A Pilot Radon Campaign Targeting Parents of Elementary School Children

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Background

Radon is a naturally-occurring, radioactive gas that is colorless, odorless, and tasteless (American Lung Association, n.d.; Environmental Protection Agency [EPA], 2014a; National Cancer Institute, 2011). The EPA has recognized radon exposure as the second leading cause of lung cancer in the U.S., following smoking (EPA, 2014a). Each year, according to estimates by the EPA (2014a), approximately 21,000 lung cancer deaths in the United States are associated with radon exposure. Within Iowa specifically, there are an estimated 400 deaths annually caused by radon-induced lung cancer (American Lung Association of the Upper Midwest, n.d).

Within the United States, some geographic areas have higher levels of radon than others. The EPA has categorized all areas of the U.S. into one of three categories. Each category represents the area’s potential for elevated indoor radon levels; Zone 1 has the highest potential, and Zone 3 has the lowest (EPA, 2011). According to this classification system, the entire state of Iowa is classified as Zone 1 (EPA, 2011).

Although radon is present in the outdoor environment, individuals are exposed to radon primarily in the home (Committee on Health Risks of Exposure to Radon & National Research Council, 1999). Approximately 72% of homes in Iowa have elevated levels of radon (Iowa Department of Public Health, 2015). Within the home, there are several entry points for radon including cracks in basement floors and walls (EPA, 2013), gaps around pipes and drains (World Health Organization, 2002), and construction joints (EPA, 2013). Additionally, as radon gas moves from the ground into the air (EPA, 2013), radon levels are typically the most elevated in homes’ basements (World Health Organization, 2002).

All Iowans are at high risk for radon exposure (EPA, 2011). However, evidence suggests that young children may be at higher risk for negative health outcomes as a result of radon
exposure. Thus, parents of children in Iowa should be particularly proactive when it comes to limiting radon exposure in the home. Due to differences in lung shape and size and the fact that children have faster breathing rates, there is potential for radon-exposed children to have higher radiation doses compared to adults. Therefore, when exposed to the same amount of radon, a child’s risk of lung cancer may be twice as high as that of an adult (Agency for Toxic Substances and Disease Registry, 2010). Given this alarming information, it is critical that public health practitioners develop health campaigns to reduce radon exposure among children in Iowa.

**Literature Review**

Parents have been the target audience in a wide variety of successful health campaigns in the past. These include booster seat use (Bryant-Stephens, Garcia-Espana, & Winston, 2013), carbon monoxide and other household exposures (Butterfield et al., 2011), fruit and vegetable intake (Evans et al., 2006), lead paint (Greene et al., 2015) and in tap water (Griffin & Dunwoody, 2000), untreated well water (Straub & Leahy, 2014), and folic acid (Rofail, Colligs, Abetz, Lindemann, & Maguire, 2011). Based largely on focus groups and intercept surveys, these studies have used a variety of message formats and channels, including multi-channel outreach kits (Bryant-Stephens et al., 2013), information delivery by public health nurses (Butterfield et al., 2011), and print media (Greene et al., 2015), signage technology (Larsson, 2014). However, the basis in theory has been relatively similar among these studies, particularly with regard to the inclusion of self-efficacy appeals (Bryant-Stephens et al., 2013; Butterfield et al., 2011). The HBM and stages of change have been used successfully by some of these campaigns (Rofail, Colligs, Abetz, Lindemann, & Maguire, 2011; Sandman & Weinstein, 1993).

While there has not been much research specifically looking at parents’ knowledge and attitudes about radon, there have been several studies on radon education, testing, and promotion
of remediation. Desvouges et al. (1992) performed a radon study with the aim of it being transferrable to other geographic regions, which found that general facts were conveyed to the public better than technical information. A number of studies have found high awareness of radon in target populations prior to the study (Desvouges et al., 1992; Golding, Krimsky, & Plough, 1992), and thus have not seen measurable improvement in community knowledge levels, but they have achieved significant improvements in knowledge about testing (Duckworth et al., 2002). Golding et al. (1992) noted the importance of personalization of risk, emphasis on the seriousness of radon, and placing a focus on the ease of testing and remediation. They also found that there was heightened concern among parents with children. Butterfield et al. (2011) found that active and meaningful involvement by parents in a campaign targeting multiple household exposures led to significant improvement in self-efficacy and precaution adoption to reduce risks to children.

Individuals with previous radon knowledge and its health risks have been shown to be more likely to test for radon and take action, supporting the importance of continued radon education even in communities with some awareness (Hazar, Karbakhsh, Yunesian, Nejat, & Naddafi, 2014). Additionally, even in families who have heard of radon, those who are in the planning stage tend to exhibit higher perceived severity, perceived susceptibility, and risk level (Rinker, Hahn, & Rayens, 2013). Homeowners are significantly more likely to have tested for radon, but have cited financial costs as a barrier to mitigation (Peterson & Howland, 1996). However, a study on lead in tap water (Griffin & Dunwoody, 2000) found that people in the highest geographical risk area were no more likely to perceive risk than people in lower-risk geographic areas. The results from this study suggests that public health practitioners should
continue make radon testing a campaign focus. Additionally, homeowners are no more likely to know about mitigation, or to have taken steps to mitigate when compared to renters.

Research on channels indicates that newsletters may be an effective source for disseminating information to parents. Positive behavior changes have been associated with newsletter communication, and this source is widely read by parents (Garton et al., 2003; Shepherd & Roker, 2005). Additionally, homeowners who have tested for radon are more likely to have gotten information from a magazine, compared to those who have not tested, who are more likely to have seen information on television, supporting the use of print media (Peterson & Howland, 1996).

**Campaign Goals and Objectives**

The proposed health campaign will target parents of elementary-school children and aims to achieve the following overarching goals:

1. Increase awareness of susceptibility and severity of radon exposure
2. Increase parents’ awareness of the availability of $5.00 radon test kits at the Johnson County Department of Public Health
3. Increase parents’ behavioral intentions to test their homes for radon
4. Increase parents’ behavioral intentions to remediate their homes

**Partnerships**

The implementation of the health campaigns involves extensive collaboration with local partners to facilitate community buy-in and maximize effectiveness. Partners that have been engaged for this specific project include the following: the University of Iowa: Iowa Initiative for Sustainable Communities, the Johnson County Health Department, individual Parent-Teacher Organization (PTO) presidents from elementary schools within the Iowa City Community
School District (ICCSD), the Iowa Cancer Consortium, the Iowa Department of Public Health (IDPH) Bureau of Radiological Health, the Minnesota Department of Health and the Before and After School Program (BASP) Coordinators at Longfellow Elementary and Lemme Elementary Schools.

