Detonation of an Improvised Nuclear Device

National Center for Environmental Health
Radiation Studies Branch

U.S. Centers for Disease Control and Prevention

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The **Oak Ridge Institute for Science and Education** (ORISE) is a U.S. Department of Energy facility focusing on scientific initiatives to research health risks from occupational hazards, assess environmental cleanup, respond to radiation medical emergencies, support national security and emergency preparedness, and educate the next generation of scientists. ORISE is managed by Oak Ridge Associated Universities.

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Table of Contents

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Executive Summary

Background: In 2009-2010, the Nuclear Detonation Response Communications Working Group, a federal interagency group of communications and radiation technical experts, developed key messages for affected communities, as well as the rest of the nation, to be used during the immediate aftermath of an IND detonation. The Centers for Disease Control and Prevention (CDC) and the Federal Emergency Management Agency (FEMA) were part of the interagency group, which developed the key messages for communities affected by the detonation of an IND. To help ensure the quality of those messages, CDC and FEMA, in partnership with Oak Ridge Institute for Science and Education (ORISE) set out to test them with the public.

Methods: In February 2011, six 90-minute focus groups were conducted to explore the relevance, comprehensibility, credibility, and effectiveness of selected messages developed for a series of video clips by the Nuclear Detonation Response Communications Working Group. These focus groups were conducted with the general public who lived in Chicago, IL (2 urban, 1 suburban) or Los Angeles, CA (2 suburban [Ventura County residents], 1 urban). After the focus groups, ORISE staff examined participants' transcribed responses to identify emerging themes. The qualitative responses were entered into qualitative analysis software, QSR International's NVivo 8.0. This software assisted in the identification and analysis of themes from the focus groups. Multiple staff members confirmed similar themes.

Key Findings:

- Participants wanted communications with action items, specific instructions on how the public can protect themselves, their families, and their homes; not scientific information.
- Participants stated that the directives were counterintuitive. They expressed they would most likely want to explore outside because of curiosity, leave town or not stay in a building because it might collapse; not stay inside as instructed.
- Several participants mentioned the need to tailor content to the impacted area because many of the directives depend on proximity to the impacted area or blast radius.
- Participants did not consider a majority of the information in the scripts and messages to be high priority in an emergency situation.

Some of the participants' overall recommendations for all the content included:

- Segment the information for blast zones
- Create short, concise and simple content
- Use authoritative and declarative language
- Avoid unfamiliar terms and phrases, and
- Integrate consistent information throughout the messages and scripts

Conclusion: Providing clear, comprehensible, credible information to people in a timely fashion is vital for reducing deaths, injuries and illnesses, reducing psychological impacts, and mitigating terror effects of the incident. In order to communicate with the public effectively during an IND emergency, the feedback from the focus groups combined with risk communication principles will be utilized to revise the current IND content.

Introduction

Detonation of an Improvised Nuclear Device (IND) in a metropolitan area of the United States would be catastrophic. Planning for such an event is critical to the nation's overall preparedness for emergency events. Amidst the calamity ensuing from a nuclear detonation, a crucial task for federal, state, and local authorities will be communicating clear and consistent messages to the public. Effective communications will be a critical factor in saving lives and minimizing injury.

In 2009-2010, the Nuclear Detonation Response Communications Working Group, a federal interagency group of communications and radiation technical experts, developed key messages for affected communities, as well as the rest of the nation, to be used during the immediate aftermath of an IND detonation. These messages are intended to provide key life-saving protective action guidance as well as responses to questions anticipated in such an event. Although incident-specific messages will still be needed, these messages will enable decision makers and communicators to provide consistent, well-developed information about a variety of concerns that will arise.

The Radiation Studies Branch of the Centers for Disease Control and Prevention (CDC) provides basic information on radiation and its health effects as well as emergency instructions for individuals and families. In addition, the Federal Emergency Management Agency (FEMA) is developing communication plans for radiation emergencies related to an IND detonation. CDC and FEMA were part of the interagency group that developed the key messages for communities affected by the detonation of an IND. To help ensure the quality of those messages, CDC requested to test them with the public and the Oak Ridge Institute for Science and Education (ORISE) provided technical assistance. This document reports on the findings from the message testing study.

Methods

In February 2011, six 90-minute focus groups were conducted to explore the relevance, comprehensibility, credibility, and effectiveness of selected messages developed for a series of video clips by the Nuclear Detonation Response Communications Working Group. These focus groups were conducted with the general public who lived in one of the two following metropolitan areas:

1. Chicago, IL (2 urban, 1 suburban)
2. Los Angeles, CA (2 suburban [Ventura County residents], 1 urban)

Demographic Characteristics of Respondents

A total of 44 adults participated in the focus groups. Each group consisted of six to eight participants who varied in gender, age, race, and education level. *Figures 1-5 summarize the demographic characteristics of the 44 focus group respondents.*

- Fifty-two percent (52%) of the focus group participants were male and 48% female (see Figure 1).
- The majority of focus group participants were between the ages of 25-54 years old (see Figure 2).
- Seventy percent (70%) of the participants were Caucasian (See Figure 3).
- Most participants had some college courses or a four year college degree (See Figure 4).
- Most of the focus group participants did not have children under age18 living in their household (see Figure 5).

