Radon Awareness and Reduction Campaigns for African Americans: A Theoretically Based Evaluation

Kim Witte, PhD
Judy M. Berkowitz, PhD
Janet McKeon Lillie, PhD
Kenzie A. Cameron, MA
Maria Knight Lapinski, MA
Wen-Ying Liu, MA

Radon gas is a significant health threat linked to thousands of preventable deaths each year. One population that may be at increased risk from harm from radon exposure is African Americans. However, little is known about what African Americans think or know about radon. A theoretically based evaluation of radon awareness and reduction campaigns was conducted with African Americans. The knowledge and perceptions results indicate that African Americans often hold inaccurate beliefs regarding radon (e.g., confusing it with carbon monoxide gas), perceive it to be a serious threat, and perceive recommended responses to be inadequate in averting harm. The campaign materials evaluation shows that campaign materials often promote perceptions of threat but not perceptions of efficacy regarding recommended responses. Recommendations are given for public health practitioners.

Radon, a naturally occurring radioactive gas caused by the breakdown of uranium in the soil, rock, or water, is a significant cause of lung cancer that results in thousands of preventable deaths each year. Radon becomes harmful when it seeps into a house through cracks in the foundation or through gaps around service openings (e.g., sump pump, sewer or water pipes) and becomes trapped due to lack of ventilation. Some experts disagree as to whether radon exposure leads to harmful effects for the general population; some studies show increases in lung disease, and others do not. However, the evidence suggests that while radon exposure may not be harmful for the general public, it is harmful to two groups in particular—smokers and children. It is important to note that Healthy People 2000, published by the federal government, identifies radon exposure as a significant health threat and has created a goal of having 40% of all homes tested by the year 2000.

Kim Witte is an associate professor, Janet McKeon Lillie is a lecturer, and Kenzie A. Cameron, Maria Knight Lapinski, and Wen-Ying Liu are doctoral students in the Department of Communication at Michigan State University. Judy Berkowitz is an assistant professor in the Department of Communication at Emerson College.

Address reprint requests to Kim Witte, PhD, Michigan State University, Department of Communication, East Lansing, MI 48824-1212; phone: (517) 355-9659; fax: (517) 432-1192; e-mail: wittek@pilot.msu.edu

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United States, radon is responsible for more deaths per year than drownings, fires, and airline crashes combined. Although a radon problem can be easy to assess and fix, individuals across the United States are often unaware of its seriousness and fail to determine if they have a problem and take action to eliminate it.\textsuperscript{1,5} For example, a recent study found that (1) only 9\% of all homes in the United States had ever been tested for radon and that (2) "while nearly 1 out of every 15 homes in the United States is estimated to have elevated radon levels, only about 1/4 of the homes tested and found to have radon levels above the [4] pCi/L guideline have been mitigated" (p. 10).\textsuperscript{5}

Health protective action against radon by members of minority groups is even less. A 1993 study showed that "many lower-income and minority populations have lower levels of radon awareness and are much less likely to have tested their homes for radon than the rest of the population" (p. 9).\textsuperscript{5} Furthermore, "many public outreach campaigns fail to communicate radon information effectively to [lower-income and minority] populations" (p. 9).\textsuperscript{5} While effective public health campaigns regarding radon awareness and reduction are desperately needed for these groups, little is known about what minority groups think or know about radon. Although several surveys and experiments have been conducted to assess public perceptions of radon and decision-making processes leading to health-protective behaviors, radon awareness research has focused mostly on white populations.\textsuperscript{4,6-12} For example, 94\% of the population was white in the Kentucky Health Survey\textsuperscript{9} and 91\% of a random sample in Florida was white.\textsuperscript{4} This neglect of minority populations in radon awareness research appears widespread.

The lack of attention to minority groups is alarming given that some groups, specifically African Americans, are at greater risk for harm from radon exposure than either whites or other minorities.\textsuperscript{13} Because African Americans have higher rates of smoking than all other population groups in the United States except American Indians, and the joint effects of smoking and radon exposure are especially lethal (resulting in almost 10 times the rate of lung cancer), African Americans are at greater risk for lung disease from radon exposure than other populations.\textsuperscript{1,14-15} Prior research shows a marked lack of awareness regarding radon among those studied, mostly whites.\textsuperscript{4,6-12} But little, if anything, is known about African Americans' awareness of radon. Any lack of awareness about the radon issue is especially problematic for African Americans, given their higher smoking rates and the deadly combination of radon exposure and smoking.

It is well documented that the culture in which we are raised shapes how we interpret and respond to health risk messages—some risks may be emphasized or addressed, whereas others are downplayed or ignored.\textsuperscript{16-17} Well-designed campaign evaluations are needed if campaigns are to work as intended.\textsuperscript{18-20} Theory-based evaluations are useful in

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\item b. It is relatively easy to detect the radon level in one's home and to reduce it such that it meets the Environmental Protection Agency's (EPA's) acceptable standards (although mitigation can be costly). The EPA recommends that each floor (up to the third floor) of all homes and schools be tested for radon. Short-term tests (from 2 to 90 days) can be purchased at local hardware stores ($15-$20) or conducted by state-certified radon testers ($50-$75). Long-term tests (90 days or more) give more accurate readings and are usually conducted by certified radon testers (about $75). Typically, test kits are placed in regularly used rooms in the lowest living space in a house (e.g., playroom in a basement). After a specified time, the test kit is sealed and sent to a lab for analysis. Test results are sent back to the consumer's home. If radon levels exceed recommended levels (i.e., greater than 4 pCi/L [picocuries per liter]), then one of several methods may be employed to decrease radon seepage into one's home. Typically, sealing cracks in floors, walls, around pipes (e.g., sump pump covers), and so on solves the problem. The costs associated with radon reduction range from about $75 to $2,000, according to the EPA and the American Lung Association.\textsuperscript{1,42-43} These costs are not trivial but are comparable to other home maintenance costs such as repair of roof, electrical system, or plumbing.
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that they allow one to examine the underlying mechanisms that may be causing a campaign to work or fail. While theory-based evaluations are rare, they are often proposed as the ideal. Thus, the goals of this study are to assess, in a theoretically based evaluation, African American knowledge and perceptions toward radon and reactions to existing radon awareness and reduction campaign materials.