Johnson County Public Health and the Iowa Cancer Consortium have already served as critical sources of knowledge on local radon activities conducted to date. Radon control efforts have taken place with support from Iowa’s Comprehensive Cancer Control Program grant from the Centers for Disease Control and Prevention (CDC).

**Target Audience**

The intended audience for this campaign is parents of elementary-aged children in Iowa City, Iowa. As described above, children exposed to radon have the potential for higher radiation doses than adults, given the same radon exposure (Agency for Toxic Substances and Disease Registry, 2010), and Iowa is classified as Zone 1 by the EPA. Targeting parents of these children has the potential to reduce lifetime exposure to radon, and has the added benefit of potentially reducing radon exposure for the entire household if testing and remediation are undertaken appropriately. While the national EPA “Living Healthy & Green” campaign has a family-oriented message (EPA, 2014b), few other campaigns have focused on the risk childhood radon exposure poses or the benefit of remediating a home when children are young.

Additionally, parents are a particularly good audience to target for behavioral change. Past health communication campaigns that have experienced success with targeting parents include lead paint (Greene, Tehranifar, DeMartini, Faciano, & Nagin, 2015; McLaughlin, Humphries, Nguyen, Maljanian, McCormack, 2004), booster seat use (Bryant-Stephens, Garcia-Espana, & Winston, 2013), and household exposures including carbon monoxide (Butterfield et
al., 2011), as well as radon (Peterson & Howland, 1996; Golding, Krimsky, & Plough, 1992). Parents may perceive more cues to act if they believe their child is at risk, particularly when the child is young and has less control over his or her exposures (Golding et al., 1992). One radon study found that individuals who had tested their homes for radon were more likely to have children; the authors suggested testing as a means to protect children from exposure (Peterson & Howland, 1996). Thus, it may be easier to convince households with children to take action.

**Theoretical Frameworks**

A growing body of evidence suggests that interventions developed with a clear theoretical foundation are more effective than those lacking a theoretical base, and that strategies that combine multiple theories and concepts have larger effects (Glanz & Bishop, 2010). The health campaign applied three models/theories to different campaign elements. These theories are described below.

**Health Belief Model**

The Health Belief Model (HBM) theorizes that people’s beliefs about their risk for a disease or health problem combined with their perceptions of the benefits of taking action to avoid it influences their readiness to take action (Stretcher & Rosenstock, 1997). This theory was used continuously to guide the development, implementation and design, and the evaluation of the project. The HBM contains several primary constructs that explicate the reasons why people will take action to prevent, screen for, or control illness conditions. HBM constructs are listed below in bold with accompanying examples of how they were applied in this campaign.

**Perceived susceptibility.** Perceived susceptibility refers to beliefs about the likelihood of contracting/developing a disease or condition. For instance, in the case of radon testing and mitigation, parents’ beliefs about their and their children’s susceptibility to radon exposure will
increase their chances of seeking out information on radon, or testing and remediating their homes for radon (Stretcher & Rosenstock, 1997). The combination of susceptibility and the next construct, severity, combine to create the concept of perceived threat (Stretcher & Rosenstock, 1997).

**Perceived severity.** Perceived severity refers to feelings about the seriousness of contracting an illness, or leaving it untreated, and includes evaluations of both medical consequences (for example, death, disability, and pain) and possible social consequences (negative effects on work, family life, and/or social relations). For the radon campaign, the severity of lung cancer as a result of chronic exposure to high levels of radon was utilized to motivate individuals to seek and be receptive to information about testing and remediating for radon.

**Perceived benefits.** Even if an individual perceives high susceptibility to a threat, behavior change is dependent on the perceived benefits of the threat reduction option proposed. Target audience members must view suggested actions (e.g. viewing a website, purchasing a test kit) as capable of reducing the threat of adverse health outcomes. Otherwise, individuals with high perceived susceptibility and severity may still not act (Stretcher & Rosenstock, 1997). The perceived benefits highlighted by the campaign revolve around preventing lung-cancer.

**Perceived barriers.** Negative aspects of a particular action (both potential and actual) may act as obstacles to undertaking recommended behaviors. In the case of radon, the financial costs of testing and remediation may be barriers to taking action as might the time and effort it takes to do either of these things. Additionally, individuals may weigh the action’s expected benefits against the perceived barriers, forming a sort of cost-benefit analysis of the issue at hand (Stretcher & Rosenstock, 1997).
**Cues to action.** These are factors that activate individual “readiness to change”. The campaign team developed cues to action based on formative research findings. Materials such as brochures and magnets have served as cues to action in previous campaigns (e.g., Austin, Ahmad, McNally, & Stewart, 2002; Lee, Weinstock, & Risica, 2008) and will serve the same purpose here. Based on preliminary findings, cues to action included sending promotional materials to Iowa City elementary before- and after-school programs (BASPs) for distribution to parents (Stretcher & Rosenstock, 1997).

**Self-efficacy.** This is defined as the belief that one can successfully perform the behavior required to produce the intended outcomes. For the radon campaign, beliefs that need to be affected include knowledge about where to get testing kits, where to find information, and options for remediation (Stretcher & Rosenstock, 1997).

**Precaution Adoption Process Model**

The Precaution Adoption Process Model (PAPM) was utilized to inform the outcome evaluation of this campaign. It should be noted this model was not part of initial campaign planning, but rather was adopted mid-stream to account for campaign refinements and challenges. The PAPM was originally developed to describe and explain the process by which people adopt precautionary behaviors (like testing for radon) against a new risk, making this model an ideal fit for our campaign. The model specifies seven discrete stages, ranging from ignorance to action. Definitions of all the stages are below.

Stage 1 involves complete ignorance of a given issue with no intention to adopt a precautionary behavior. Stage 2 is characterized by awareness of the target issue, but individuals in this stage have not yet considered adopting the precaution. Individuals who reach Stage 3 are personally engaged by the target issue, but are undecided about whether to adopt the precaution,
and are still “considering their response”. Individuals in Stage 4 may decide against adopting the precaution, or may move into or out of the sequence of action adoption. Stage 5 comprises individuals who decide in favor of precaution adoption but have not yet taken action. Individuals in Stage 6 have acted on a target behavior-related decision. Table 1 demonstrates the various stages, their applications to radon testing and the change strategies utilized by the campaign.