Figure 1. Gender of Focus Group Participants

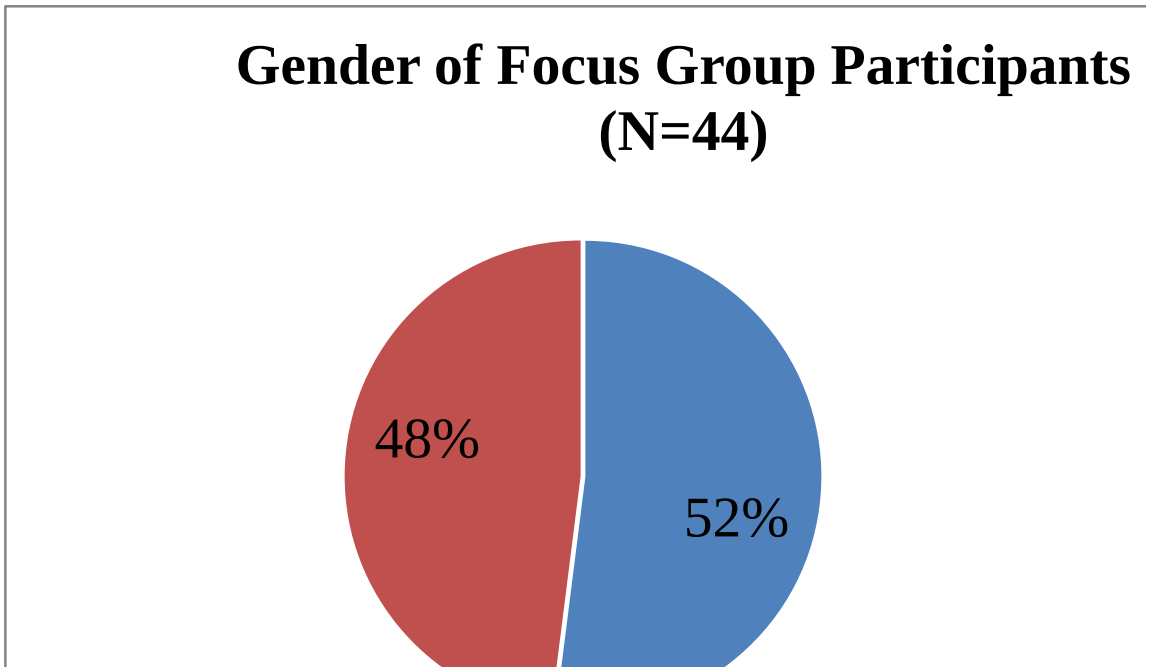


Figure 2. Age Ranges of Focus Group Participants

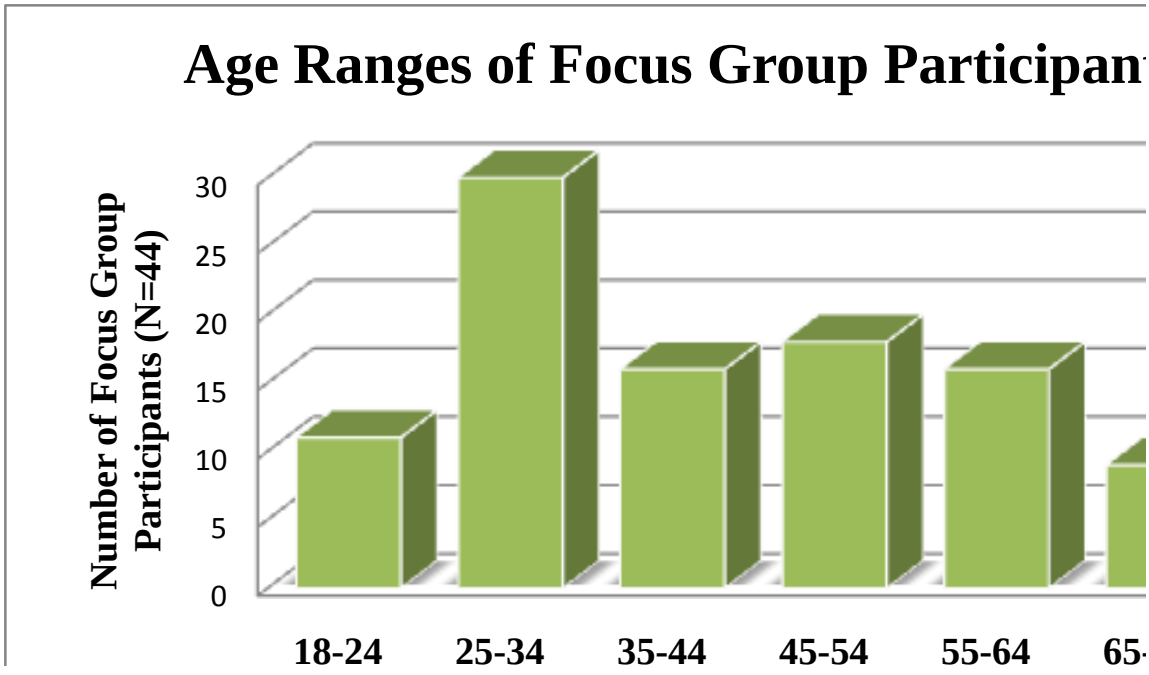


Figure 3. Race of Focus Group Participants

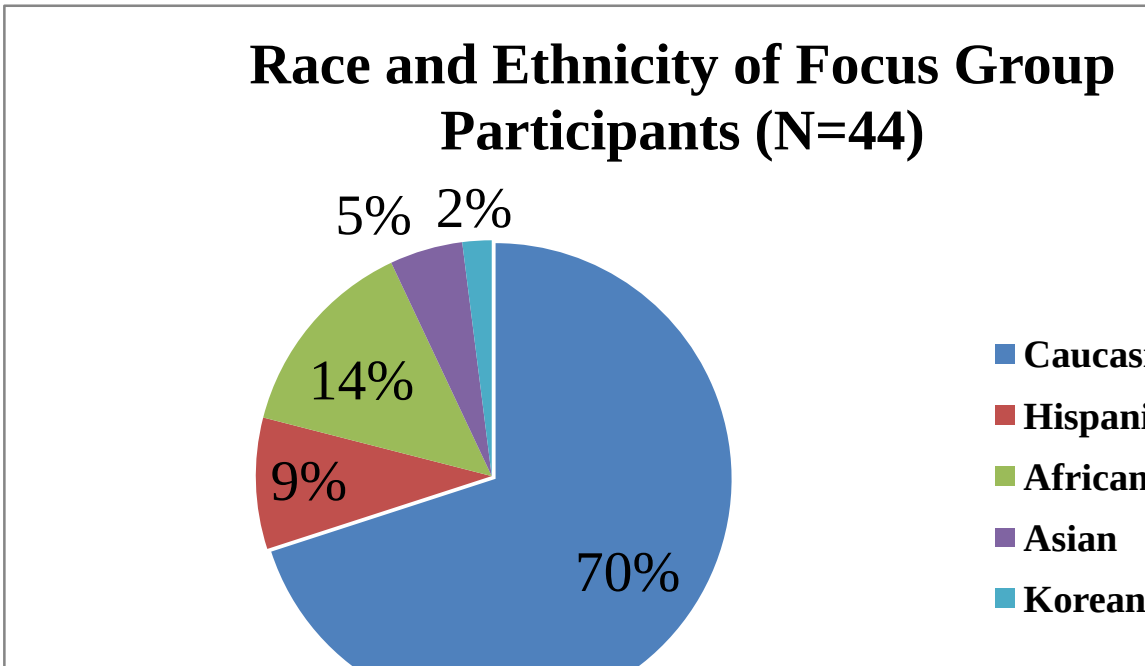


Figure 4. Education Level of Focus Group Participants

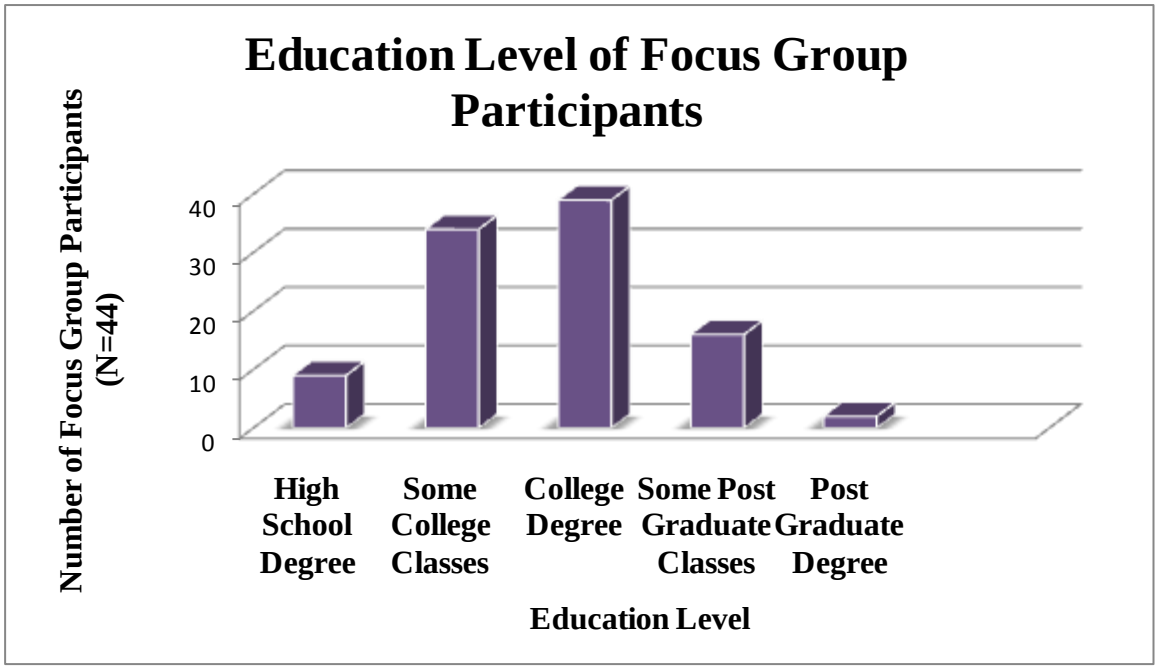
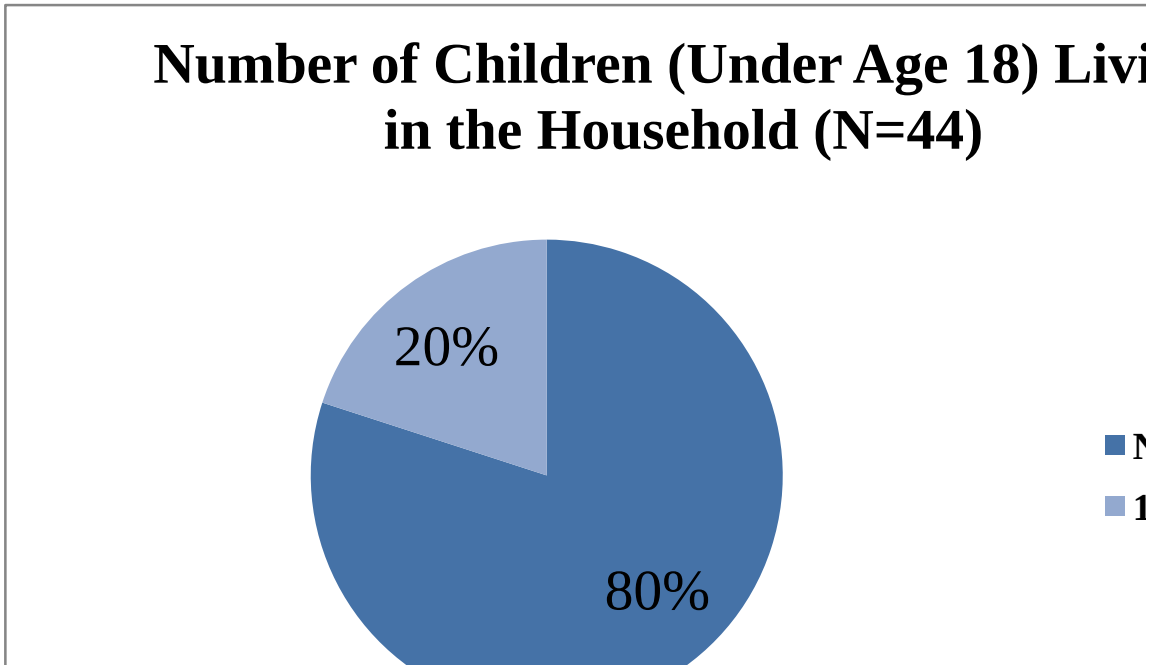


Figure 5. Number of Children (under age 18) Living in the Household of the Focus Group Participants



Process

Market research facilities at the two different locations recruited participants, under the supervision of ORISE. The screening instruments used are included in Appendix A. Prior to participating in the study, participants received an information sheet providing information on sponsorship of the study, their rights as participants, risks and benefits in participating, and contacts for more information. Appendix B contains the Participant Information Form. Participants were paid a cash incentive for participation.