**A HEALTH RISK MESSAGE THEORY: THE EXTENDED PARALLEL PROCESS MODEL**

A health risk message theory, called the extended parallel process model (EPPM), will be used as the theoretical framework for the evaluation. The EPPM is based on 40 years of fear appeal research and integrates many different health behavior change models into one. Tests of it have been generally supportive across a variety of topics (e.g., skin cancer, HIV/AIDS prevention, tractor safety, etc.) and populations (e.g., farmers, Hispanic immigrants, juvenile detention youth, etc.). Briefly, the EPPM suggests that campaign messages should contain a threat component and an efficacy component (see Witte for full explanation of model). The threat portion of the message tries to make the audience feel susceptible to a severe threat. The efficacy portion of the message tries to convince individuals they are able to perform the recommended response (i.e., self-efficacy) and that the recommended response effectively averts the threat (i.e., response efficacy). The EPPM argues that individuals have one of three responses to a fear appeal. First, if a fear appeal fails to induce fear or promote any sort of perception of threat, people will fail to react because they are not motivated.

Second, when individuals perceive high levels of threat (e.g., "I’m at risk for significant harm from radon exposure") and high levels of efficacy (e.g., "But I know I can detect a radon problem and fix it if I have one"), then they are motivated to protect themselves against the threat by making recommended behavioral changes (e.g., "I’m going to get my home tested for radon and fix it if I have a problem"). Thus, when people have high-threat and high-efficacy perceptions, they are motivated to control the danger by taking self-protective actions.

In contrast (and third), the EPPM suggests that when threat perceptions are high but efficacy perceptions are low (e.g., "I don’t think I’ll be able to adequately test my home for radon and even if I can, I won’t be able to get rid of it completely"), people give up controlling the threat and begin instead to control their fear by denying they are at risk (e.g., "My home is not in a risky area"), defensively avoiding the threat (e.g., "It’s too scary, I’m not even going to think about it"), or lashing out in anger against campaigners (e.g., "There really is no harm from radon, it’s just another government plot to scare us"). Thus, when people have high-threat and low-efficacy perceptions, people give up controlling the danger (they think it is futile to do so) and instead turn to controlling their fear through denial, defensive avoidance, or reactance. Fear control and danger control processes are mutually exclusive in that if one is engaging in fear control processes and denying he or she is at risk, then one usually is continuing the risky behavior and not making appropriate danger control behavior changes.

In sum, the EPPM argues that perceived threat motivates action—any action—and that perceived efficacy determines whether individuals will act in a self-protective manner (danger control processes dominating) or an avoidant manner (fear control processes
dominating). Thus, the level of perceived threat determines the strength of response to a health threat, whereas the level of perceived efficacy determines the direction or nature of that response (pro- or anti-health).

**Application to Radon**

In terms of the health threat of radon for African Americans, the EPPM would suggest that those individuals with high-threat perceptions toward radon and high-efficacy perceptions toward testing and reduction efforts would be most likely to engage in health protective behaviors (danger control processes). Thus, if the evaluation reveals that perceptions are lacking or are in directions opposite to that needed to promote health-protective behaviors, then the EPPM's guidelines can be used to develop effective campaign materials for African Americans. In addition, the evaluation should reveal whether existing campaign materials are promoting perceptions and beliefs that result in health-protective actions (i.e., danger control responses) or whether they are inadvertently promoting health-avoidant actions (i.e., fear control responses) among African American audiences. In sum, the evaluation sought to discover existing knowledge and perceptions regarding the radon issue, as well as evaluate several campaign materials according to the components of the EPPM (i.e., susceptibility, severity, response efficacy, and self-efficacy).

**METHOD**

**Overview**

Nine focus groups were conducted with African Americans from six counties representing diverse areas in Michigan's lower peninsula. Focus groups were chosen as an appropriate method because they are an especially advantageous means of gathering information on difficult-to-reach populations.²⁴

**Site Selection**

There were two selection criteria for choosing the counties included in the study. First, we were interested in conducting focus groups in counties with high proportions of African American residents. Second, we were interested in conducting focus groups in counties with elevated radon levels (as determined by the Michigan Department of Public Health [MDPH]). According to the U.S. Census,²⁵ Wayne, Genessee, and Saginaw counties had the greatest proportion of African American residents in Michigan (40.21%, 19.57%, and 17.39%, respectively). The remaining three counties—Calhoun, Ingham, and Kalamazoo—all had elevated radon levels (MDPH zones 3, 4, and 5, with 5 being most radon contamination) and a significant proportion of African American residents (10.58%, 9.87%, and 8.90%, respectively).³
Participants

Nine group sessions were conducted with a total of 64 participants. Participants were recruited at worksites or churches and were eligible for participation if they smoked or had ever smoked or if they had children under age 12. Ninety-five percent of the participants were African American. The remaining 4 participants classified themselves as Hispanic, Native American, White, and Other. Half of the participants were married, 27% were single, and 20% were widowed, separated, or divorced. Participants ranged in age from 18 to 79 years ($M = 43.37$). They had a median income of $20,000 to $29,999, and 85% had, at a minimum, graduated from high school. Eighty-four percent owned a home, whereas 16% rented. Participants had lived in their current location an average of 4 to 6 years. Of the 64 participants, 25% indicated that they currently smoked cigarettes, an additional 17% said they were former smokers, and 58% indicated that they never smoked. Fifty-two percent indicated that they had at least one child younger than age 12 living in their household. In addition, 41% indicated that their family had a history of cancer, and 8% indicated that they or a family member had health problems due to smoking.

Focus Group Protocol

*Knowledge and perceptions.* The first section assessed knowledge of radon, radon testing, and radon reduction. The remaining sections used constructs from the EPPM to develop questions. Specifically, the second section assessed perceived severity of radon, perceived susceptibility of harm from radon, perceived response efficacy of testing and reduction, and perceived self-efficacy toward testing and reduction. The third section determined radon reduction behaviors in which participants might have engaged.