**Table 1. Stages of the Precaution Adoption Process Model.**

<table>
<thead>
<tr>
<th>Precaution Adoption Process Model Stages</th>
<th>Application to radon testing</th>
<th>Potential change strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 1 Unaware of issue</td>
<td>Never heard of radon</td>
<td>Increase their awareness through brochure and web page</td>
</tr>
<tr>
<td>Stage 2 Unengaged by issue</td>
<td>Never thought about testing</td>
<td>Increase their awareness through brochure and web page</td>
</tr>
<tr>
<td>Stage 3 Deciding about acting</td>
<td>Undecided about testing</td>
<td>Increase their awareness through brochure and web page</td>
</tr>
<tr>
<td>Stage 4 Decided not to act</td>
<td>Decided not to test</td>
<td>Increase their awareness through brochure and web page</td>
</tr>
<tr>
<td>Stage 5 Decided to act</td>
<td>Decided to test</td>
<td>Provide information about places to get test kits</td>
</tr>
<tr>
<td>Stage 6 Acting</td>
<td>Testing</td>
<td>Provide information about mitigation and various remediation strategies</td>
</tr>
<tr>
<td>Stage 7 Maintenance</td>
<td>Not applicable</td>
<td></td>
</tr>
</tbody>
</table>


**Transtheoretical Model**

The Stages of Change component of the Transtheoretical Model was also utilized for the campaign during the formative research process. Stages of Change posits that individuals experience change by progressing through a series of six stages: precontemplation; contemplation; preparation; action; maintenance. As only part of this model was applicable to the health behavior of testing for radon this model was not utilized further.

**Table 2. Theoretical Logic Model.**

<table>
<thead>
<tr>
<th>Audience</th>
<th>Knowledge Changes</th>
<th>Changes in HBM Variables</th>
<th>Ultimate Outcome of Interest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parents of elementary-aged children in Iowa City, IA</td>
<td>-Increase knowledge and awareness about risk of radon exposure and the higher susceptibility of children to radon-associated health risks. -Increase knowledge about availability of testing kits and mitigation systems.</td>
<td>-Increase perceived susceptibility regarding children being at a higher risk of lung cancer if they are exposed to radon -Increase perceived severity regarding radon exposure as a health hazard, especially in children -Increase perceived benefits of radon testing and remediation in lowering radon levels</td>
<td>-Increased awareness of radon-associated health risks Increased radon remediation behavior -More families testing for radon -More mitigation systems being installed</td>
</tr>
</tbody>
</table>
- Decrease barriers.
- Increase readiness to take action by providing cues to action
- Increase self-efficacy around reducing radon exposure

These include perceived susceptibility, perceived severity, benefits and barriers to a behavior, cues to action, and self-efficacy. In the context of radon, it was theorized that individuals would take action to reduce their exposure if they felt susceptible to radon, believed exposure is serious, were confident that they could take action, and believed that the benefits to
taking action outweighed the barriers (Stretcher & Rosenstock, 1997).

**Formative Research**

Prior to the development of the campaign, formative research took place in order to gain a better understanding of the current radon-related behaviors and beliefs of the target audience. Activities consisted of a search of relevant literature, the creation of an annotated bibliography based on literature findings, and the development and implementation of a survey among the target audience. These activities are described in further detail below.

**Literature Review and Annotated Bibliography**

The first phase of this formative research consisted of a thorough search of the literature. Relevant articles were found in the following key areas: beliefs and perceptions about radon; formative research design; health behavior theory; previous health communication campaigns that have been done on radon and other relevant (e.g., lead poisoning) topics; and interventions that used schools to disseminate messaging on radon. An annotated bibliography was then created that contained information on articles deemed potentially useful for this project.

**Formative Research Survey**

An online Qualtrics survey was developed to gain additional information from the target audience in order to better inform the development of campaign messages and materials (refer to Appendix A to view a copy of this survey). To get respondents for this survey, 11 presidents of Parent Teacher Organizations (PTOs) of elementary schools within the Iowa City area were e-
mailed to determine if their PTO would be interested in participating. Out of these 11 presidents, five responded to our request. One declined to participate; the four presidents who agreed to participate were e-mailed the survey link to forward to members of their PTO.

Regarding the content of the survey, many of the questions included were based on constructs from the Stages of Change (replaced by the Precaution Adoption Process Model in later measures) and the Health Belief Model. Survey respondents were first asked questions regarding their awareness and knowledge of radon gas, the number of children they have and their ages, and to describe their current residence. Respondents who were aware of radon were asked questions seeking to measure their stage of change for radon testing and installation of a radon mitigation system; these questions were adapted from Prochaska et al. (1994).

To assess perceived susceptibility and severity, using measures adapted from Weinstein, Sandman, and Roberts (1991), respondents were asked to indicate the likelihood that their current residence had elevated levels of radon and how serious an illness caused by radon would be. To measure self-efficacy, respondents were asked to indicate the extent to which they felt confident in identifying the health effects of radon on children, determining if their home was safe from radon, and taking steps to reduce exposure to radon. These questions were adapted from a previous study on radon testing (Larsson et al., 2014). Respondents were then asked to describe the benefits and barriers to taking steps to reduce exposure to radon.

Using a question adapted from Oetzel, De Vargas, Ginossar, and Sanchez (2007), respondents were asked where they would go to receive information about radon were they to seek it out (e.g., print media, Internet, etc.). This information helped to determine the channels that should be used to reach the target audience, an important component of campaign development (Noar, 2012). To develop more targeted messaging, in addition to asking the
questions above, respondents were also asked to indicate their gender, age, race/ethnicity, annual income, and the elementary school that their child attended.

Formative Research Survey Findings

A total of 86 people completed the survey. Two people were excluded from the findings because they did not have any children less than 18 years of age living at their current residence. Of those included (n=84), 17% had only one child less than 18 living at their current residence; 54% had two; 21% had three; 6% had four; and 2% had five. A majority of respondents (80%) had children between 6 to 11 years of age; 6% had children 0 to 11 months; 43% 1 to 5 years; 23% 12 to 14 years; and 8% 15 to 17 years.