Data Collection

Data were collected by means of focus groups, moderated by an experienced moderator, Mark Herring, Ed.D. All groups were facilitated using a discussion guide (see Appendix C). At the beginning of each focus group session, the moderator played a video to familiarize the participants with the IND detonation scenario. At the time of the focus groups, three scripts were prepared and tested on "Helping Others", "Protective Actions", and "Food and Water Safety". ORISE also tested the content of three messages ("Radiation Basics", "Nuclear Detonation Basics", and "Response to a Nuclear Event") that were being developed into scripts at a future date. After the video, the moderator read the script or message and asked participants to share their initial reactions and impressions of the content based on just hearing it. Next, the moderator passed a hard copy of the script or message to the participants and read the message to participants again. Participants were asked to underline important parts of the script or message and to circle confusing parts of the script or message. Once the participants completed the activity, the moderator facilitated a discussion with the participants about the elements that they liked, found important, disliked, or found unclear/confusing. As part of the discussion, participants were asked about the difficulty of implementing the suggested instructions and the believability of information in the content. Each group went through the process above with a total of three scripts or messages. The scripts/messages rotated among different groups. See Appendix D for the Messages Tested and Appendix E for the Rotating Script/Message Schedule. Groups concluded by participants identifying credible spokespeople and sources of information they would trust and utilize during an IND emergency. Subject matter experts (SMEs) from CDC's Radiation Studies Branch were available to answer questions at the completion of each focus group session.

All sessions were audio recorded, video streamed live (for those to view off-site), and attended by CDC and ORISE staff. Additional observers included people from CDC, ORISE, Federal Emergency Management Agency (FEMA), Environmental Protection Agency (EPA) , Department of Energy (DOE), and state and local partners. Transcripts were used for data analysis.

Data Analysis

ORISE staff examined participants' transcribed responses to identify emerging themes. The qualitative responses were entered into qualitative analysis software, QSR International's NVivo

8.0. This software assisted in the identification and analysis of themes from the focus groups. Multiple staff members confirmed similar themes.

Findings and Comments
(See Appendix D for Messages)

Perceived Main Idea(s):

The content provided participants with steps to help protect themselves and others from radiation. Some protective actions mentioned by participants included:

- Keep the phone lines clear, only use text messaging to communicate.
  - *Just that, you know, keep the phone lines clear, something that's hard to believe people will do.*
  - *I think the importance of staying out off the land lines seemed pretty crucial ….using just your cell phone for texting, but always being able to be in contact.*
  - *Keeping phone lines clear.*
  - *I think the only thing that is really essential from this is the phone lines. I wouldn't have even thought about that.*
  - *I like the texting aspect, I like that.*
  - *The only stuff from here that I'd bring over and say right away is keep the phones line clear.*
- Remove clothing and shower. Participants felt comfortable that a simple act, such as removing their clothing, could remove up to 90% of the contamination.
  - *I get a lot of comfort knowing that just taking off the clothes could be 90% of the contamination. It comforts me a lot and calms me, in a state of emergency.*
  - *I almost feel a bit disgusting with radioactivity potentially on my skin or on my body and to know that the shower and taking off the clothes and all that was a good direction to take as you might be helping others in a situation.*
  - *The instructions about removing clothes, I thought those instructions were very helpful.*
  - *To remove outer wear. Again, I don't think a lot of people would know right off the bat what to do once they found out it was a nuclear attack, so that whole radioactive stuff, again, knowing what little I know that's the last thing I think about is taking a shower.*
- Stay inside, especially for those in or near the impacted area.
  - *The first one [bullet], stay inside.*
  - *I'm staying in my house, indoors, in my basement.*
  - *The positives were stay inside and stay away.*
  - *Stay inside!*
- Keep roads clear for emergency vehicles and stay away from hospitals, fire and police departments.
  - *I think keep roads clear for emergency vehicles and personnel is important.*
  - *Not to go to fire departments and hospitals if you're not really in need. I think that if there is a true emergency, things are going to have to be prioritized and so it's better if people take care of their needs themselves, if their needs are small.*
  - *Staying away from the police.*

- Instructions on how to help others if you are able to take them into your home.
  - *Well the initial thing was what can you do to help.*
  - *It talked about the relief for others, helping others in a dire strait time*
  - *It talks about how you can help others too.*
  - *Basically, the different steps to do to help people that are in the area if you're okay by yourself.*

Feedback:

- Participants believed the *Helping Others* script contained two separate messages. Some felt the script provided directives for people in the blast zone and for others who were outside the blast zone. Others believed the script addressed what to do to protect yourself and how to help others.
  - *It distinctly had two different messages. To me it was, one, if you're in the blast zone, here's what to do and you know, you're in the affected area and two, if you're outside the affected area. You want to help out, go get blankets and food and get them to the Red Cross or whoever your charity organization is. So that's like two very different messages that should be two different, not all rolled into one long story.*
  - *I guess it was a little ambiguous because at first it was talking about being in the area that was safe from harm, outside the blast radius but then it was also talking about bringing people into your home.*
  - *It's clearly two messages. One, you're affected; two, if you want to be a Good Samaritan. I mean, it's that simple.*
- This was perceived as an altruistic message but at the same time, participants were very skeptical about bringing strangers into their home. In addition, people worried about the "guests" contaminating their family members and homes.
  - *I think the idea of helping others would help you keep more calm about it because you'd focus on something else rather than being afraid.*
  - *Also, I think some people might question taking in someone in needing assistance, because if it's a stranger, there are people who would advise against doing that, so I just put a caution.*
  - *But if I was at home and – this may sound mean but, however much of this information is true as far as don't go outside, don't open the door. If I know it's nobody that I know, sorry. Not gonna have you coming in and bringing whatever.*
  - *I feel like they could be putting me and my family in danger.*
  - *One thing it doesn't say which I probably just think, like what are the chances of you getting radioactivity, like radiation on you from another person? Like how spreadable would it be? Even if they take it off. It would make me paranoid about bringing people into my home when I already am worried about even just opening my door let alone.*
- Most participants favored text messaging as a form of communication, but questioned if cell phone towers would work during the time of the emergency. In addition, participants mentioned that everyone does not have text messaging on their cell phones and might not be able to communicate.
  - *Wouldn't the cell towers all be destroyed?*
  - *For me it raises more questions like, okay, the phone may not work but okay how would your text work?*
  - *Well first off, if the cell phones towers go down, it's a power thing. How am I going to text?*

- *The text thing, I didn't like that at all because a lot of people won't text and a lot of people won't text on their cell phones, so they need to call.*

- *Helping Others* was not seen as high priority information during an emergency situation. For instance, participants believed collecting supplies was premature and contradicted the "stay inside" and "stay away for the impacted area" instructions.
  - *That message, I wasn't even paying attention because I'm not going to a hospital and I'm not collecting items and doing all those things and I'm not worrying right away about taking a guest in my home who's knocking on my door. I'm not worry about that right off the bat. I want to know what I personally should do.*
  - *Collecting clothes and blankets, that's not going to be a priority.*
  - *Depending on the timing of the message, collecting food and clothing might be a little bit premature.*
  - *It has to be more bold because it says collect food items in your community, but it was saying outside the impacted area.*
- The safety of children and family members concerned several participants. They revealed that even if they were instructed not to pick up their children that they might not follow instructions.
  - *That is what's important to most -- because I have a little boy, so I felt the same thing. Well, if he's at school, would I race over there even though I'm not supposed to but it's my son?*
  - *I think there would be more panic and more concern and people would just overlook what's being said because they want to protect themselves and their family.*
- Many participants questioned how they would know if they were contaminated and what contamination would look like. They also wondered if the levels of contamination varied and what symptoms correlated with each level.
  - *What does contamination look like? And then what to do.*
  - *Maybe they should put down degrees of contamination and what to do.*
  - *So there's like stages of it, like cancer you have stage four, you're a gonner.*
- Terminology such as "dire," "detonated" and "improvised" were unfamiliar or confusing to several focus group participants.
  - *I think dire might confuse people.*
  - *I was definitely questioning that line, unless it's a dire emergency. To me personally, I couldn't imagine a more dire emergency than a bomb going off. I'm sure a lot of people would be running to the emergency room if they have contamination on their arm. I'm assuming there would be a lot of questions and a lot of panic, if people did hear these messages first.*
  - *The first line, improvise nuclear devices, detonated. Like a nuclear explosion goes off? Detonated, people don't know what that means.*
  - *When I hear improvised nuclear device, does that mean that somebody's strapped it to the back of a car? On themselves?*
  - *And I wasn't sure about the improvised word either, what that would really mean?*

