issued for the invention conceived or first actually reduced to practice in the performance of work under this health research grant?
Yes_____ No___
If yes, indicate number of patent, title and date issued:
Patent number:
Title of patent:
Date issued:

f. Were any licenses granted for the patent obtained as a result of work performed under this health research grant? Yes_____ No___

If yes, how many licenses were granted?_____

g. Were any commercial development activities taken to develop the invention into a commercial product or service for manufacture or sale? Yes___ No___

If yes, describe the commercial development activities:

23(B) Based on the results of this project, are you planning to file for any licenses or patents, or undertake any commercial development opportunities in the future?

Yes_____ No____X_____

If yes, please describe your plans:

24. Key Investigator Qualifications. Briefly describe the education, research interests and experience and professional commitments of the Principal Investigator and all other key investigators. In place of narrative you may insert the NIH biosketch form here; however, please limit each biosketch to 1-2 pages. *For Nonformula grants only – include information for only those key investigators whose biosketches were not included in the original grant application.*

BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors in the order listed on Form Page 2.
Follow this format for each person. **DO NOT EXCEED FOUR PAGES.**

NAME	POSITION TITLE
Thomas F. Gordon	Professor of Public Health Department of Public Health Temple University
eRA COMMONS USER NAME (credential, e.g., agency login) TFGORDON2006	

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	MM/YY	FIELD OF STUDY
Montana State University	B.S.	5/1967	Communication
Michigan State University	M.A.	5/1969	Communication
Michigan State University	Ph.D.	5/1973	Communication

A. Personal Statement

I am pleased to participate in this research project. By using perceptual mapping and vector message design strategies, this project represents a unique and innovative combination of theory and methodology that could prove highly successful. The results will allow us to graphically and mathematically model how participants conceptualize the critical elements involved in their decision-making processes. Dr. Bass and I have worked closely on similar studies involving these same mapping, modeling, and decision aid design procedures.

My background in communication, and extensive experience with perceptual mapping make me uniquely qualified to participate in this proposed research. I have had extensive experience over the past 25 years conducting marketing studies involving perceptual mapping for such clients as: *ABC Television Network; World News Tonight program (*national study across 26 markets); *ABC Spot Sales Division* (national surveys across four years); *Group-W Westinghouse Broadcasting (*radio and television positioning studies in four major markets); *Weightman Advertising* and *Kimmich Advertising* (mapping customer needs and preferences for various products); *Hershey Foods* (mapping product perceptions to develop promotion strategies); *Financial services projects for 12 major banks (*to establish "benchmark" customer typologies and do mapping for positioning and promotion); *Lehigh Valley Farms Dairies* (typology of consumers and mapping to identify market niche for new product); *Tastykake Baking Co.* (consumer surveys, focus groups, and perceptual mapping to develop customer typologies and positioning strategies).

For the past 10-years I have concentrated on health research and the use of perceptual mapping and segmentation approaches to develop more effective health campaigns. As director of the *Risk Communication Laboratory* at Temple University, I have been involved in conducting focus group and perceptual mapping studies, a NCI funded R21, a NIBIB funded RO3, and several studies for the Pennsylvania Department of Health, and the Philadelphia Department of Pubic Health. Much of this research has involved working with low-income, low-health-literacy minority communities and has successfully produced tutorials and message strategies that are culturally and developmentally appropriate for these target groups. These studies have covered diverse areas of application including colorectal cancer screening, radiological terror, smallpox vaccination, avian flu attitudes toward vaccination and quarantine, public perceptions of emergency preparedness, and perceptions of patients by HIV/AIDS caregivers. These projects involved collaboration with other researchers, and produced several peer-reviewed publications and presentations. In summary, I have a demonstrated a record of successful and productive research involving typology development, perceptual mapping and message/campaign design, and psycho-physiological assessment. This unique experience and expertise is integral to the implementation of the planned project.

B. Positions and Honors

Positions and Employment

1969 – 1971 Instructor: Dept. of Communication, Michigan State University
1971 – 1976 Assistant Professor: Radio-TV-Film Dept, Temple University
1976 – 1993 Associate Professor: Radio-TV-Film Dept, Temple University
1978 – 2007 Editor, Communication Abstracts (Published by Sage Publications, Inc.)
1990 – 1993 Chair, Mass Media & Comm. Ph.D. Program, School of Comm.& Theater, Temple University
1993 – 1998 Professor: Communication Sciences Dept., Temple University
1999 – Present Professor: Dept. of Public Health, Temple University, Philadelphia, PA

Other Experience and Professional Memberships

1991 – *Top Paper Award*, Health Communication Division, International Communication Association
2000 – 2001 Senior Res. Consultant, *Health Comm.& Informatics Res. Branch*, National Cancer Institute
2000 – 2002 Ph.D. Program Director, Health Studies Department, Temple University
2000 – 2002 Associate Dir. for Health Communication, Center for Public Health, Temple University.
2000 – 2003 Chair, *Healthy People 2010 Committee*, Health Comm. Working Group, Am. Pub. Health Asoc.
2000 – Present: Health Comm. Working Group, *HHS Office of Disease Prevention & Health Promotion*,
Jan 2001-Oct. 2001: Planning Committee and Participant: *HHS Office of Disease Prevention & Health Promotion* Invited Conference Charting the Course: Action Plans for the Health Communication Objectives
2008 *NIH/Community Influences on Health Behavior (CIHB)* study section.
2009 *NIH/Risk Prevention and Health Behavior (RPHB)* study section.