*Campaign materials evaluation.* The fourth section assessed reactions toward existing campaign materials (described below) in terms of the level of perceived severity or susceptibility and the level of response and self-efficacy they promoted. The fifth and final section elicited ideas and suggestions from focus group members on what effective campaign materials targeted toward African American audiences should address.

Campaign Materials Evaluated

Three genres of campaign materials were evaluated: pamphlets, trinkets (magnets, bookmarks, stickers), and children's coloring books. A broad range of materials was gathered from the main organizations conducting radon awareness and reduction campaigns in Michigan (i.e., American Lung Association, Michigan Department of Public Health, Environmental Protection Agency [EPA]). Copies of each campaign material are available on request from the authors. In the pamphlet genre, the main radon pamphlets, distributed by the American Lung Association, the EPA, and the MDPH, were selected. The trinkets and coloring books also were gathered from a variety of agencies and were reviewed as a genre (e.g., did people think that trinkets were a good way to induce severity? What did people think about coloring books as a means to induce susceptibility?). According to the experts on MDPH's Radon Awareness Advisory Committee
(RAAC), these campaign genres/materials were a representative and thorough cross-section of the campaign materials currently disseminated.

**Procedure**

*Pilot tests.* The focus group protocol was pretested in two ways. First, the researchers met with the RAAC of the MDPH to review the protocol for completeness, accuracy, and flow. Second, the focus group protocol was pilot-tested with African American homeowners to determine (1) flow of the protocol, (2) timing (e.g., how long does the focus group take?), (3) understandability of the questions (e.g., is the language used appropriate and easy to understand?), (4) problems with content (e.g., are there certain items that people refuse to answer? why?), and (5) introductory procedures (e.g., scripts for introducing the topic and securing cooperation with subjects). Minor modifications were made to the introductory procedures only as no other problems emerged.

*Recruitment phase.* Local county health department officials in the state of Michigan assisted in the recruitment of potential focus group participants. Public health officials in eligible counties received a packet of information describing the project and containing recruitment materials, including flyers, scripts, and sign-up sheets. Each public health official attempted to recruit a minimum of 10 people for each focus group, primarily at worksites and at churches. In addition, each official set up the site, day, and time of the focus group(s) for his or her county. Many officials passed the recruitment materials on to church leaders; church leaders then coordinated the recruitment of focus group participants.

*Focus group phase.* The night before each focus group, a research team member contacted participants to remind them of the location and time of the focus group. At the scheduled time and place, the participants gathered for refreshments and were asked to complete a two-page demographic and health risk profile. (Child care was provided.) Next, the facilitator began the session and established rapport by introducing herself as well as the project, stating the goals of the focus group session and explaining that participation was voluntary and that anonymity was guaranteed. Questions were fielded and then the focus groups began. Each session was audiotaped and lasted approximately 1 ½ to 2 hours. Three of the focus groups went overtime; therefore, coloring books were not evaluated in these three groups. When the sessions were over, the participants were thanked, compensated for their time ($15), and given a packet of information about radon. Discussion group size ranged from 3 to 14 individuals ($M = 7.11$). One group was composed solely of men, two groups had both men and women, and the other six groups were composed of all women.

*Analysis phase.* Standard focus group analytical procedures were followed, as outlined by Stewart and Shamdasani. First, the audiotapes of the focus groups discussions were professionally transcribed. Second, the research team (six persons) met and developed a classification scheme based on several passes through the transcripts and based on our theory. Third, at least two members of the research team independently examined each transcript and extracted phrases or statements that fit into each category. The coded material for each category consisted of phrases, statements, or words that best represented each category. Fourth, the coded material was placed into discrete tables, and the entire
research team met together as a whole to interpret the analyses and write up the report. This qualitative and interpretive approach to data analysis was preferred over a quantitative approach because the theoretically developed questions provided enough structure to the data.

**KNOWLEDGE AND PERCEPTIONS RESULTS**

**Knowledge**

Knowledge about radon was sorely lacking. Most participants only knew that radon was a gas and nothing more. For example, “It's a naturally occurring gas,” and “It's invisible... like carbon monoxide,” were common answers. Some members of groups also were aware of some of the properties of radon—namely, that it is colorless and odorless. However, most members of groups held inaccurate knowledge about radon. When asked what radon was, many members confused radon with carbon monoxide and other fumes/gases, such as water heater fumes, cigarette smoke, and septic gases. For example, participants stated that “you can smell it from the septic tank,” and radon comes “from all the chemicals that we use.” Overall, most participants did not know anything about radon and expressed concern about how radon affects one’s health, how radon can be detected, and how to fix the radon problem.

*Health-related knowledge.* Many group members appeared to know of a connection between radon and cancer but did not know any specifics about which type of cancer was caused by radon. One viewed radon as a “cancer-causing agent which has cumulative effects over years.” Others felt that it “lives inside and eats away at you and causes cancer.” In one group, it was expressed that radon is a “silent killer... like high blood pressure.” In addition to the possibility of cancer, group members mentioned other health problems they believed to be caused by radon, such as headaches, rashes, allergies, gastrointestinal symptoms, and asthma.

*Radon detection knowledge.* When asked how one would detect radon, many focus group participants mentioned that the local utility agency (Consumers Power) provides such services. Others mentioned that a radon detector would be useful. Some indicated accurate knowledge of types of radon detectors, saying that one can purchase a radon “detector with charcoal,” whereas others indicated knowledge of locations where one can purchase radon detectors, such as hardware stores.

Other group members, however, had inaccurate knowledge of how to detect radon, saying that “an alarm would make a beeping noise” if radon were in the room. More specifically, many individuals believed that a carbon monoxide detector would detect what they thought was radon, and therefore one should “put the detectors in the places where people sleep.” Furthermore, some individuals believed that radon could be detected through some type of ultraviolet scanning procedure. In addition, some participants believed it is impossible to detect radon. Responses such as these indicate the contradictory “knowledge” about radon detection procedures.