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Food and Water Safety (Script)

Perceived Main Idea(s):

- Participants believed the main idea of the *Food and Water Safety* script was only eat food in sealed packages and containers and only drink bottled water.
  - *The main message obviously is anything that's in a sealed container has not been contaminated. It's saying open up the bag of lettuce but get rid of the cellophane that was contaminated sitting on the counter. But it wasn't contaminated if it was in your refrigerator. The main message is you have to make sure your water is in a sealed container and all your food is sealed. That's the main message I got.*
  - *Well I mean basically I got from it that you're supposed to only eat stuff within containers.*
  - *Food that's been sealed in a bag or container and sealed tightly; unspoiled food in a refrigerator and freezer are safe to eat, too; wash your food with water; tap water is okay for washing food.*
  - *You can eat the food that you have, as long as it's protected.*
  - *That bottled water is the primary source that is free from contamination.*

Feedback:

- The *Food and Water Safety* message was perceived as informative because it provided participants with instructions for food and water safety and disposal of cleaning materials.
  - *[It tells you] when you get hungry or thirsty, what to do and not to do.*
  - *I think it was a little more informative, because I was thinking about the food in the fridge, or the stuff in the -- it mentioned stuff in the pantry, as long as it's sealed, as long as it's behind the doors, it should be okay. And if you are worried about it, you can rinse it off with tap water.*
  - *Put the bottled water and the sealed food all the way at the top just so you can already know that those are the to-do's. Also, I underlined [indicating important] sealed tightly. I think common knowledge tells us like whenever you buy anything or you have anything, it's always best when it's sealed. So that's good, so just like a refresher and a reminder.*
  - *I think it's important to know the towels that you use are sealed. I can see that being a detail you don't remember, as you're wiping everything down and you grab these radioactive towels in the corner that you keep handling. I mean when you think about it you can say, oh, well of course you should do that, but I've been in tight situations before and I've seen that happen when you overlook simple details.*
- Participants liked the dust example and thought the statement that instructions were the same for everyone was important information.
  - *I underlined [indicating important]obviously radioactive material settles like dust.*
  - *That radiation is primarily going to be transferred and you're going to be subjected to it through the dust.*
  - *If there's dust, the dust is still gonna be on there 36 hours. So the dust, the contamination would be gone outside but that apple still has the contamination so it has to be washed prior to eating.*

- *I thought it was important to note that the safety measures are the same for everyone because I know, I was imagining myself and I was…say I was stuck at home or at a grocery store and there were senior citizens there or a pregnant woman. I might be overly concerned about these people, but if you know the safety precautions are the same, it's easier just to think about.*

- Participants thought the tone of the message was advisory and lacking a sense of urgency.
  - *I think the tone and this kind of wording may not get across the seriousness of the situation.*
  - *The thought that went through my mind was that it was initially too nonchalant. It seems like it's not that big of a deal and just wash it off.*
  - *I think the language is way too advisory. It says you can do this; you have the option of doing this. I mean, I've been just scratching things off as they go by here, the way I'd read it from the top down would be, pay close attention to what you eat and drink, the less radioactive material the better; radioactive material settles like dust; safety measures are the same for everyone; food that's been sealed in a bag is safe, even if the outside is bad; your refrigerator and freezer are safe too; clean pots and utensils; wash your food with water; towels should be put in a plastic bag. You can go through all that information that shortly and people aren't going to question it.*
  - *So I circled the last three main sentences, because I feel like it needs to be more direct, more concise, more to the point, not you're probably wondering -- it's like we're just casually thinking about radioactivity and it's not that big of a deal, like this is serious business.*
  - *The more indirect it is, the more questions people are going to be asking.*
- The safety of tap water was a concern for a majority of the participants. Participants noted that the information was contradictory because it stated "only bottled water is safe," but also provided directions for using tap water to rinse food. The water safety also made participants skeptical of taking showers for decontamination.
  - *My concern is that you're telling me to rinse things off but yet the water is contaminated. Gee, something is amiss and am I really going to use all my bottled water to rinse the containers off? I've got a problem with this.*
  - *I'm confused about the water, because if it's safe to wash your food, why isn't it safe to drink? That, to me is something is not right there, it's very weird.*
  - *Washing your food. Yeah, and even if this is all true, even if this, for some reason this actually does make sense, it's not clear. So I'm not going to trust this because I'm confused by it. It seems contradictory to me even if it isn't. Even if it is true, they need to do a better job of clarifying exactly what the message is.*
  - *It's almost like there needs to be an entire sheet just on water. Like with every little possible thing. I don't think they can be specific enough about water. With water, there's so many different possibilities.*
  - *The whole water situation, we were discussing about taking a shower and now all of a sudden it's in your mind is the water safe. It would be confusing.*
  - *That's a major concern. Because like they said before, take a shower right away. But then they're like, well we don't know if the water is good to wash your food so drink the water. So, I mean, this whole water thing, this information needs to be accurate before it goes out.*
  - *Let's say the water is contaminated and I take a shower in it. Would it be better, even though it's contaminated, to take a shower in that contaminated water, than to have*

the stuff sit on us? I feel like I don't know that. We're not sure about the tap water. It makes me feel like I want to go have like a reservoir in my house of water.

- Participants questioned the signs, symptoms, and dangers of radiation contamination.
  - *What concerns me is the different degrees of contamination and what the short time effects are. What happens to people that are seriously contaminated? Will their brain go to mush?*
  - *What are the symptoms of contamination and how do you know you're infected and to what degree?*
  - *And what would that actually do to us, the radiation?…. What's gonna happen to us if we don't wash off?*
  - *After you're exposed to radiation and cleaned off, obviously you stay inside but say you or your family members started having adverse affects, what kind of healthcare steps could you do for yourself and your family inside the home as opposed to going to a hospital?*
  - Several participants were interested in finding out how to clean counters and other surfaces and what types of cleaning products they should use. during the emergency. Other participants believed there should be more emphasis placed on cleaning your home. Participants were also interested in potential effects of radiation contamination in the home.*It says you can clean counters, etc, etc, I think it would be helpful to say what you could clean them with. Some people just wipe it off with a paper towel. Some people run it under the tap water. Some people, like me would get out the Clorox wipes.*
  - *Well it was a little overwhelming, like when they were saying to wash the kitchen down and I'm thinking well, what would I use to clean the kitchen. I'm sure a sponge isn't going to work, or you know, just feeling overwhelmed by a lot of questions, worrying about keeping it safe.*
  - *It says about cleaning off your plates, pots and utensils. I guess that would be assuming that they'd be out instead of in a cupboard? But after you clean off your plates, should you put them in plastic bags to reduce the chance of extra radiation landing on it in the next couple of hours? Would it be okay to just put them in a drawer, or how sealed up should they be?*
  - *Maybe put emphasis on how important it is and how much maybe damage if you do not clean. But if they put it in there, I'm assuming that it's an important enough information for you that you might have to want to do that. Some people might be like, well it's cleaned up, and right now that's not my priority. How important is it and how much does it affect you if you don't wipe counters?*
- The statement regarding using a towel to remove contaminants from containers confused some participants because they were unclear if their towels were contaminated. This message also introduced some worry among participants about their houses being contaminated.
  - *They're talking about washing things and cleaning countertops but if all your towels are outside, or out of the plastic bag, then how is that clean enough to wash your countertops with? You're just cleaning it with stuff that's contaminated.*
  - *And then the other thing about the towels, okay, you just told me that this is dust and it's all over my containers of food, but where are my towels? Is it not all over my towels?*
  - *It's not that obvious, but I'm just wondering how long does it keep settling? If you have all your windows shut and everything else, maybe they should have something*

on there if you have any tape, tape the windows or if you have a fireplace, make sure the trap is shut. If there's any way this dust can get in the house, try to prevent it as best as possible.