C. Selected Peer-Reviewed Publications

Most Relevant to Application

1. **Gordon, TF.** Subject abilities to use metric multidimensional scaling: Effects of varying the criterion pair. In G. A. Barnett & J. Woelfel (Eds.), *Readings in the Galileo system: Theory, methods, and applications*. Dubuque, IA: Kendall/Hunt Publishing Co., 1988.

2. Kreps, G. & **Gordon, T F**. Centers for excellence in health communication: Health communication objective 11-5. In *Communicating health: Priorities and strategies for progress: Action plans to achieve the health communication objectives in Healthy People 2010*. Washington, D.C.: U.S. Department of Health & Human Services, Office of Disease Prevention and Health Promotion. pp. 93-112, 2003.

3. Bass, SB, Ruzek, SB, **Gordon, TF**, Hanlon, A. "Preparedness for a smallpox outbreak: Comparing metrics for assessing levels of vaccination among healthcare workers by state." Epidemiology and Infection. 2007; 135(4):622-33.

4. Bass, SB, **Gordon, TF**, Ruzek, SR, Hausman, A. "Mapping perceptions of factors related to acceptance of smallpox vaccination under varying levels of threat among hospital emergency room personnel." Biosecurity and Bioterrorism; 2008; 6(20): 179-189.

5. Ward, SH, Lin, K, Meyer, B, Bass, SB, Parameswaran, L, **Gordon, TF**, Ruzek, SB. "Impact of Risk Perceptions and Screening Guidelines on Colorectal Cancer Screening in African Americans: A Review of the Literature." Journal of the National Medical Association; 2008; 100(6): 748-758.

6. Bass, SB, Ruzek, SB, Ward, L, **Gordon, TF**, Hanlon, A, Hausman, A, Hagen, M. If you ask them, will they come? Predictors of Quarantine Compliance During a Hypothetical Avian Flu Pandemic: Results from a Statewide Survey. *Disaster Medicine and Public Health Preparedness*; 2010; 4:1-10.

7. Ward, S., Parameswaran, L., Bass, SB. Paranjape, A., **Gordon, TF**, Ruzek, SB. Resident Physicians' Perceptions of Barriers and Facilitators to Colorectal Cancer Screening for African *Americans; Journal of the National Medical Association* 2010; 102: 303-311.

8. Bass SB, **Gordon TF**, Ruzek SB, Wolak C, Ward S, Paranjape A, Lin K, Meyer B & Ruggieri D. "Perceptions of colorectal cancer screening in urban African American clinic patients: Differences by gender and screening status". *Journal of Cancer Education;* 2010; DOI: 10.1007/s13187-010-0123-9.

BIOGRAPHICAL SKETCH

NAME Sarah Bauerle Bass	POSITION TITLE Associate Professor of Public Health; Temple University Department of Public Health
eRA COMMONS USER NAME (credential, e.g., agency login)	

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	MM/YY	FIELD OF STUDY
Temple University	Ph.D.	5/2001	Health Education
Temple University	MPH	5/1996	Public Health
Temple University	Grad. Cert.	5/1996	Women's Studies
Northwestern University	BS	5/1986	Communications-R/TV/F

A. Personal Statement

The goal of the proposed research is to develop culturally appropriate interventions to encourage African American PLHAs to disclose HIV status and/or use condoms as regular preventive practices. By utilizing perceptual mapping and vector analysis, this study is an innovative model that will provide new methods to address health behavior decisions. As co-Principal Investigator, I will be overseeing all four phases of the project, taking primary responsibility in developing perceptual mapping survey tools and then the resulting perceptual maps and vector modeling to create messages. With Dr. Rutledge, I will also be involved with developing the Computer Touch Screen tutorial and the Motivational Interviewing interventions. I have the expertise, leadership and motivation necessary to help develop and implement the study. With over 20 years of experience working in the area of HIV/AIDS, as well as risk communication, I have expertise in all areas of study, from focus groups and perceptual mapping methodology, to development of culturally and developmentally appropriate materials. My background in communications, and specifically health and risk communication, make me uniquely qualified to participate. As co-director of the Risk Communication Laboratory at Temple University, I have been integral in conducting focus groups and defining and using the perceptual mapping technology, which is currently not used in public health research anywhere else in the United States. As co-PI on a NCI funded R21 and PI on a NIBIB funded RO3, I have used this methodology extensively. This research has primarily been with low-income, low health literacy minority communities and has been quite successful in helping understand barriers to care and develop culturally and developmentally appropriate messages. Specifically, research has been done in the areas of colorectal cancer screening, radiological terror, smallpox vaccination, avian flu attitudes towards vaccination and quarantine, public perceptions of emergency preparedness and perceptions of patients by HIV/AIDS caregivers. I have also worked in message development for HIV/AIDS prevention as public information coordinator for the West Virginia Department of Health and developed and implemented multiple HIV/AIDS community-based programs while Director of Health Education for the American Red Cross. As such I have worked with many HIV service organizations in Philadelphia. In addition, I have successfully administered projects, collaborated with other researchers, and produced several peer-reviewed publications and presentations from each project. The current application builds logically on this prior work, and I have previously collaborated with Dr. Rutledge and extensively worked with Dr. Gordon on other projects. In summary, I have a demonstrated a record of successful and productive research projects in the risk communication area, and specifically in the adaptation of new technologies in developing messages. This unique experience and expertise is integral to the implementation of the planned project.