*Radon reduction knowledge.* When asked how one would fix a radon problem in one’s home, responses ranged from appropriate answers such as sealing cracks and sump pumps to more extreme answers such as moving out of the house or, at the very least, remodeling.
the entire house. In addition, participants questioned the likelihood of removing a gas that one cannot smell, see, or taste. Some participants were skeptical of the effectiveness of fixing radon as they expressed that "you never know how long it will take to seep in again."

Perceptions

Overview. Generally, prior perceptions about the threat of radon and the efficacy of recommended responses appeared minimal. Many participants appeared to be generating perceptions, as opposed to recalling existing perceptions, when asked about the seriousness of radon or their susceptibility to it. For example, 4 of 9 groups had no prior beliefs about their susceptibility to radon exposure.

Of those who did have prior perceptions, most thought that radon was an extremely serious threat and that they were at high risk for being exposed to it. Those people with prior opinions had strong beliefs that radon was a killer and that it was similar to carbon monoxide poisoning. They also thought they would be able to use test kits to detect radon but were less confident about whether they would be able to fix a radon problem. Participants also appeared to think that test kits would accurately detect radon but that repairs would not eliminate or even substantially reduce the problem.

Severity. Overall, the majority of participants had high severity of threat perceptions toward radon. One group member said, "I think [radon] is serious, hazardous." Another participant agreed, "I feel that it is dangerous because it does give cancer, right? So many people are dying of cancer." However, a significant number of participants had no existing perceptions of severity toward radon prior to the focus group. Those with no prior perceptions of severity often generated perceptions of radon based on the discussion of other group members. For example, one group member said, "Now that I am listening [to the discussion] it’s kind of frightening ‘cause I have never heard of this."

Susceptibility. Perceived susceptibility to exposure to radon risks varied considerably across the groups. The majority of the group participants thought that it was very likely that they would be exposed to radon risks in their homes. One group member said, "It’s everywhere," and another added, "There might even be some here." Two groups had low-susceptibility perceptions and did not believe they would be exposed to or harmed by radon. "I don’t think [my home] is at risk . . . we would have found it out," said one participant. Other group members were unsure about their susceptibility to the risks associated with radon. For example, one group member said, "I think my house is pretty well tight . . . but with radon being such an odorless gas . . . it may seep in." Again, many participants had no prior beliefs about their susceptibility to radon exposure or harm.

There was a significant minority of participants who were more concerned about radon than they needed to be. For example, they thought radon could appear in our food since food grew in the soil and the soil might contain radon. In addition, some were concerned about their children playing in sandboxes and inquired, "Are we sending our children out to play in a death trap?" Many participants expressed concern for the susceptibility of other family members: "My daughters live in homes and they’re both old homes and that’s what I’m concerned about because my grandkids live there. Their houses are real old."
Response efficacy. Most people thought the tests would adequately detect radon (although some questioned the reliability of the tests), and most individuals thought that it would be extremely difficult if not impossible to eliminate or decrease a radon problem in their homes. For example, one member stated, “It seems like just patching the problem, take care of the hole and you may still have the radon factor.” Participants were especially pessimistic about whether it was possible to fix a radon problem in one’s water supply. One said, “If you test [the water] and it is high, how are you going to get it out?”

Self-efficacy. It appeared that most individuals had not thought about testing for radon or about fixing any problem. None of the participants had performed a test or actually fixed a radon problem. Therefore, most individuals appeared to have no prior beliefs about their perceived ability to perform recommended responses. However, when asked about testing or fixing radon problems in their homes, the groups thought they could easily and feasibly perform tests but that they would not be able to eliminate or substantially decrease any radon problems. For example, they thought the tests would be self-explanatory and that the instructions would probably adequately tell them what to do. Participants said, “As long as there were instructions included,” it would not be difficult to perform the radon detection test. Not all group members were as confident, however. One group member expressed doubts about performing the test: “Instructions are not always clear if you haven’t had the experience. I would always wonder if I did it right.”

In addition, many participants thought that sealing cracks would be too costly and most likely ineffective in preventing radon exposure. One group member expressed, “Once you seal your house, it will get old and crack and leak in again. That will cost, cost, cost.” Furthermore, some participants believed themselves unable to eliminate a radon problem in the water. Perceived cost of the test and of fixing one’s home were barriers to individuals’ addressing a radon problem in their home.

Overall, about half the participants thought they could do something about a radon problem, and others thought they would be unable to adequately do anything to prevent harm from radon. They thought that because radon was in the air, everywhere, they were unable to do anything about it. Participants wanted reliable kits and training sessions or demonstrations on how to correctly use test kits.

Additional perceptions. Many individuals expressed suspiciousness and distrust of yet another “new” health threat promulgated by the government and media. “I’ve never heard any of the experts talk about this issue and all of the sudden here it is,” said one participant. Another participant said, “Why is it such a significant thing now? It has been here on earth for all these many years.” Some suggested that the government was withholding information and might have even produced radon through nuclear testing. Many participants questioned whether radon was a problem or whether big business had dreamed up a new problem for them to be worried about as a ploy to make money through radon test kits and repairs (e.g., “All of the sudden it’s a way of making money for a whole market of new businesses.”).

In addition, many participants thought that radon ranked relatively low on the list of health threats to be concerned about. For example, one participant said, “This is the norm of everyday life in Black homes. . . . you have other priorities that are more pressing, that you are more concerned about, and what do you care about something that you can’t see, taste, smell, or whatever?” Many people wanted to know if there was any legislation about radon. For example, they wondered whether landlords were required to test and/or fix
radon problems for renters. Participants were concerned about the safety of their workplace as they spend most of their time at that location.

**Behaviors**

None of the participants had tested their home for radon; hence, none had fixed a radon problem in their home.

**CAMPAIGN MATERIALS EVALUATION RESULTS**

First, the three pamphlets were evaluated and then the trinkets and coloring books. This order of evaluation was chosen because we wanted to get specific details on the content of the three pamphlets (which took more time and cognitive effort) and only overall impressions of the trinkets and coloring books as a genre.