- Participants desired to know if some food packaging materials such as metals were less susceptible to radiation than other materials like plastic.
  - *I immediately started to want to understand a little bit more about radioactivity and what items might be conducive to more radioactivity. You know, like is a metallic item going to receive radioactivity in the event of a nuclear bomb more than like a fabric item, or a food item, and some sort of guidance in that direction as to stay away specifically couch items, like it holds it. I don't know enough about nuclear or radioactivity.*
  - *I don't know about plastic because plastic sometimes stretches and there's little tears and there's little spots. Would that still seal it off?*

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Protective Actions (Script)

Perceived Main Idea(s):

- Participants perceived the main ideas of the *Protective Actions* script as go to the basement or the middle of a building and stay inside, then get clean by removing clothing and showering.
  - *Try to stay in the center of the building or away from windows or where this [radiation] could leak in.*
  - *Stay inside for at least 12 to 24 hours until more information about the explosion is available.*
  - *Get inside, stay inside, get clean and get more information. It pretty much says it all.*
  - *Get into the building or even the center core of the building as far as deep in as you can, which wasn't contaminated by radiation would be our best shot. And then any exposed skin or even the clothes that's contaminated, so we have to go down to our skivvies and then wash up. So it was very informative.*
  - *If I was covered in it, take my clothes off, clean myself.*

Feedback:

- Hearing that a nuclear detonation was survivable was an important component of the *Protective Actions* script; this statement surprised many of the participants and was reassuring to others. Although participants understood the event was survivable, a few participants were concerned about their quality of life after the event, and fears of long-term health effects.
  - *I like that sentence, because a lot of people are going to think oh, I'm a goner. But if you're told right off the bat that it's survivable, people are going to relax a little more and then pay attention what they need to do. That would be my reaction.*
  - *You can survive the event.*
  - *That it's survivable, that you can live after something like that. I wouldn't think that you could actually.*
  - *You can survive the event. Whether you will then die a long painful death of radiation sickness is another situation. Or your grandchildren will have genetic defects. So I mean, as I said, there are bigger things than just surviving.*
  - *I actually circled survivable instead of underlined it because it's sort of…what kind of quality of life there is if survivable just means you're alive but what is your quality of life?*
- Participants found the information stating that radiation levels would decrease in 12-24 hours informative but a few thought the time period was too broad and more details were needed. Participants were concerned that some people may go outside too early.
  - *It is very informative. It gave you a time period, a timeframe, 12 to 24 hours.*
  - *I would keep the 12 to 24 hours and maybe me a little more specific because what if I go outside after 13 hours and still there's something going on? They need to be more specific to say after 24 hours. So 12 to 24 hours still isn't a guarantee.*
  - *Where it says wait 12 to 24 hours, that's really specific but based on vague, generic information. Depending on the size of the blast, 12 to 24 hours may be just the right amount to wait, or it might be nearly enough time to wait. So I just think that it's too much, too many specifics based on vagaries. Is that a word?*

- Participants responded positively to directives that provided personal actions (e.g., avoid use of conditioner), but wanted instructions prioritized and moved to the beginning of the script.
    - *Don't use conditioner….I would have NEVER thought of that!*
    - *It's like if I wanted to get clean, I would go take a shower but I didn't…if somebody's like oh, I should take a shower but then they start scrubbing or like oh I should get clean and they start washing off but then it said don't scrub your skin. What if they start scrubbing their skin right away? I think it should have been reorganized.*
    - *I think, in the beginning one of the first things they say is get clean and then it's not brought up again until the end of the message. I was waiting for that to come through there.*
    - *I think you should move the information that you can survive a nuclear…follow these steps and the possibility of surviving is there or phrase it in a way…*
- Several participants mentioned the need to clarify the impacted area because many of the directives depend on if you're in, near or outside the impacted area or blast radius.
    - *We need to know where the bomb is. Location. Because again it gets back to one of the initial points, that it's so different depending on where you are. It's not survivable in some places; it's clearly not.*
    - *I don't know how you would do it, but maybe some more clarity would work. In terms of the size [of the explosion]. Obviously it's not a very specific statement.*
    - *Don't they have different levels of areas? I mean I don't know about bombs but I would imagine, what's the circumference of a normal bomb? A mile, ten miles? Would it impact building, how high does it go? If one went off right here, are we safe because we're up kind of high?*
    - *Or how far it extended. How would you know? And maybe it happened here and you're two miles away, maybe you might get electricity.*
    - *They'd almost have to figure out some sort of judged radius zone to say like, okay, you're safe here but everybody else stay inside.*
    - *I think so much is going to depend on where you are from the epicenter of the explosion. I mean -- but I have read that like a certain number of square miles would just be like contaminated forever. In even one of the smallest of these. It's going to depend on where you are; it's going to have to be very specific.*
- Participants noted that the script covered many details about when one is inside their home but did not provide instructions for those who were outside or in their cars. The statement "cars do not provide good protection from radiation" was alarming to several participants because they stated that they commute more than they are home; yet they are unsure about protective actions to take when in a car.
    - *It might be nice to have something like if you are outside during the impact, first go to like a school type area or large building. Second, go to commercial areas. Third, go to residential areas or something. If that would be the appropriate way to approach it. Because I think the frantic, if someone knocks on my door and you've been exposed, I don't know if I want to let you in. But if it's a school, and if you've all been exposed outside, you guys are kind of on the same team in that sense. So some sort of an informative part of that for people who are outside, where they can go.*
    - *I would say the majority of the people listen to radio in their car and I think the statement that says, that radiation…you're not protected from the radiation in your car so I think that should be something that's brought up first and foremost because*

I'm in the car, what do I need to do? Do I need to get into a building right away? If you are in your car, please seek a building first.

- *While they covered all the details about when you're inside and what happens, but what about if you're commuting and the blast goes off and you're stuck in traffic? I'd be curious what would you say to those people? Should they stay in their cars even if they're immobile? Should they be leaving and trying to find some other area?*
- *So what do you do? It just says the car is really not the safest place for you; but then leaving the car to get in the air to get to a house. Is it worth going for? Do you take the chance?*

- The *Protective Action* script was believed to be too wordy and participants thought it could be condensed and bulleted. Making the information more concise would eliminate the conversational tone and encourage participants to follow directives.
  - *I really like the suggestions of taking out the extra words, putting it more in bullet form. I don't support the conversational tone as much as I did in the beginning.*
  - *I would like to see bullets, this first page be bulleted. I think that that's kind of important.*
  - *You just want one sentence that's going to be straight to the point and not like one of these sentences about, you know, there's the scratching, shampoo and conditioner, be very specific of those areas but get straight to the point. Some of these words are not needed.*
  - *And the words that you're using, I mean, it's not bad that you're using words like loved ones but it just felt like more of a story and less with instructions.*
- Some found the information to be contradicting because it stated "watch and listen for updates" and "be aware that phones and electricity may not work." The script also directed participants to obtain safety messages from information outlets that require electricity. Hearing electricity may not work concerned many participants because they questioned how they would receive emergency updates.
  - *The part about the electricity and then watching television, it was kind of contradictory, because it said something like you might not have electricity, but then stay tuned on the TV for messages and so on. So that part to me was a little conflicting.*
  - *What happens if you're in a place where there's not a radio or TV or anything? How do you know? What do you do? Any specifics other than needing a radio or TV?*
- There was some confusion among participants regarding the instructions to bag their clothes. They did not understand the significance of placing clothing in a bag and sealing it and questioned what one would do if plastic bags are not available, or if plastic bags had some sort of special characteristic that prevented cross-contamination.
  - *What I don't understand is okay, so to put everything in a plastic bag and seal it up. Why? I understand don't let it touch you or get close to it but why seal it up and why look for a bag?*
  - *What kind of bag is it and if you don't have a bag should you tell them to just leave their clothes outside?*
  - *Also, what it doesn't address that we brought up is, okay, remove your clothes and shoes to keep materials from spreading; move them outside and what if you…no bag is available? What do you do?*
- Participants were concerned about their family and friends, and they thought firmer instructions should be given to the public about not going to look for them.

- *I might sound naïve but I really liked them bringing up family because I think it should just say do not go outside, because your family is trying to do the right thing but don't go out looking for them. I think it should just say it is dangerous to yourself, do not go outside.*
- *For the other public, if it was 30 miles away, say not to drive into the area so much as get your kids. Not to drive into a problem because it maybe 30 miles away and she has to drive 30 miles to go pick up her kid, she could drive right into the problem. They'd almost have to say not to.*
- *And how do we know that our friends and family have been instructed [to stay inside]?*

- The information about taking a shower worried participants because they were uncertain about the water safety.
  - *But then is the water safe to shower. How do you know?*
  - *The only thing I circled was one possible the shower, because again, are they saying don't take a shower if the water is not good, or are they just talking about if you're not near a shower. That just confused me.*
  - *Also, I know that if this was me and the message was telling me to shower, the first thing I would question would be to the water supply. Is the water supply clean? I don't know that I would be all that gung-ho to jump in the shower after there was just a nuclear -- so I think that maybe there needs to be some specifics regarding, you know, the water supply should be safe or just some sort of reinsurance. Something to get over the hump. Because I don't know. I can't that I would do that if there was a nuclear explosion outside. I don't trust the water.*
- Participants thought the words "detonation" and "dire" were unfamiliar words and above the average person's reading level.
  - *I think there's one word that's above that it doesn't have to be used is the word detonation. A whole bunch of people don't know what the word detonation means. They do know what explosion means. I think it's a wonderful term but I can see my eight year old not knowing what a detonation is but everybody know explosion. It's a more understandable down to earth word.*
  - *I'm just afraid of folks who don't know what that means (dire).*

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Response to a Nuclear Event (Message)

Perceived Main Idea(s):