Of the respondents who indicated where their child attended elementary school (n=51), 61% indicated Penn Elementary; 22% Lemme Elementary; 4% Buford Garner Elementary; 4% Horn Elementary; 4% Weber Elementary; 2% Borlaug Elementary; 2% Shimek Elementary; and 2% Van Allen Elementary. The majority of respondents were female (80%) and Non-Hispanic or Latino (96%). 94% of respondents were White; 4% were Multiracial; and 1% were Asian. The age of respondents ranged from 26 to 72 years, with a mean age of 40. Annual household income levels were high, with 79% reporting household incomes of $75,000 or more; 16% had an income of $50,000 to less than $75,000; 3% had an income of $35,000 to less than $50,000, and 3% had an income of $20,000 to less than $25,000. 96% of respondents indicated that they owned their own home.

A large majority of respondents (96%) had heard of radon gas or knew what radon was. Among those respondents who indicated that they had heard of radon (n=77), 69% had already had their current residence tested for radon; 1% planned to test their current residence for radon within the next month or had taken steps towards preparing to test for radon; 1% planned on
testing for radon within the next six months; and 21% indicated that they did not intend on testing their current residence for radon within the next six months. 8% of respondents answered “Other”; responses for this item included the following: believing they should test for radon but have not yet looked into it; having a radon detector in their basement; and intentions on asking their landlord if their home has been tested.

44% had a radon mitigation system installed in their current residence; 3% planned on installing a radon mitigation system in their current residence within the next month or had taken steps towards preparing to install a radon mitigation system; 1% planned on installing a radon mitigation system within the next six months; and 42% did not plan to install a radon mitigation system in their current residence within the next six months. 10% of respondents answered “Other” and responses included installing a mitigation system if next radon test warrants it; installing a mitigation system if levels are found too high when selling their home; don’t know/unsure; and belief that a mitigation system already exists given the newer age of their home.

In breaking down the results by whether or not the respondent had tested for radon, the findings differ between these groups. Among those who indicated that they had tested for radon ($n=53$), 58% had a radon mitigation system installed in their current residence, with only 28% indicating that they did not plan to install a radon mitigation system in their current residence within the next six months. In contrast, among those who had not tested for radon ($n=24$) only 13% had a radon mitigation system installed in their current residence, and 71% did not plan on installing a radon mitigation system in their current residence within the next six months.

Perceived susceptibility of radon varied among respondents. When asked how likely it was that their home had radon levels higher than what the EPA recommended ($n=68$), 67% indicated that it was unlikely, very unlikely, or that there was no chance. Only 10% of
respondents indicated that it was either likely or very likely, while 22% of respondents indicating that there was a moderate chance. When looking at the responses of those who have neither tested nor installed a radon mitigation system (perceivably the persons who would know the least about their true susceptibility) \((n=16)\), although no respondent indicated that was no chance that their home had elevated radon levels, 63% indicated it was very unlikely or unlikely and 31% indicated there was a moderate chance. Only 6% indicated it was likely.

Perceived severity of radon-related illness was higher than perceived susceptibility. When asked how serious a radon-related illness would be, 76% of respondents indicated that an illness caused by radon would be serious or very serious; 21% indicated it would be somewhat serious, and only 3% indicated that it would be minor. When asked questions on radon-related self-efficacy, respondents’ self-efficacy for identifying the potential health effects of radon on children was mixed, with 32% feeling confident or very confident, and 68% feeling not so confident or not confident at all. A larger proportion of respondents felt confident or very confident in determining if they home was safe from radon (69%) and in taking steps to reduce exposure to radon (66%).

Forty-three out of the 77 people who had heard of radon provided comments on the benefits to taking steps to reduce exposure to radon. Almost all respondents indicated that taking steps could reduce their risk of illnesses such as lung cancer \((n=35)\). Some respondents included comments about their families \((n=3)\), indicating that reducing exposure to radon would lead to healthier kids and would keep their family safe. Other responses including having a “resale bonus” on their home \((n=1)\). Some respondents were not sure what the benefits would be \((n=4)\), or indicated that there would be no benefits \((n=1)\).

In terms of the barriers that exist to taking steps to reduce exposure to radon, the biggest
barrier cited was cost \( (n=26) \), with lack of radon-related knowledge and information on how to reduce exposure the second most cited barrier \( (n=12) \). Other responses included lack of time \( (n=3) \) and potential issues that could occur with the radon mitigation system (i.e., lack of effectiveness; potential failure) \( (n=2) \). Some respondents did not perceive any barriers \( (n=2) \), while others were not sure what the barriers would be \( (n=3) \). Lastly, participants were asked where they would go to seek out information on radon \( (n=71) \); 92% of respondents indicated that they would go to internet; and 4% indicated print media (e.g., brochures) and 4% interpersonal (i.e., radon specialist; doctor). “Other” responses included the public health department \( (n=1) \) and a radon specialist \( (n=1) \).

**Development and Testing**

**Message Development**

Draft campaign messages were created based on the formative evaluation findings discussed previously. The messages and materials addressed all constructs in the Health Belief Model. As described in the findings above, respondents generally had a low level of perceived susceptibility to having elevated levels of radon in their home, and cited cost and a lack of knowledge/information as barriers to taking steps to reduce radon exposure. While a majority felt confident that they could take steps to reduce exposure to radon, one third indicated that they did not feel confident. Thus, the messages developed were designed to align with these findings. The draft messages created were put into a brochure that was used during message testing (a copy of this draft is available in Appendix B).

**Intercept Interviews**

To test these messages and brochure, intercept interviews were conducted with 29 individuals. The intercept interview script was designed to be short given expectations that only
a short amount of time could be spent with each individual interviewed. Parents were provided with a copy of the first draft of the brochure and asked to respond to six open-ended questions. Questions were adapted from Massi Lindsey et al. (2009), Noar et al. (2014), and Sorensen et al. (2008). A copy of the intercept interview script is available in Appendix C.

Intercept interviews were conducted in downtown Iowa City on the pedestrian mall and in the children’s section of the Iowa City Public Library. Personal networks of the project team were also utilized to recruit parents to give feedback on the brochure. Notes written down during the intercept interviews were reviewed by the project team and were divided into major themes.

**Intercept Interview Findings**

The majority of individuals interviewed found the brochure to be visually appealing (responded that they liked the pictures, fonts, graphics and colors of the draft brochure) and attention-grabbing. Individuals also found the information on the brochure to be credible and clear. Many individuals commented that they really liked how “straightforward” and “to the point” the brochure was and that they liked that they did not have to read purely scientific information. While not asked specifically, many individuals who were interviewed discussed their radon-related beliefs and behaviors (i.e., awareness of radon, had they tested, etc.). Overall, the majority of people had heard of radon and had already mitigated their homes.