**Pamphlet 1—“Radon: Something You Can Live Without,” MDPH (in collaboration with the American Lung Association and the American Cancer Society)**

*Susceptibility.* The degree of perceived susceptibility induced by this pamphlet appeared to be high. Most of the participants thought this pamphlet made people feel at risk for harm from radon exposure. For example, they said that the picture on the front page “makes you feel susceptible because it [shows radon] seep[ing] in through cracks in cement.” Similarly, they thought that the information given on the “estimated radon deaths [in the pamphlet] make you feel no one is exempt.”

*Severity.* The degree of perceived severity induced by this pamphlet appeared to be moderately high. The majority of the participants thought that the information given about radon conveyed its seriousness. For example, participants thought the pamphlet emphasized that the “consequence of radon equals death.” Also, they said that the “1 in 8 homes [information] conveys seriousness” and that the “45% of homes” statement “makes it sound serious.” Some participants thought that citing the surgeon general in the pamphlet made radon seem serious because “[it’s] serious if the Surgeon General talks about it.” However, some participants did not think that the pamphlet conveyed adequate amounts of danger because it depicted a “cozy home [that was] peaceful.”

*Response efficacy.* The pamphlet appeared to induce low levels of response efficacy. Participants said that the pamphlet made them feel like “[we] can’t get rid of it—it’ll seep in anyhow.” They also pointed out, “It just says it’s fixable but doesn’t say how” and it “does not address how to prevent a recurrence of the problem.” One concluded, “Knowing you have the problem isn’t enough; [the] brochure does not address what you should do to fix the problem.”

*Self-efficacy.* The pamphlet appeared to induce mixed levels of self-efficacy. For example, the “brochure tells you about the kit, but doesn’t assure you that you can perform it easily.” Also, some people thought they “may procrastinate [in getting their home
tested] because of costs.” However, a few thought that the pamphlet made them feel like they “can buy” the “inexpensive kits.”

General comments. Participants thought that listing the costs of the test kits in the pamphlets would be a barrier, especially for senior citizens and low-income persons. Also, people thought that the pamphlet “[did] not grab attention, so people wouldn’t pick it up to read it.” Many people thought the pamphlet was too wordy. They wanted more color and pictures.

Pamphlet 2—“Protecting Yourself & Your Family From Radon,”
American Lung Association

Susceptibility. This pamphlet appeared to promote moderately low perceptions of susceptibility. Many participants thought, “If you don’t smoke, [the] brochure doesn’t apply [or] make you feel susceptible.” Similarly, some thought it did not make them feel susceptible unless they already had lung problems (e.g., asthma or bronchitis). Furthermore, some thought that “[radon’s] not going to be in your soil” unless “[you live] near an explosive or uranium plant.”

Severity. This pamphlet appeared to induce moderate perceptions of severity. Some people thought that having the American Lung Association as a sponsor made the problem of radon seem more serious. Others thought that relating the risk of radon to cigarette smoking, which most people are familiar with, made radon seem more serious. Others thought that because the text went into depth about radon, radon seemed serious: “If it has a lot of info, it seems more serious; but [there’s a] tradeoff because people don’t want to read as much.”

Response efficacy. Low levels of response efficacy toward reducing radon in the home seemed to be induced by the pamphlet. Some people said that the pamphlet “doesn’t say how to fix [our] homes.” Mentioning the costs of fixing the home in the pamphlet appeared to produce skepticism about whether “fixing your house once [would] permanently fix the problem, it [would] be an ongoing and expensive battle.” The cost issues seemed to be paramount in people’s minds: “[I] may not be able to afford it [fixing a problem], but it is possible that you could reduce it.” The pamphlet did appear to produce a moderate level of response efficacy for detecting radon. For example, participants said although the pamphlet “doesn’t say how” to test for radon, it did make them feel like they would be “able to check it out.”

Self-efficacy. The self-efficacy level promoted by the pamphlet appeared to be relatively low. For example, “It is like you feel [that] as an individual, you do not have any power” and have no “control over the source [of the radon problem].” Similarly, others thought that the “responsibility of the individual is not reflected in the brochure.” However, others thought that the pamphlet made them feel like they “would be able to do home repairs themselves” and that they would be able to “look into [it] right away.”

General comments. Many participants thought that the brochure did not seem applicable to those who did not smoke, given its apparent focus on the link between smoking, radon, and lung cancer. They made specific recommendations: “The brochure asks questions; it would be better if they were statements,” “make consequences of what
happens to your lungs more clear,” and state “what diseases does radon exposure cause exactly.” They said that the “1 in 15 homes” reference minimized risk to them (one suggested, “one house on every block”). Also, participants criticized the materials for containing “no hard core facts about radon” and thought that the statistics were confusing and could be misinterpreted. For example, the “statistics are cumbersome [and do] not mean much,” and the “technical/scientific lingo makes it difficult for the layperson” to understand. Also, “‘picocuries per liter’ [is] difficult to understand, how big is a picocurie? It’s not something there’s a tangible idea for that amount.” The outlined costs of $500 to $2,500 seemed prohibitive to many and resulted in responses such as, “What happens to the person who can’t afford to fix their home?” and “if you can’t afford to fix your home or to move, what do you do?” Finally, bringing up the issue of radon in the soil seemed overly frightening: “When you start talking about the soil, you know you go to playgrounds and they have sand pits for the children playing, what are we doing? You know our children, putting them in a death pit? And, I mean it makes you wonder?”


Susceptibility. Participants thought the pamphlet conveyed a moderately high level of susceptibility. The emphasis in the pamphlet on the many ways that radon could get into one’s home and the CDC endorsement made participants feel very susceptible. However, the focus on suburban rather than urban homes appeared to diminish susceptibility (i.e., participants thought that the pictures in the pamphlet were of suburban and not urban life and, therefore, not as relevant to many African Americans).

Severity. The pamphlet appeared to induce mixed levels of severity. Some people thought that the pictures/graphs/visuals, the EPA and CDC logos, and statistics conveyed high levels of seriousness. However, other people thought that the “happy family on the cover” and the information presented in the pamphlet made the radon problem seem less serious (e.g., from the “information presented, radon isn’t scary.”).