- When prompted to provide the main idea of the message, participants stated the message provided food, water and road information. Participants thought the message was reassuring and consoling.
  - *Where is the food and water that is free of contamination? Those are the most important things about this message.*
  - *For the most part it's telling us what the U.S. government is going to do.*
  - *After a nuclear detonation, levels of government is saving lives. That is very important to me.*
  - *I think they're going to be able to tell me where I'm going to get food, and they're going to let me know real soon where it's safe to go and that I'll be able to have food and water. I think that was important.*
  - *The last paragraph that they're trying to figure out where the safest roads are. Yeah, of course they're going to but it's somewhat reassuring to me that they're going to try to find those safest roads, the food and what-not. But other than that it's not really important.*
  - *I thought it was consoling to know that government is working. In the end because you know that government is working you have a sense of relief that help is on the way. It is kind of clear and simple as that.*
  - *I did like, too, that they listed specific departments they were going to have on different things that anybody, anything that anyone would be concerned about like forensics, what's going to happen and the enforcement. I think that comforts people when they know that there are specific branches of the government or branches of agencies that are in motion to do everything they can to work together and fix whatever and help people.*

Feedback:

- Participants felt the *Response to a Nuclear Event* message did not provide priority information. They wanted directions to assist them in protecting themselves and their families instead of information about actions the government officials were taking, unless those actions had a direct impact on their personal safety.
  - *It's a little bit like we'll give you information soon but we actually don't have anything to tell you.*
  - *Well, it was now what? This happened and then it was kind of like I wanted something more after that to say ok, here's what's happening; here's what's going on.*
  - *I'm still more concerned with what to do rather than what they're doing.*
  - *Tell me what I need to know right now. I don't need…whatever the situation is, it is not going to help me. If they plan on looking for them wherever, just tell me where to go.*
  - *I want to know is someone coming to help me. Is the National Guard coming? Is something going to happen?*
  - *We want useful information now. Like I don't care what LAPD and the marshals, national guards are doing. They're going to be doing what they need to do. That's why we pay them with taxes.*

- Participants did not like the retaliation component of the message because they thought the message needed to focus on information relevant to their personal safety.
  - *I think the part where we're going to track down the people…it's irrelevant.*
  - *I had the same thoughts of like this would just make me angry when I need to focus on just being safe right now. So I put, talk about this later. When people are safe and what-not, then we can get angry.*
  - *We're doing everything possible to identify those responsible for this malicious event. That kind of gives me a sense of like, oh someone did this to us. That might not necessarily be the case. It could have been an accident, it could have been – I don't know, some other country doing something. But to me, I didn't really like it. It kind of just gives as sense that someone attacked us, and something could happen or some more things could happen or we might feel the need to retaliate.*

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Nuclear Detonation Basics (Message)

Perceived Main Idea(s):

- Participants thought the most important components of the message were the instructions to quickly go inside and stay inside and information for those in a car.
  - *On the second page, protective structure, quickly go inside and stay inside. That's important what to do.*
  - *Stay inside, stay put.*
  - *The most important thing to do, obviously, is to get to the closet or the furthest point from all of the walls, obviously, from the roof and the ground levels and stay put.*
  - *The car information because I think that will get people to stop, but I changed the sentence so the second sentence was first; cars do not provide adequate protection from radiation from a nuclear detonation. If you are in a car, find a building for shelter immediately. I think that will get their attention.*
  - *A great important notice was if you're in a car, find shelter immediately.*
  - *Don't jump in your car because it doesn't help with protecting you from radiation fallout.*

Feedback:

- Some participants expressed they would not follow directives to stay inside because of curiosity or fear.
  - *In the video, they all decided at once to go into this small room and listen to the radio…my first thought would be to go outside and look at what happened which is counterintuitive to what I saw.*
  - *Most people are going to take a look and see what happened.*
  - *I can see people just totally panicking. You say stay inside and they say why stay inside? I'm going to go out. I want to see what is going on. I'm not saying I would but it would be like if they tell you to stay inside I'm sure people would be, like, well I want to know what is going on.*
- A few participants thought mentioning the concept of distance would encourage people to leave the area instead of staying inside as instructed.
  - *At the beginning, like this whole fallout section, you're saying the farthest you are away from the point, the farthest you are away, but then it says go inside. Like to me that kind of gives mixed signals because when people hear like get as far away as you can, they're going to want to jump in their car and go somewhere. But then it's also telling you, the whole next page is stay inside, go hide behind something. So it's just a little – somewhat mixed signals but it cleared it up though on the second page just telling to stay inside, so.*
  - *And furthest away means, I mean I would be like, okay I'm gonna run away from it.*
- The scientific explanations of fallout, fireballs, and electromagnetic pulse (EMP) held limited appeal among participants. They preferred less information about the science and more information about instructions on how to protect themselves and their families.
  - *I was less interested in the why and the background and what it actually meant but more interested in what can I do now. When there's an accident on the freeway we're told which routes to take to get around it, not to explain how the accident took place.*

- *Putting the information that is quick and simple and most important for your survival at the beginning of the message and put the science at the end. So if people really want to listen to what they need to know.*
- *I think that it's valuable information but not in a true emergency. So the emergency is calm, it's kind of moved out of the area, now we start doing more information about what just happened. But first out of the gate, I'd want to know what to do, page two.*

- Participants noted the lack of safety information presented in the *Nuclear Detonation Basics* message. They stated there were no instructions regarding eating and drinking or information to help protect their homes from the radiation.
  - *One thing I want to know if it would be addressed or at least people should know about is tap water. What to eat or drink.*
  - *It doesn't say anything about food, though, and that troubles me.*
  - *Should I grab food on my way out? Should I grab cans of something? Am I going to be there for a long time?*
  - *I'd want to know what I can do in my house because most likely I'd probably be at home because I'm a stay at home mom. Do I need to cover my windows? I don't know, safety things inside my house.*
  - *One thing I think people would want to know if their windows were open…if that would help at all. I don't know why but I'm sure people would be like, should I shut this before I go to the center or the basement or wherever.*
- The blast location was of great interest to many participants because it would provide them with a better perspective of their risk of radiation exposure and contamination.
  - *One thing I would add to that, too, since it is probably not going to be for specific areas of the country, the blast radius, what area…I mean you may not hear any blast but you might be in California and hear on the news of a nuclear attack and you wouldn't know if it was what city.*
  - *Yeah. Maybe if things are going to be recorded at all, maybe like regions of the United States with like the southwest or the northeast. That way everyone else that is not in that area…it wouldn't incite panic in the rest of those.*
  - *How far away am I from Ground Zero?*

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Radiation Basics (Message)

Perceived Main Idea(s):

The *Radiation Basics* message was reassuring and provided participants with hope knowing a nuclear incident was survivable. Participants indicated the following as the main ideas:

- Communicated information about radiation
  - *Pretty much just the summary of what radiation – how to treat radiation if you're near some sort of object that's emitting radiation from it. It just kind of gives you a brief overview of what the effects are and how you should respond.*
  - *The first sentence was pretty good because I feel like not too many people know exactly what radiation.*
  - *I think it's important to leave in the line that says it takes a very large dose of radiation to cause a noticeable health event.*
- The difference between exposure and contamination
  - *In an emergency it seems to me the first thing I'd want to hear is the sentence that starts with exposure and contamination are not the same thing immediately because now I'm hearing that the bomb went off in downtown and my first thought is going to be Hiroshima, that my skin is gonna start falling off and I'm dead. So that piece of information would be pretty important to me.*
  - *The x-ray example stands out. When you get an x-ray, you are exposed to radiation but not contaminated because it doesn't stay on your skin.*
  - *Exposure occurs when radiation interacts with body. That's like the starting point, I guess.*
- The concept of shielding
  - *Shield yourself from the radiation source in protective areas.*
  - *The three basic concepts to reducing radiation exposure, like knowing the time, distance and shielding.*
  - *There's precautionary things you can do to minimize the radiation. The thickness of the building, going in places where you're not exposed to it as much.*

Feedback:

- Participants found the concept of distance contradictory to directives to stay inside. These opposing statements left participants questioning if they should leave their homes or stay.
  - *Two contradictory things. It says gets as far away from the radiation as possible; stay where you are.*
  - *Take out the further you are from a radiation source, the less exposure you will receive, and my reason is I see the highway jam packed with everyone trying to get out of town and that would be a very inflammatory message because even though it says you can go inside, I'd get in my car. I'd think I need to get in the mountains, I need to get out of downtown.*
  - *Like I said earlier, shield yourself, don't go anywhere and get away from the source. Those are…you know…opposites from each other.*
- The information about radiation exposure versus contamination was unclear to participants. The message did not provide any instructions for reducing exposure or

contamination, for determining if they were contaminated, and for removing the contamination from their bodies and clothing.