Key recommendations included a suggestion to include hotline contact information, more information about where to buy the test kits, and more specific information about radon and how it enters the home, as well as the dangerous levels at which residents need to mitigate. Based on the feedback we got from the intercept interviews, we changed and added pictures and diagrams, made certain messages more specific, included information about unsafe radon levels, and added
contact for the Radon Hotline. See below for the draft messages and the finalized messages included in campaign materials. The finalized brochure can be viewed in Appendix D.

Table 3. Draft and Final Campaign Messages based on the HBM.

<table>
<thead>
<tr>
<th>Concept</th>
<th>Draft messages</th>
<th>Final Messages</th>
</tr>
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</table>
| Perceived susceptibility | “Radon levels in Iowa are some of the highest in the country. Everyone should test for radon”  
“Radon may be especially hazardous to children because of the size and shape of their lungs” | “About 72% of homes in Iowa have elevated levels of radon”          |
| Perceived severity | “An estimated 400 Iowans die every year from radon exposure”  
“Radon is the second leading cause of lung cancer…” | “An estimated 400 Iowans die every year from radon exposure”  
“Radon is the second leading cause of lung cancer in the U.S. and the leading cause among non-smokers”  
“Radon may be especially hazardous to children because of the shape and size of their lungs” |
<p>| Perceived benefits | “You can protect your family from radon!” | “You can protect your family from radon!” |</p>
<table>
<thead>
<tr>
<th>Perceived barriers</th>
<th>“Testing for radon requires very little time and effort”</th>
<th>“Radon test kits can cost as little as $5.00 when purchased from your local public health department. “Testing for radon requires very little time and effort”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cues to action</td>
<td>“Everyone should test their home for radon”</td>
<td>“Everyone should test their home” Promotional magnetic clip with the follow text: “You can protect against radon! For more information: <a href="http://www.cancer.iowa.org/radoncampaign.aspx.%E2%80%9D">www.cancer.iowa.org/radoncampaign.aspx.”</a></td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>“You can protect against radon!”</td>
<td>“You can protect your family from radon” “Testing for radon requires very little time and effort” “You can protect against radon” “Help is available if you have questions about testing”</td>
</tr>
</tbody>
</table>

**Channels**

We selected print media as the optimal channel for dissemination of our campaign for multiple reasons. First, there is evidence to suggest that print media generally may be better suited to informing people about radon. Peterson & Howland (1996) found that university employees who had tested for radon were more likely to have read about radon in magazines,
while those who had not tested were more likely to have seen information about radon on
television. While the authors suggested that this may simply reflect differences between testers
and non-testers in exposure to television, education level, and propensity to read, the findings
were statistically significant.

Second, and more specifically, print media in the form of tip sheets/brochures are a more
involving channel, with high reach, and newspaper messages have been demonstrated to be high-
impact (Schooler et al., 1998). Tip sheets and flyers also have the advantage of specificity, as
they can be disseminated in locations of choice so as to avoid unintended effects on other
audiences (e.g. thinking the message does not pertain to them). As BASPs were used as the main
setting for this campaign, materials with these capabilities were hypothesized to be the most
effective. Lastly, the budget and timeline for the pilot campaign were better-adapted to the
implementation of a print campaign, we selected this channel for our materials.

Online interventions have the advantage of being low-cost and high-reach, and have been
found to effectively influence voluntary behaviors promoted in social marketing campaigns
(Cugelman, Thelwall, & Dawes, 2011). These resources also can combine features from both
interpersonal and mass communication, forming a hybrid channel with broad reach (Cassell,
Jackson, & Cheuvront, 1998). An additional advantage is the ability to include a variety of
information on a web page that can be accessed selectively by a variety of participants, and the
opportunity to direct participants to additional resources quickly and easily.

As 92% of respondents’ to the formative research survey indicated they used the internet
as resource for radon information, a web page was developed specifically for this campaign
through the Iowa Cancer Consortium. Additionally, the web page included the similar messaging
to those included in the campaign brochure. The web page includes the following three main
The tab “Radon and Your Health” focuses specifically on the health effects of radon and includes a video of one man’s experience with radon exposure. “Testing your Home” includes information about where to obtain test kits and the radon testing process. Lastly, “Radon Solutions” provides information about mitigation and remediation strategies.

As mentioned earlier, the magnets will serve as a cue to action for the target audience to take action to reduce their exposure to radon. Magnets were chosen because they have been effectively used in previous radon campaigns (Witte et al., 1998) and in campaigns targeting parents and their children (Evans et al., 2006). The magnets chosen were green to match the color displayed on the brochure and web page and contained the text “You can protect against radon!” Below this text, a link to the web page was displayed. In this regard, the magnets were also used as a way to direct traffic to the web page.

Given time constraints, only the messages on the brochure were tested with individuals. However, the messages used on the web page are similar in their clarity and length and the message on the campaign magnet is the same self-efficacy message “You Can Protect Against Radon” from the brochure.

**Implementation Plan**

Originally, it was planned that this pilot campaign would take place in elementary schools. However, given administrative constraints, before and after school programs will be targeted. The pilot for this health campaign will be implemented at the before and after school programs (BASP) of Lemme Elementary and Longfellow Elementary. All of the final health campaign materials will be delivered to the coordinators of the elementary schools’ BASPs and the pilot will take place in the late spring.
Health campaign messages will be delivered via brochures, a radon web page developed through the Iowa Cancer Consortium, and a promotional magnetic clip. The link to the radon web page is included in both brochures and promotional magnetic clips. At both elementary schools, brochures and magnetic clips will be placed adjacent to the child sign-out sheet; therefore, parents can voluntarily take the information as they pick up their children. Any materials that were not collected will be retrieved.

**Evaluation Plan**

To evaluate the campaign, both process and outcome measures will be utilized. The process evaluation will focus on quantifying the activities that will be conducted during the campaign (Kotler & Lee, 2008), while the outcome evaluation will focus on determining whether or not the campaign reached its objectives. The specific measures used for these evaluations are described in detail below.

**Process Evaluation**

A log containing the number of brochures and magnets that were handed out to the BASPs will be kept. The number of brochures and magnets that were actually received/taken by the parents will also be logged; this information will be obtained from the BASP coordinators. To determine how many people were exposed to the web page (i.e., reach), the number of hits that the web page receives will be documented and tracked over time. Data on the number of times that members of the target audience have visited the web page (i.e., frequency) will be collected in an evaluation survey described below (Kotler & Lee, 2008).