Response efficacy. The pamphlet appeared to induce a high level of response efficacy for fixing a radon problem. Participants thought that the pamphlet “addresses how to reduce radon,” emphasized that “you can fix your home, but it won’t eliminate the problem,” and explained that “you can get it to acceptable radon levels, even very high levels can be reduced to acceptable [levels].” (There was no mention of radon testing.)

Self-efficacy. Participants thought the pamphlet “makes people feel they can reduce radon levels” and be able address a radon problem. (There was no mention of radon testing.)

General comments. Participants thought that the pamphlet was too “time-consuming to read” and may be difficult for low-literate audiences. For example, “[there’s] too much information, especially if you don’t like to read.” Also, people thought that it needed to be more eye-catching and interesting. Finally, the participants did not “like the fact that this is solely from the EPA.” “We’d rather have multiple sponsoring agencies because then it gives it more credibility and makes it seem like it is more than just one person’s point of view.”
Trinkets

The following trinkets were evaluated as a genre: (1) “Radon: Call or Test Your Home Today” (magnet: dog with gas mask and 1-800 number), (2) “1-800-RADON-GAS: Radon, Something You Can Live Without” (monkeys on bookmark), (3) “Radon: Get Rid of It” (magnet: pencil erasing the word radon), (4) “What You Don’t Know Can Hurt You: Radon” (EPA sticker with 1-800 number), (5) “Find the Family with the Radon Problem” (EPA magnet of homes of President Clinton, Gilligan, the Adams family, and your family).

Susceptibility. On the whole, the trinkets did not appear to convey whether one was susceptible to harm from radon. However, some aspects of the trinkets made participants feel susceptible to harm from radon (e.g., the “dog with the gas mask catches your attention and makes you feel at risk”).

Severity. Participants thought that the trinkets minimized the severity of the radon problem. For example, they thought that the “monkeys are cute, but they do not make radon look serious, seems more of a joke.” Overall, they thought that the trinkets made “radon seem like a trivial problem.”

Response efficacy. Participants thought that the trinkets offered some response that might help solve a radon problem—namely, “call the 1-800 number.” They also pointed out that the trinkets did not provide any information about how to check out or reduce a problem.

Self-efficacy. The participants did not think that the trinkets addressed the issue of one’s ability to perform the recommended responses.

General comments. Some participants liked the trinkets and thought they would generate questions and awareness. Others thought that the trinkets trivialized the radon problem and made it seem like “a joke, makes you feel like it’s something to laugh about and not worry about.” Many respondents thought that the trinkets should be scarier to motivate action, even suggesting adding a skull and crossbones or showing dead rats coming out of the wall (“Black people need to see that... they need to have a little fear”).

Coloring Books

The following coloring books were evaluated as a genre: (1) “Jason’s Radon Adventure,” Illinois Department of Nuclear Safety; (2) “The Radon Student Activity Book,” Arizona Radiation Regulatory Agency and the Arizona Department of Real Estate; and (3) “Radon Awareness Coloring Book,” American Lung Association–Alabama, Huntsville-Madison Health Department.

Susceptibility. Participants thought that the coloring books conveyed some risks of harm from radon. However, most participants questioned whether kids or parents would really look at the pictures or read the content. For example, respondents stated that “kids won’t pay attention to what they are coloring.” Also, some participants thought that “the pictures alone don’t make you feel susceptible,” and they doubted whether anyone would read the text accompanying the pictures.
Severity. Participants thought that the coloring books might make parents feel that radon was a severe problem but not influence kids’ perceptions about radon. Some participants thought that by virtue of being a coloring book, perceptions of severity might be diminished. Some of the pictures did make the parents feel as if radon was a serious problem (e.g., “the picture of radon seeping through the soil makes it seem serious”), but most of the pictures did not (e.g., “the cover guy doesn’t look like he’s in danger, he needs to look more serious”).

Response efficacy. Most participants thought that the coloring books did not address whether recommended responses worked. However, some participants thought that the coloring books suggested reduction procedures but did not show these procedures to be effective (e.g., “[it makes me feel like] you could do something, but it wouldn’t be effective”).

Self-efficacy. Participants thought that the coloring books did not address one’s ability to test or fix a radon problem. Some participants questioned targeting a coloring book toward children when “it is not their responsibility” and the children would not be able to do anything about a radon problem. Also, “because it’s targeted at kids, it doesn’t make you feel like you can do anything about it.”

General comments. The participants thought that kids would color the coloring books but would not read them or pay attention to what they were coloring. They thought that if one really wanted to reach kids, then a video or “Sega-Genesis game on radon” would work better. They also thought that the coloring books would not reach parents because few parents interact with their children while their children are coloring. Overall, they liked the coloring books and thought they might increase awareness, but they did not believe the books would effectively reach people and/or that people would really read them.

Recommendations for Effective Campaigns

Respondents requested simple, eye-catching pamphlets that used vivid imagery, fear, and humor (all together). They thought that most campaign materials were too technical, too scientific, and that information needed to be relayed to audiences in a clear, vivid style with a lot of pictures. Table 1 contains specific recommendations for distribution channels, sources of materials, and information needed in the materials.

DISCUSSION

Knowledge and Perceptions Evaluation

The evaluation revealed that most focus group participants had limited and often inaccurate knowledge about radon gas and radon testing and reduction procedures. For example, many comments throughout the focus groups indicated that participants confused radon with carbon monoxide. Furthermore, although some participants were aware of radon test kits, most participants did not know how to detect radon. In addition, most
Table 1. Recommendations Offered by Respondents for Effective Radon Awareness and Reduction Campaigns Targeted Toward African Americans