- *If I was near a radiation blast, should I remove clothing? It's giving me information but it's not telling me what to do with that information.*
- *So, it really gave me nothing I could use, I don't believe.*
- *We know they were exposed but all we really know is that they suffered from the blast. Were they contaminated and were they exposed?*
- *If you are carrying around a lot of nuclear material on your body and clothes, it's going to be worse…but it doesn't give you any ability to determine that.*
- *It's telling you there are protective actions but they're not giving them to you which is more frustrating.*

- Several participants were confused by the following terms and phrases: "contamination," "exposure," "radioactive decay," and "depositing energy."
  - *It was a little vague about exactly how you get contaminated. I still don't know now…I'm confused.*
  - *What I'm thinking based on what you read was just because you're exposed to it doesn't mean you are contaminated. Why would they even say that?*
  - *Doesn't make it clear to me that the ash and dust they are covered with is contaminated or not? Or what actions to take…does everybody get naked?*
  - *For me, radioactive decay; I mean that wouldn't make much sense to me. In a catastrophe I probably would not care about that.*
  - *The second line, radiation effects people by depositing energy in the body tissue, at the time of a catastrophe I just want to get to the main points rather than getting more or less a science lesson.*

See Appendix F for suggested changes to all the tested IND messages.

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Key Commonalities

- Participants wanted information delivered by a live voice and not a recording because it gave them reassurance and hope that others are alive in the world. They also desired an organization or person with credibility and trusted by the majority of the public.
  - *Somebody with a good calm voice that you can understand. No accents. Like a newscaster, someone who has a trained voice that everybody is familiar with.*
  - *Honestly, you're going to be looking for something, anything you can trust and hold onto. And so familiarity in people or voices that you've heard before.*
  - *A specialist, they give you more update expertise. At the same time, I think that maybe a combination platter of a specialist and maybe someone from the government because the natural reaction and you're fighting between reaction versus responding and a natural situation like that, you won't respond, you're going to react.*
- If battery/crank radios are the only source of information, many respondents could be isolated from emergency communications. Only about half of the focus group participants had a crank/battery operated radio.
  - *I was thinking more often than not I'm sure electricity is gone. So there's a lot of radios but not everybody has a non-electric radio so you might not be able to get any message at all.*
  - *That's when I found out I didn't think about batteries in a radio, and I did think about a hand crank because I have a hand crank flashlight but not a radio. I would think a hand crank radio would be a necessity.*
- Participants identified the following people as trusted spokespeople:
  - Local/national media reporters
  - President
  - Mayor
  - Chief of Police
  - Fire Chief
  - Radiation experts and scientists
- Participants wanted messages that include action items, specific instructions on how the public can protect themselves, their families, and their homes; not scientific information.
  - *Tell them right away here is what you need to do. And then later on put the science out there.*
  - *I guess I almost just want a list of priority of things to do and like which order. Like do this first, do this second.*
  - *I definitely think it's important off the bat to say a nuclear explosion is what has happened because I think in most people's minds, you've seen enough movies, you've seen enough history, duck and cover and everything where you know that that is a different disaster scenario than there's a flash flood, there is blah, blah, blah…It's completely on a different plane. So I think it's important that people know that but then I think people will start to panic so I think telling people immediately after that this is how you stay safe and then get to the science behind it.*

- Several participants stated that the directives were counterintuitive. They expressed they would most likely want to go outside because of curiosity, leave town or not stay in a building because it might collapse; not stay inside as instructed.
  - *I'm going to step outside and see what happened.*
  - *My impulse would be that it was a bomb and I need to get out of the building before it falls down.*
- Participants questioned what contamination looked like and how they would know if they were contaminated.
  - *What does contamination look like? And then what to do.*
  - *What concerns me is the different degrees of contamination and what the short time effects are. What happens to people that are seriously contaminated? Will their brain go to mush?*
  - *What are the symptoms of contamination and how do you know you're infected and to what degree?*
  - *And what would that actually do to us, the radiation?…. What's gonna happen to us if we don't wash off?*
- Participants criticized the length, the wordiness, and redundant information of several messages. They worried that in their current form, people would miss vital information regarding radiation contamination.
  - *It's so long. I think if you bullet-pointed things it might get people's attention.*
  - *I feel like almost it might be beneficial to have two sets of messages playing where you had a brief message where you went over with the quick facts, don't go outside; don't drink this…and then all of the sort of nuance information could be played on maybe every fourth message that was longer.*
  - *Make it short and to the point.*
  - *The second bullet, while every person responds differently to radiation exposure, I would take that out and have the sentence start, the protective actions are the same for everyone including children, pregnant women and the elderly.*
  - *It's too redundant. It's phrased a little bit different but it's sort of redundant.*
  - *Yeah, I crossed off most of page one except one sentence about a nuclear explosion, one sentence about the fallout and then people in the path of the radioactive material should pay attention to state and local officials. And then the EMP, the thing about removing the battery.*
  - *And then the second sentence just kind of reiterates the first; increase distance from the radiation source, the farther you are from the radiation source – I mean you've already told us.*
- The flowery language such as "you're probably wondering" and rhetorical questions were distracting to participants.
  - *I'd cross off the sentence you're probably wondering about the safety of drinking water because then you've got people who weren't wondering about it, now you've got them wondering about it.*
  - *The part where it says this may feel as if it goes against your natural instinct, that was just fillers for me.*
  - *One of the things that should come back in the first sentence, what basic….Are you asking me? I'm listening to you, I want direction. It should just be more, you know, protect yourself from contamination. Radioactive materials settle like dust. Don't be like -- you're wondering what?*

Overall Recommendations for Improvement

The following recommendations provide ways to improve current and future IND communication for the public. Focus group participants provided rich suggestions for improving current content. Recommendations include:

1. Tailor Content To Various Audiences

During the focus groups, many participants suggested that the information should be tailored for audiences based on the location from the IND incident. Tailored messages would assist participants in adhering to directives that are applicable to their location.

- **Provide separate messages for audiences that are in or near and outside the impacted area or blast radius.**
  - *It uses the terms "your area" and "outside the impacted area", but it's unclear that you're going to know what that is. How are they defining that? Is the area, I don't know, 20 square miles? 50 square miles?*
  - *I think it needs to be able to convey small, medium and large and that might be done with different adjectives or by describing the impacted area. And this impacted a 10 mile radius, it was a small nuclear device.*
  - *I circled[indicating confusion] if you're in or near an impacted area, meaning who knows that that is. It could be anywhere from a mile to a few miles. So maybe a little bit more clarification I think would help everybody to understand.*

2. Tailor Content to Various Delivery Methods (i.e., TV, radio, social media, print)

In a majority of the focus groups, participants thought the information was better suited for other formats, such as print material, rather than video or radio public service announcements.

- **Consider the delivery method when developing future IND messages.**
  - *Where would we hear it? Would it be like something in your mailbox? How would we receive it for us to pay attention to it in the first place?*
  - *I guess you have to pose the question how is this being read? Is it for radio? Is it for television? Is it for like just general information if something like this were to occur?*
  - *Are you going to be saying this on a radio or are you going to be having people read this?*
  - *But in its current form, … it just reads like a pamphlet.*
  - *Is this like a brochure that they're going to be mailing out to people like an informative if something happens this is what you do? Because that's how it's reading. This is not something I would expect to be read over the radio after a bomb goes off.*
- **Develop messages that are 60 seconds in length at most**, 30 seconds is preferable
  - *If it's the radio you have a 30 second sound bite. You're not going to be able to get all of this information in there.*

3. Key Language Concepts

To improve the comprehension of information during an emergency, IND messages must adhere to vital principles of emergency communication.

- **Create short, concise, and simple messages.** Communicate the main idea of the message in the first 1-2 sentences. Use bulleted format, plain language when possible, and reduce the reading level.
  - *I think bullet points would serve for this best. You don't need full sentences…you don't need to surround it with supporting grammar and stuff when you're trying not to die.*
  - *When you were reading it, I was trying to remember the thing from the top when you were at the bottom. Like you forget a lot of that stuff.*
  - *It needs to be a lot briefer, a lot more concise and a lot more hard hitting.. Like, don't eat your food! Wash everything you've got! Rinse the container before you touch it!*
  - *Just quick do's or don'ts.*
  - *Best thing is to keep it as short as possible.*
- **Use more authoritative and declarative language.** The tone of the message must be more directive and authoritative rather than suggestive and nonchalant.
  - *Kind of make it more of a do this, don't do that. Quick to the point, give me the hard facts. It's a bit nonchalant, you know, oh you should wash your food off and make sure it's in containers.*
  - *This is what we know. This is what we're unsure of. And this is what we don't know anything about.*
  - *They say you will increase your chance of survival, that's strong language, but I think if they even put an extra set and say, this is a disastrous or a lethal situation, you know, maintaining calm and explain to people this is really serious, listen to what we have to say.*
  - *I mean to tell me to gently blow my nose, like, okay, tell me I need to blow my nose or I need to…but I don't think that make sure you clean your eyes and ears and don't forget to gently blow your nose, it kind of reads like a story and not an urgent message.*
- **Be consistent. Make sure the same content is integrated across all messages.** Avoid contradicting statements, for example the water message, stated "bottled water is the only source that we are certain is free of contamination," but the food message stated "rinse food with tap water."
  - *There's two different sentences right here. The first one is tap water can be used for washing food and the second paragraph says, until we know more about the impact of the nuclear explosion of the water system…. So when you're washing off the food, is it saying you still might have some contamination?*
  - *The fourth paragraph. It left a lot of questions for me. Tap water can be used for washing your food, well is it really safe or whatever*
  - *I still was questioning the tap water. I wouldn't necessarily feel comfortable using tap water. Who knows if it's been impacted at the time.*
- **Remove the wordiness and "flowery" language.**