**Outcome Evaluation**

The outcome evaluation will consist of a survey (refer to Appendix E) that will be implemented among parents whose children attend the two BASPs exposed to the campaign (i.e.,
the campaign groups). To gain a better understanding of the potential effects that the campaign in particular may have had on radon-related behaviors and beliefs, the same survey will be implemented among parents whose children attend two BASPs that will not receive the campaign materials (i.e., the control groups). Almost all of the questions included in the formative research survey are included in the outcome evaluation survey (with a few exceptions, described below). To determine if objective #1 was met (i.e., increase awareness of susceptibility and severity of radon), questions that align with these Health Belief Model constructs will be examined.

Replacing the Stages of Change as a theoretical framework, questions will be asked that seek to determine which stage respondents are in on the Precaution Adoption Process Model. Respondents will be asked if they have heard about radon testing, if they have tested their current residence for radon, and to describe their thoughts on testing. The same questions will be asked about radon remediation. These measures will be used to determine if objectives #3 (i.e., increase behavioral intentions to test their homes for radon) and #4 (i.e., increase behavioral intentions to remediate their homes) were met.

Measures on campaign awareness will also be used, which will include both unaided recall and recognition. Unaided recall involves asking respondents to provide details about the campaign without being given any prompts or initial information (Southwell, Barmada, Hornik, & Maklan, 2002). Using measures adapted from Niederdeppe (2005), respondents will be asked if they have recently seen or received any materials or information about radon. If they indicate they have, they will be asked to describe what they remember about these materials and information.

Measures of recognition will assess the respondents’ engagement with specific campaign
materials. Here, respondents will be asked if they have ever seen or heard of the magnet, brochure, and web page (adapted from Southwell et al., 2002). A picture of the magnet, the front of the brochure, and a screenshot of the web page will be shown. To gain additional information on the extent to which respondents are currently or have engaged with the materials, they will also be asked if they currently have the magnet displayed at their current residence and whether they currently or have previously owned the brochure. Respondents will be asked how many times they have visited the web page (adapted from Southwell et al., 2002). To measure objective #2 (i.e., increase parents’ awareness of the availability of $5.00 radon test kits at the Johnson County Department of Public Health), respondents will also be asked if they know where to purchase radon test kits for $5.00. If they answer yes, they will be asked to identify where these test kits can be obtained.

After the survey has been implemented and all data collected, data analysis will occur. Descriptive statistics will be run for each question asked in order to determine the percentage of people responding to each response item. On the questions seeking to measure the PAPM stage that the respondent is in, the PAPM stage classification algorithm developed by Weinstein & Sandman (2002) will be followed, with the percentage of respondents classified in each stage reported. These statistics will be run separately for the campaign and control groups. Inferential statistics will also be run to compare these responses between the campaign and control groups.

One limitation to this method is that unobserved differences between the campaign and control groups may be present that explain the findings obtained. While these differences cannot necessarily be controlled for, at the very least inferential statistics will be run on all demographic questions to determine if significant differences exist on these factors.
Proposed Timeline

The campaign timeline was spread out over the course of five months. A timeline of major project activities is shown below.

Table 4. Pilot Project Timeline.

<table>
<thead>
<tr>
<th>Activities</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>April</th>
<th>May</th>
<th>June</th>
<th>July</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formulate and conduct formative evaluation survey</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Develop and test campaign messages</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conduct outreach to BASP coordinators</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Develop and order campaign materials</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deliver campaign materials</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collect process evaluation data</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collect and analyze outcome evaluation data</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

While the beginning project timeline was very similar to this, delays were experienced particularly in conducting (mostly recruiting) individuals for formative evaluation and in developing appropriate messages based on these delays. Working with schools provided many challenges, however they remain an ideal setting to reach parents.
Budget and Budget Justification

Table 5. Pilot Project Budget.

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
<th>Cost</th>
<th>Justification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staffing</td>
<td>N/A</td>
<td>In-Kind</td>
<td>Formative Evaluation, Message Development/Refinement, Message Testing</td>
</tr>
<tr>
<td>-Initial outreach to PTO’s</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-1 hour meeting per site (2 for pilot)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-Campaign materials development</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brochures</td>
<td>150 @ $1.33</td>
<td>$200.00</td>
<td>Campaign materials for dissemination to parents</td>
</tr>
<tr>
<td>Stock Photography/Graphics</td>
<td>3 photos</td>
<td>In-Kind</td>
<td>Pictures of families to make materials professional and relatable</td>
</tr>
<tr>
<td>Web page Hosting/Maintenance</td>
<td>N/A</td>
<td>In-Kind</td>
<td>Campaign materials for dissemination to parents</td>
</tr>
<tr>
<td>Magnets</td>
<td>250 @ .99 +$40 one time set-up fee</td>
<td>$290.00</td>
<td>Campaign materials for dissemination to parents</td>
</tr>
<tr>
<td>Total:</td>
<td>N/A</td>
<td>$490.00</td>
<td>Campaign</td>
</tr>
</tbody>
</table>

This budget reflects the major cost outlays for this campaign to date; however, it should be noted that the number of staff hours necessary to evaluate the campaign outcomes will be substantial. Additionally, it should be noted that the current campaign web page was meant to be a beginning framework, designed to offer parents of elementary school-aged children information on radon, but future efforts should be made to add information and resources. There are not hosting fees or set-up fees for the web page thanks to our partnership with the Iowa Cancer Consortium; however, future edits to this site may require financial resources or dedicated staff resources.
Additionally, as the group’s formative evaluation and testing activities suggested that the current materials may not be convincing or may be less effective for parents who rent rather than own their homes, information specific to parents who rent may need to be added. Other suggestions for future content include inclusion of pictures of additional families (e.g. single parents, same-sex parents, grandparents, minority families), a list of certified radon mitigation specialists in Johnson County, a list of local vendors that sell test kits, and contact information for Health Department staff should parents get referred and want materials/more materials at their school.

**Conclusion**

Existing research on radon and formative evaluation from this pilot project suggest that parents of elementary-aged children are a receptive audience to radon concerns. Based on findings from the intercept interviews, the materials developed for this campaign have shown promise in convincing parents that viable options exist for radon testing and remediation, and that the health effects associated with radon exposure are serious enough to take action to reduce exposure. While more research and follow-up activities need to be completed to test the effectiveness of this campaign among a larger population of our target audience, there is reason to believe that ultimately, this will be an effective campaign in convincing parents to test their homes and consider remediation options.