<table>
<thead>
<tr>
<th>Distribution Channels (for pamphlets, posters)</th>
<th>Sources of Messages</th>
<th>Information to Include</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct mail</td>
<td>African American celebrities</td>
<td>Charts/clear visual depictions</td>
</tr>
<tr>
<td>Flyer with utility bill</td>
<td>Sports stars</td>
<td>Emphasize death, be blunt</td>
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<tr>
<td>Church bulletin</td>
<td>OSHA representative</td>
<td>Explain links to disease</td>
</tr>
<tr>
<td>Grocery store bulletin board</td>
<td>Friends/neighbors</td>
<td>Address concerns of being conned/victim of scam</td>
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<tr>
<td>TV commercials</td>
<td>Councilmen/councilwomen</td>
<td></td>
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<tr>
<td>Doctor’s office</td>
<td>Surgeon general</td>
<td>Address cost issue</td>
</tr>
<tr>
<td>Schools</td>
<td>Teachers</td>
<td>Offer subsidies for tests/fixing problem</td>
</tr>
<tr>
<td>Bus stops</td>
<td>Utility companies</td>
<td>Give away test kits</td>
</tr>
<tr>
<td>Bars</td>
<td>Michael Jordan</td>
<td>Distinguish between radon and carbon monoxide</td>
</tr>
<tr>
<td>Community centers</td>
<td>Rappers</td>
<td>Use simple language</td>
</tr>
<tr>
<td>Voting sites</td>
<td>American Lung Association</td>
<td>Provide drop-off sites for test kits</td>
</tr>
<tr>
<td>Library</td>
<td>American Cancer Society</td>
<td>(instead of mail)</td>
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<tr>
<td>Neighborhoods (face-to-face channels)</td>
<td>Public Health Department</td>
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<tr>
<td>Fast-food restaurants</td>
<td>United Way</td>
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<tr>
<td>Paycheck stubs</td>
<td>Consumer Reports</td>
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<tr>
<td>Worksites</td>
<td>Preachers</td>
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<tr>
<td>Door-to-door</td>
<td>Parent-teacher organization meetings</td>
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<tr>
<td>Targeted radio</td>
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<td>Targeted cable (BTN)</td>
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<tr>
<td>Television shows</td>
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<tr>
<td><em>(This Old House)</em></td>
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<tr>
<td>WIC offices</td>
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<tr>
<td>Targeted magazines</td>
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<tr>
<td><em>(Ebony)</em></td>
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<tr>
<td>Adult education centers</td>
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<tr>
<td>Movie theaters</td>
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<td>Documentaries</td>
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<td><em>(20/20, 60 Minutes)</em></td>
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<tr>
<td>Billboards</td>
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<td>No telephone</td>
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<tr>
<td>No bumper stickers</td>
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</tbody>
</table>

respondents did not know what to do if elevated levels of radon were found in one’s home. The lack of accurate knowledge about how to effectively avert harm from radon among African Americans suggests a low level of perceived self-efficacy regarding radon
reduction techniques. Furthermore, many African Americans expressed skepticism that they would be able to get rid of radon even if they knew what to do. Thus, perceived response efficacy appeared low too.

The lack of knowledge about radon also appeared to contribute to increased perceptions of severity and susceptibility to harm from radon. People appeared to be afraid of the unknown and expected the worst. Specifically, focus group participants generally perceived radon to be a serious threat. Many also felt they were susceptible to radon risks in their own homes. Some group members were particularly concerned about individuals other than themselves, such as individuals with low incomes and the elderly (they appeared to be worried about how these individuals would cover the costs of fixing a radon problem). Although most individuals had no prior beliefs about performing recommended responses, after a brief discussion about radon testing, most felt they could perform a radon test and that the test would detect the presence of radon. However, most were unsure of their ability to eliminate radon in their homes and water supply. Many participants reasoned that if radon was a gas like oxygen or carbon monoxide, then it would be impossible to prevent it from getting into their homes. Also, the perceived high cost of fixing a home contributed to a sense of helplessness among the participants. Many participants thought that $500 for radon mitigation was prohibitive and that this would interfere with their ability to do anything to decrease radon exposure.

Overall, the participants expressed low perceptions of self-efficacy and response efficacy (they lacked the skills to protect themselves against radon and expressed doubt that they would be able to do anything anyway) and high perceptions of severity and susceptibility toward radon exposure (they often thought it was worse than it really was). According to the EPPM, low perceived efficacy and high perceived threat is a dangerous combination likely to lead to fear control strategies such as defensive avoidance, denial, or reactance (instead of self-protective danger control actions). Indeed, reactance and denial strategies did emerge throughout the focus groups, as evidenced by the following comment:

Now who is the EPA and my question would be like, oh well, they said it cost $500 to $2500 a home. Well, they just tryin' to get my money. The EPA has created or invented this problem, radon, to sell me or make me spend all my money. Well, there's really no problem.

This type of suspiciousness toward the government and large corporations was an unexpected theme of many of the focus groups. However, the EPPM would predict this type of response given the participants' generally low-efficacy and high-threat perceptions. Future radon awareness campaigns need to explicitly increase perceptions of self-efficacy and response efficacy, as well as accurately delineate the severity of radon exposure and one's susceptibility to it.

Campaign Materials Evaluation

Reactions to the campaign materials were mixed. The MDPH pamphlet produced strong perceptions of threat toward radon and relatively low perceptions of efficacy toward recommended responses. According to the EPPM, this pamphlet would motivate action but may not produce the desired actions because people appeared to doubt whether recommended responses would work. The American Lung Association pamphlet was
seen as relevant to smokers only. Respondents' threat perceptions appeared to be mini-
mized somewhat in response to the pamphlet because most did not smoke and, therefore,
the pamphlet made them feel like they were not at risk for harm from radon. Furthermore,
the pamphlet appeared to induce low levels of perceived efficacy. According to theory,
this pamphlet might fail to motivate action (because of minimized threat perceptions),
and if it did motivate action, it may not produce the desired action because of the
low-efficacy perceptions. The EPA pamphlet also appeared to motivate action because it
induced at least moderate perceptions of threat. In addition, it produced relatively high
levels of perceived efficacy. Therefore, the EPPM would suggest that this pamphlet would
motivate appropriate health-protective action given its promotion of high-threat/high-
efficacy perceptions. However, the main criticism leveled against this pamphlet was that
it was too long, too wordy, and too technical. Respondents questioned whether people
would actually sit down and read it. For those who would take the time to read it, however,
it appeared to produce desired perceptions.