B. Positions and Honors

Positions and Employment

1988-1990 Public Information Director, HIV/AIDS Program, WV Dept. of Health, Charleston, WV
1990-1993 Director of Health Education Programs, American Red Cross, SEPA Chapter, Philadelphia, PA
1997-1999 Adjunct Faculty, Department of Extension Services, Temple University, Philadelphia, PA
1998-2000 Adjunct Faculty, Department of Health Studies, Temple University, Philadelphia, PA
1998-2001 Adjunct Faculty, Department of Health Education, Arcadia University, Philadelphia, PA
1999 Adjunct Faculty, Department of Women's Studies, Temple University, Philadelphia, PA
2001-2003 Faculty, Dean's Appoint., Department of Public Health, Temple University, Philadelphia, PA
2003-2008 Assistant Prof. of Public Health, Dept. of Public Health, Temple University, Philadelphia, PA
2008-current Associate Prof. of Public Health, Dept. of Public Health, Temple University,
2007-current Co-Director, Risk Communication Laboratory, Temple University

Other Experience and Professional Membership

1996 - Member, American Public Health Association
1996 - Member, Society for Public Health Educators
2002 - Member, Healthy People 2000, 2010 Health Communication Committee
2008 - Delta Omega Public Health Honorary Initiate

Honors

2009 Temple Univ. Writing Intensive Award for Instructor/Student Achievement
2007 Lindback Award for Distinguished Teaching, Temple University
2006 College of Health Professions, Temple Univ. Excellence in Teaching Award
2001 Cancer Info Service, National Cancer Institute "Partner Award in Use of New Technology"
1994 College of Liberal Arts (Women's Studies), Temple Univ. "Distinguished Teaching" Award
1992 Better Business Bureau Award. "Best Introduction of a Service", Teen Peer AIDS Education

C. Selected Peer-Reviewed Publications/Presentations

Most Relevant to Application

1. Gordon TF, Ruzek SB, **Bass SB**, & Kufs LS. *Evaluation of the Pennsylvania Disaster Preparedness Guide: A pilot study using eye-tracking technology, heart-rate, and skin-conductance*. 2006, September, Report prepared for the Pennsylvania Department of Health, Temple University Center for Preparedness Research, Education, and Practice: Philadelphia, PA.
2. Gordon TF, Ruzek SB, **Bass SB**, Hagen M, Hanlon AL, & Hausman AJ, *Mapping public perceptions of avian flu - a statewide survey: Using perceptual mapping to model perceptions and design health campaign strategy*, in *American Public Health Association Annual Conference*. 2007, November: Washington, DC.
3. **Bass SB**, Gordon TF, Ruzek SB, & Hausman AJ. Mapping perceptions of factors related to acceptance of smallpox vaccination under varying levels of threat among hospital emergency room personnel. *Biosecurity and Bioterrorism*; 2008; 6(20): 179-189.
4. Ward SH, Lin K, Meyer B, **Bass SB**, Parameswaran L, Gordon TF, & Ruzek SB. Impact of risk perceptions and screening guidelines on colorectal cancer screening in African Americans: A review of the literature. *Journal of the National Medical Association*; 2008; 100(6): 748-758.
5. Gordon TF, Rovito MJ, Ruzek SB, **Bass SB**, Ward S, Lim K, Myers B, Wolak CN, Britto J. & Abedin Z. *Improving colorectal cancer screening strategies for low-literacy African Americans: Using risk-benefit segmentation to define a typology of patients and mapping perceptions to design targeted decision aids.*, in *American Public Health Association Annual Conference*. 2009, November: Philadelphia, PA.
6. **Bass SB**, Ruzek SB, Gordon TF, Wolak CN, Rovito MJ, Britto J, Parameswaran L, Ward S, Meyer B, Lin K. & Paranjape A. *Developing computer touch screen interactive colorectal cancer screening decision aid for low-literacy populations: Lessons learned.*, in *American Public Health Association Annual Conference*. 2009, November: Philadelphia, PA.
7. **Bass SB**, Gordon TF, Ruzek SB, Wolak CN, Ward S, Meyer B, & Lin K. *Perceptions of colorectal cancer screening in African Americans: Differences by gender and screening status*, in *American Public Health Association Annual Conference*. 2009, November: Philadelphia, PA