**Limitations and Unintended Consequences**

While project members involved in this campaign strove to be iterative and responsive, time constraints and other challenges did leave some areas of this campaign unexplored. One area that was beyond the scope of this campaign was the segmentation of parents based on their living situation, which may or may not serve as a proxy for parent income. A recurrent theme in both the formative evaluation and the intercept interviews was that among homeowners,
knowledge about radon, radon testing, and radon remediation (usually mitigation) stemmed from discussions with a home inspector at the time of home purchase. While home inspectors certainly should not be dissuaded from this practice, the fact that home inspectors rarely, if ever, visit rental properties, combined with the likelihood that low-income individuals are more likely to rent their homes, creates the possibility for the development of health disparities when it comes to radon-induced lung cancer.

Furthermore, it should be recognized that working with parents through schools carries the risk of reproducing social trends, such as parent involvement. For example, schools with parents and/or administrators who are able to commit to passing out the radon campaign in their classrooms/programs/meetings may already have parent communities who are highly involved, and thus may already be the most likely individuals to take steps to reduce family health risks. More research should be conducted to determine how this might be accounted for in future campaigns.


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Prochaska, J. O., Velicer, W. F., Rossi, J. S., Goldstein, M. G., Marcus, B. H., Rakowski, W.,


Appendices

Appendix A: Formative Research Survey

Q1 Have you ever heard of radon gas before or do you know what radon is?
○ Yes (1)
○ No (2)

Q2 Which of the following best describes your current residence?
○ Own a home (1)
○ Rent a home (2)
○ Rent an apartment (3)
○ Other (please describe:) (4) ____________________

Q3 How many children less than 18 years of age live at your current residence?
○ None (1)
○ 1 (2)
○ 2 (3)
○ 3 (4)
○ 4 (5)
○ 5 (6)
○ 6 or more (7)
If None Is Selected, Then Skip To End of Survey

Q4 For each of the age ranges listed below, check if there is a child in that age range that lives at your current residence. Check all that apply.
☒ 0 to 11 months (1)
☒ 1 to 5 years (2)
☒ 6 to 11 years (3)
☒ 12 to 14 years (4)
☒ 15 to 17 years (5)
Answer If Prior to this survey, had you heard of radon gas before? Yes Is Selected

Q5 Which of the following statements best describes you:
○ I have had my current residence tested for radon. (1)
○ I plan on testing my current residence for radon within the next month or have taken steps towards preparing to test for radon. (2)
○ I plan on testing my current residence for radon within the next six months. (3)
○ I do not plan on testing my current residence for radon within the next six months. (4)
○ Other (please describe) (5) ____________________
Q6 Which of the following statements best describes you:
- I have a radon mitigation system installed in my current residence. (1)
- I plan to install a radon mitigation system in my current residence within the next month or have taken steps towards preparing to install a radon mitigation system (e.g., calling a contractor) in my current residence. (2)
- I plan to install a radon mitigation system in my current residence within the next six months. (3)
- I do not plan to install a radon mitigation system in my current residence within the next six months. (4)
- Other (please describe): (5) ____________________

Q7 How likely is it that your home has radon levels higher than what the Environmental Protection Agency recommends?
- No chance (1)
- Very unlikely (2)
- Unlikely (3)
- Moderate chance (4)
- Likely (5)
- Very likely or certain (6)

Q8 How serious would an illness caused by radon be?
- Very minor (1)
- Minor (2)
- Somewhat serious (3)
- Serious (4)
- Very serious (5)

Q9 For each of the statements below, indicate the extent to which you feel confident:

<table>
<thead>
<tr>
<th>Statement</th>
<th>Very confident (1)</th>
<th>Confident (2)</th>
<th>Not so confident (3)</th>
<th>Not at all confident (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identifying the potential health effects of radon on children (1)</td>
<td>☒</td>
<td>☒</td>
<td>☒</td>
<td>☒</td>
</tr>
<tr>
<td>Determining if your home is safe from radon (2)</td>
<td>☒</td>
<td>☒</td>
<td>☒</td>
<td>☒</td>
</tr>
<tr>
<td>Taking steps to reduce exposure to radon (3)</td>
<td>☒</td>
<td>☒</td>
<td>☒</td>
<td>☒</td>
</tr>
</tbody>
</table>
Answer If Prior to this survey, had you heard of radon gas before? Yes Is Selected
Q10 What are the benefits, if any, to taking steps to reduce exposure to radon?

Answer If Prior to this survey, had you heard of radon gas before? Yes Is Selected
Q11 What are the barriers, if any, that exist to taking steps to reduce exposure to radon?

Q12 Which elementary school does your child attend?

Q13 What is your gender?
   ☐ Male (1)
   ☐ Female (2)

Q14 What is your age?

Q15 Are you Hispanic or Latino?
   ☐ Yes (1)
   ☐ No (2)

Q16 Which of the following would you say is your race?
   ☐ White (1)
   ☐ Black or African American (2)
   ☐ American Indian or Alaska Native (3)
   ☐ Asian (4)
   ☐ Pacific Islander (5)
   ☐ Multiracial (6)
   ☐ Other (please describe): (7) ____________________

Q17 What is your annual household income from all sources?
   ☐ $20,000 to less than $25,000 (1)
   ☐ $25,000 to less than $35,000 (2)
   ☐ $35,000 to less than $50,000 (3)
   ☐ $50,000 to less than $75,000 (4)
   ☐ $75,000 or more (5)

Q18 If you were to seek out information on radon, where would you go to receive this information?
   ☐ Print media (e.g., brochures, magazines, etc.) (1)
   ☐ Internet (2)
   ☐ Interpersonal (e.g., family member, doctor, etc.) (3)
   ☐ Radio (4)
   ☐ Television (5)
   ☐ Other (please describe): (6) ____________________
Appendix B: Brochure Draft

For More Information About Radon and A List of Local Retailers Where You Can Buy Radon Test Kits, Please Visit Us Online at:

www.canceriowa.org/radoncampaign

Is your family at risk for RADON?

Radon: The Basics
Radon is a radioactive gas that has no color or odor. Radon gets into your home through cracks and gaps in the walls and floors.

The only way to know if radon is present in your home is to test for it.

About 72% of homes in Iowa have elevated levels of radon. Everyone should test their home.

Radon and Your Family's Health
Radon is the second leading cause of lung cancer in the U.S. and the leading cause among non-smokers.