The trinkets were viewed somewhat negatively. Instead of increasing awareness of the
problem of radon, many participants thought that they minimized or trivialized radon’s
importance and that they would not promote any action—not even calling the 1-800
number. In terms of the coloring books, most participants thought they were rather clever
and interesting, but they also thought that they would not have the intended effects.
Specifically, most participants thought that neither children nor parents would ever
actually read the coloring books for content. Furthermore, because the coloring books
appeared to induce relatively high-threat perceptions toward radon and low-efficacy
perceptions toward recommended responses, the EPPM would suggest that they would
not have the intended health-protective effects.

Implications for Practice

Overall, the knowledge and perceptions sections indicated that African Americans
need to learn about radon before they will be motivated to test their home and fix it if
there is a problem. The evaluation of the campaign materials indicated that the materials
do a fairly good job of making people feel at risk for harm from radon exposure and
making people believe that radon is a serious health threat. However, it appears that the
campaign materials do not make people feel like they are able to do something to
effectively fix a radon problem. According to our theoretical framework, campaign
materials that produce perceptions such as these (i.e., high-threat/low-efficacy percep-
tions), are more likely to backfire and motivate people to control their fear (instead of the
danger) through such responses as denial, defensive avoidance, or reactance. The EPPM
suggests that only when individuals believe they are able to effectively avert a health
threat will they do so. It should be noted, however, that the EPPM simply offers a
framework within which to interpret these study results and fails to address several
important issues relevant to radon awareness campaigns. Specifically, the EPPM does
not address issues such as the relative importance of radon in individuals’ lives (as
compared to other health threats), the role of the state and federal government in
legislating policies that would prevent unnecessary radon exposure in the home or
workplace, or the role of the home builder in building homes that protect against radon
exposure.

Based on the results of the knowledge and perceptions sections, we offer the following
specific recommendations for campaigns. First, individuals need to learn what radon is,
how it affects them, why it is now a health threat, how to fix a problem, where to get help, and where to get test kits with the overall goal being to increase efficacy and decrease threat perceptions. Second, because cost is a major concern, cost issues and ideas for inexpensive treatment alternatives or funding ideas should be discussed. Third, the sources of messages should be African American celebrities or leaders or individuals from private nonprofit agencies to minimize reactance.

Based on the results of the campaign materials evaluation, we offer the following specific recommendations. First, campaign materials must offer simple, concrete steps on how to test for radon and then on what to do if a problem emerges to increase perceived self-efficacy. Second, campaign materials must clearly identify the degree to which certain radon elimination procedures work to increase perceived response efficacy. Third, campaign materials should use real-life anecdotes with vivid pictures to increase perceived severity and susceptibility. Finally, Table 1 offers specific, creative ideas on potential distribution channels, sources of messages, and information to include in campaign materials.

Limitations

There are several potential limitations inherent in focus group research. Given the theoretical basis of the protocol, as well as the participants’ limited knowledge of radon, some of the questions may have led respondents to formulate perceptions during the discussion. For example, participants may never have thought of whether they were susceptible to harm from radon before asked. However, to analyze campaign materials from a certain theoretical perspective, it is necessary to ask questions based on the theory.

Another limitation inherent in focus group research is that there may have been a bandwagon effect. That is, some participants may have simply agreed with what other participants said about radon, as opposed to voicing their own opinions. To minimize this problem, the facilitators attempted to elicit responses from all focus group members. Finally, these results are suggestive only in that they are not based on a random sample.

Conclusion

As research has shown, campaign evaluations improve one’s chances of developing effective public health campaigns because one knows which beliefs to target and in which direction to target those beliefs. The use of theory in this evaluation was useful because it offered specific guidelines on what beliefs to assess and on what beliefs to target in future campaigns. Future research should evaluate theoretically developed campaign materials to see if they promote a greater degree of health-protective behaviors than other approaches.

References


Sociopsychological Correlates of Motivation to Quit Smoking Among Low-SES African American Women

Clara Manfredi, PhD
Loretta Pratt Lacey, RN, DrPH
Richard Warnecke, PhD
John Petraitis, PhD

This article examines correlates of desire and plans to quit smoking among 248 young, low-socioeconomic status African American women, using variables derived from the health belief model (HBM) and the theory of reasoned action. Consistent with these theoretical models, stronger concern about the effect of smoking on one’s health and having close others who want the smoker to quit increased motivation to quit smoking. However, motivation was not associated with specific HBM components regarding lung cancer. Heavier smoking and stronger perceptions regarding the functional utility of smoking decreased motivation to quit, but not as much as expected in this study population. Consistent with a process of change approach to smoking cessation, the factors that moved smokers from not planning to planning to ever quit were different from factors associated with further motivation level among the smokers who did plan to ever quit.

Young women of low-socioeconomic status (SES) are an important target for smoking cessation interventions. The health risks associated with smoking are compounded in this age and gender group by risks specific to reproductive, maternal, and child health. This population subgroup continues to show high smoking prevalence rates and has not demonstrated the same overall decline in smoking as the general population. Moreover, many of these women appear to have low motivation to quit smoking and be classifiable as precontemplative according to the Prochaska and DiClemente model. Little is known about what factors might increase their motivation and readiness to undertake smoking cessation and help reduce their smoking rates.

Low education is expected to be the strongest predictor of continued smoking well beyond the year 2000. However, low education is a proxy measure of the combined

Clara Manfredi works at the Health Research and Policy Centers, University of Illinois at Chicago. Loretta Pratt Lacey, who contributed substantially to earlier drafts of this article, died May 31, 1994. Her affiliation was with the Prevention Research Center at the University of Illinois at Chicago. Richard Warnecke works at the Health Research and Policy Centers, University of Illinois at Chicago. John Petraitis works in the Department of Psychology, University of Alaska, Providence.

Address reprint requests to Clara Manfredi, PhD, Health Research and Policy Centers, University of Illinois at Chicago, 850 W. Jackson, Suite 400, Chicago, IL 60607; phone: (312) 996-2428; fax: (312) 996-2703; e-mail: clara.manfredi@uic.edu

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