Radon may be especially hazardous to children because of the size and shape of their lungs.

An estimated 400 Iowans die every year from radon exposure.

You Can Protect Against Radon!
Radon test kits are affordable and widely available.
Testing for radon requires very little time and effort.
Help is available if you have questions about testing.

If current radon levels are found to be unsafe, there are steps you can take to reduce radon levels in your home.
Appendix C: Intercept Interview Script

1. Is this brochure:
   a. Generally appealing?
      i. Possible follow-up: Why or why not?
   b. Attention grabbing?
   c. Is the information in this brochure credible?
   d. Convincing? (Successful at warning people about radon?)

2. Is any of the information in the brochure confusing or unclear? If so, what information?

3. What are your impressions of the pictures in the brochure? Likes? Dislikes?

4. What behaviors, if any, would you be motivated to do after seeing this brochure?

5. Would you discuss the information contained in this brochure with others?
Appendix D: Final Brochure

**Radon: The Basics**

Radon is a naturally occurring element in the soil. Radon gets into your home through cracks and gaps in the wall and floors.

Radon is a radioactive gas that has no color or odor. The only way to know if radon is present in your home is to test for it.

About 72% of homes in Iowa have elevated levels of radon.

Everyone should test their home.

**Radon’s Negative Health Effects**

An estimated 400 Iowans die every year from radon exposure.

Radon is the second-leading cause of lung cancer in the U.S. and the leading cause among non-smokers.

Radon may be especially hazardous to children because of the shape and size of their lungs.

**You Can Protect Your Family From Radon!**

Radon test kits can cost as little as $5.00 when purchased from your local public health department.

Testing for radon requires very little time and effort.

Help is available if you have questions about testing.

If current radon levels are found to be unsafe, there are steps you can take to reduce radon levels in your home.*

*The Environmental Protection Agency currently recommends that any home with radon levels above 4 pCi/L be remediated.
Appendix E: Evaluation Survey

Q1 Have you ever heard of radon gas before or do you know what radon is?
- Yes (1)
- No (2)

Q2 Which of the following best describes your current residence?
- Own a home (1)
- Rent a home (2)
- Rent an apartment (3)
- Other (please describe:) (4) ____________________

Q3 How many children less than 18 years of age live at your current residence?
- None (1)
- 1 (2)
- 2 (3)
- 3 (4)
- 4 (5)
- 5 (6)
- 6 or more (7)
If None Is Selected, Then Skip To End of Survey

Q4 For each of the age ranges listed below, check if there is a child in that age range that lives at your current residence. Check all that apply.
- 0 to 11 months (1)
- 1 to 5 years (2)
- 6 to 11 years (3)
- 12 to 14 years (4)
- 15 to 17 years (5)

Q5 Have you heard about radon testing?
- Yes (1)
- No (2)
Q6 Have you tested your current residence for radon?

- Yes (1)
- No (2)

Q7 Which of the following best describes your thoughts about testing your current residence for radon?

- I've never thought about testing (1)
- I'm undecided about testing (2)
- I've decided I don't want to test (3)
- I've decided I do want to test (4)

Q8 Have you heard about radon mediation strategies?

- Yes (1)
- No (2)

Q9 Have you used any radon mediation strategies?

- Yes (1)
- No (2)

Q10 Which of the following best describes your thoughts about using radon mediation strategies?

- I've never thought about remediation (1)
- I'm undecided about remediation (2)
- I've decided I don't want to remediate (3)
- I've decided I do want to remediate (4)

Q11 Do you know where to purchase radon test kits for $5.00?

- Yes (1)
- No (2)
Q12 Where can you purchase radon test kits for $5.00?

Answer If Prior to this survey, had you heard of radon gas before? Yes Is Selected

Q13 How likely is it that your home has radon levels higher than what the Environmental Protection Agency recommends?

- No chance (1)
- Very unlikely (2)
- Unlikely (3)
- Moderate chance (4)
- Likely (5)
- Very likely or certain (6)

Answer If Prior to this survey, had you heard of radon gas before? Yes Is Selected

Q14 How serious would an illness caused by radon be?

- Very minor (1)
- Minor (2)
- Somewhat serious (3)
- Serious (4)
- Very serious (5)

Answer If Prior to this survey, had you heard of radon gas before? Yes Is Selected

Q15 For each of the statements below, indicate the extent to which you feel confident:

<table>
<thead>
<tr>
<th>Statement</th>
<th>Very confident (1)</th>
<th>Confident (2)</th>
<th>Not so confident (3)</th>
<th>Not at all confident (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identifying the potential health effects of radon on children (1)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Determining if your home is safe from radon (2)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Taking steps to reduce exposure to radon (3)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
Q16 What are the benefits, if any, to taking steps to reduce exposure to radon?

Q17 What are the barriers, if any, that exist to taking steps to reduce exposure to radon?

Q18 Have you recently seen or received any materials or information about radon?
- Yes (1)
- No (2)

Q19 Describe any details that you remember about these materials and information.

Q20 Have you ever seen or heard of this magnet?
- Yes (4)
- No (5)

Q21 Is the magnet shown above displayed at your current residence?
- Yes (1)
- No (2)

Q22 Have you ever seen or heard of this brochure?
- Yes (1)
- No (2)

Q23 Do you currently own or have you previously owned the brochure shown above?
- Yes (1)
- No (4)

Q24 Have you been to or have you heard of the following webpage?
- Yes (1)
- No (2)
Answer If Have you been to or have you heard of the following webpage? Yes Is Selected
Q25 How many times have you visited the website shown above?
○ Once (1)
○ 2 to 4 times (2)
○ 5 to 10 times (3)
○ More than 10 times (4)

Q26 Which elementary school does your child attend?

Q27 What is your gender?
○ Male (1)
○ Female (2)

Q28 What is your age?

Q29 Are you Hispanic or Latino?
○ Yes (1)
○ No (2)

Q30 Which of the following would you say is your race?
○ White (1)
○ Black or African American (2)
○ American Indian or Alaska Native (3)
○ Asian (4)
○ Pacific Islander (5)
○ Multiracial (6)
○ Other (please describe): (7) ____________________

Q31 What is your annual household income from all sources?
○ $20,000 to less than $25,000 (1)
○ $25,000 to less than $35,000 (2)
○ $35,000 to less than $50,000 (3)
○ $50,000 to less than $75,000 (4)
○ $75,000 or more (5)