- *Just tell me; you don't have to get very story telling with it, just short and then stay tuned for more information. These flowery phrases like it's natural not to want to leave to find…it's natural not to want to –forget that, just say, do not leave (Inaudible) family and friends. Be specific.*
- *Also I circled, so your best bet, the way they worded, I don't kind of like that your best bet.*
- *The second bullet, while every person responds differently to radiation exposure, I would take that out..*

- **Eliminate the question and answer format.** Rhetorical questions may be difficult to understand if delivered in any other format than print.
  - *That first sentence, if a nuclear device is detonated in your area, what precautions should you take? I mean why are you asking me? If you're playing this message, a bomb went off.*
  - *And you know, I want information from you, don't be posing it as a question!*

- **Avoid or define unknown terms and phrases.** The following terms were unfamiliar to participants, eliminate or better define for future messages.
  - Detonation
  - Dire
  - Depositing energy deep in the body tissue
  - Improvised Nuclear Devise
  - Fireball
  - EMP
  - Contamination

- **Provide messages in multiple languages** for non-English speaking people.
  - *Would this only be broadcast in English? Especially in a major city, I mean, I live in Uptown, there are people there that speak all these different African languages, Asian languages, would not understand this. Even if you made this simple, they're not going to get it. And if you live in a diverse community and your neighbor panics, that endangers you.*
  - *How many languages would be this broadcast in? English is not the first language of many people in this country.*

4. Message Content

When communicating IND messages, including all necessary information and message structure is critical. Developing a strategic approach for communication efforts should include identifying and prioritizing important information, understanding the channels and sources of information that may be available during an IND emergency, and delivering the information as simply and concisely as possible.

- **Address participants' concerns about bringing strangers and contaminated people into their homes.**
  - *The point of taking a person from the outside. I mean why would you do that? I would assume if it's the same area and you're in your home, a person wandering around, I would think their home would be safe, too. Why would there be people out and about trying to get in, that you would take in?*

- *My question is if you're supposed to be indoors in the basement, how are you going to go open the door for somebody and contaminate your house. It's gonna come in your house, right?*
- *If it's not somebody I know, he's not getting in. I don't know him. He's not coming in my house. No stranger could possibly come in my home.*

- **Provide details on how to stay informed if phone service and/or electricity is lost.** Include specific timeframes on the next available update and alternative methods to receive additional information (e.g., battery/crank radios).
  - *I circled the part about the electricity may not work, but then safety messages would be made by public announcements, television, radio and internet. Well, if the electricity is not working, you can't get any of those.*
- **Provide direct contact information for the public to receive more information.**
  - *There aren't any numbers to call for information. Not everybody has a cell, the elderly may not have one. So maybe they need a phone number.*
  - *Pay attention to local and state officials. Is there any information on how to contact these people?*
  - *I don't' see any contact information in the last paragraph at all.*
- **Provide information for various scenarios.** Present specific safety instructions for those that are in cars or outdoors.
  - *What about having a safe place to go, like they do during a flood or an earthquake or something, go this local school or Y or a church or someplace. Have some place designated for people who are out and about.*
  - *There's a good chance that you could be in your car.; Especially here.*
- **Develop more guidance around decontamination.** Provide information about how to clean, what to clean, and types of cleaning products to remove radioactive material.
  - *Say you did like a Clorox wipe with bleach in it, would that do anything with the radiation? Is it just soap and water?*
  - *On this first paragraph it says you can clean pots and utensil and all that but it doesn't say with what.*
  - *When you wipe it off, it sort of disperses too, even if your cloth is a little wet, you're going to disperse that, that powered dust and you can never get it really clean.*
  - *But how do you clean the counters, I mean you wipe it off, but then is it clean? Or that cloth, you throw away each cloth every time you take a wipe, I don't know.*
- **Create language that encourages people not to leave their homes to check on love ones.** Based on comments from participants, the research team recommends creating a separate and stronger message to encourage people not to leave their homes to check on love ones.
  - *There's really no mention about parents or your kids. Because for most parents who have kids in school, that's going to be the first thing that goes through their mind. What do I do? I have to admit myself, if something happened, I'd want to go jump in my car and pick up my kids. So they haven't addressed that issue at all and it's a big one.*
- **Provide pre-event education before an emergency occurs.**

- *I was just thinking that maybe it would be good for them to give us commercials on how to prepare when they show that -- like stocking up on the batteries with the radio and just to remind us again because that kind of hits home when you see something like that and now what do we do. You know, maybe give us a little more instruction on the water, on all those things again.*
- *I think it's better to know ahead of time and be prepared than not know at all and then get hit with all these new facts. It's just the reality of the world we live in today and it just has to be looked at as some people might not want to hear it, but it's the reality and I think I'd rather know than not know.*
- *This should be out there long before anything happens, like this should be something we're getting in the mail or in the newspaper, today. Cut it out, put it on the refrigerator.*

Discussion

This research set out to explore the relevance, comprehensibility, credibility, and effectiveness of IND messages and scripts to the general public. Participants provided rich information that will help develop, refine, and communicate clear and consistent messaging during an IND emergency. Overall, the three scripts, *Helping Others*, *Food and Water Safety*, and *Protective Actions* provided participants with instructions to protect themselves. The three messages, *Response to a Nuclear Event*, *Radiation Basics*, and *Nuclear Detonation Basics* were abstract, lacked personal actions, and obtained too much scientific information for participants. During the research, several participants' suggestions for improvements aligned with risk communication principles. As revisions to the IND messages are incorporated, Covello and Allen's (1988) seven cardinal rules of risk communication should be kept in mind:

1. **Accept and involve the public as a partner.** Incorporate the feedback from the focus groups. Continue to message test revised and other IND messages with the public.
2. **Plan carefully and evaluate your efforts.** Remember different goals, target audiences, and the media require different plans, messages and evaluations.
3. **Listen to the public's specific concerns.** Participants were more interested in safety instructions to protect themselves and their families than complex scientific information details.
4. **Be honest, frank and open.** Obtaining the public's trust and credibility are difficult; be careful not to lose their trust with contradictory statements. Once the public's trust is lost, it is almost impossible to regain it.
5. **Work with other credible sources.** Conflict and disagreements among organization about certain recommendations (i.e. drinking water recommendations) need to be resolved, so the public is hearing one consistent message.
6. **Meet the needs of the media.** Provide appropriate messages for the media channel. Also, supply simple, short and concise messages to the media.
7. **Speak clearly and with compassion.** Never let your efforts prevent your acknowledging the tragedy of an illness, injury or death.

In addition, risk communication experts recommend the following guidelines when presenting technical information to the public:

- Avoid using jargon; translate technical terms (e.g., water distribution systems, ground water, etc.) into everyday language the public can easily understand.
- Use active voice and plural and personal pronouns.
- Limit key messages to no more than 3 or 4 messages that are stated briefly, concisely, and clearly.
- Present actions the public can take to alleviate or manage their risk exposure.
- Provide contact for additional information; include a 24-hour hotline and/or web address.
- Supply audience with information about when and how to stay tuned for additional information (Covello & Heartland Center, 2003; Lundgren & McMakin, 1998).

Conclusion

The Nuclear Detonation Response Communications Working Group developed key messages for affected communities, as well as the rest of the nation, to be used during the immediate aftermath of an IND detonation. By conducting focus groups with the public before an IND detonation, the working group was provided with a unique opportunity to strengthen current and future communication efforts with the public.

The research concluded that in an emergency situation, people prefer content that contains information they can use to protect themselves. Participants criticized the length of the messages and scripts and stated the information was too technical. In addition, the messages and scripts tried to provide information for all audiences and all scenarios, which led to distrust from participants. To improve current and future communications for the public, the working group should write short and concise instructions, separate messages for audiences varied by location, consider the delivery method, and integrate the content across all the messages.

Providing clear, comprehensible, credible information to people in a timely fashion is vital for reducing deaths, injuries and illnesses; reducing psychological impacts; and mitigating terror effects of the incident. In order to communicate with the public effectively during an IND emergency, the feedback from the focus groups combined with risk communication principles will be utilized to revise the current IND messages.

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Appendices

A. Screening Instruments

B. Participant Information Form

C. Moderator's Guides

D. Messages

E. Message Rotation Schedule

F. In-Depth Feedback of Tested Messages

G. Contacts for More Information

Appendix A. Screening Instrument

CDC Study

Screening Instrument

Recruit

- 6 groups (3 per day)
  - 3:30 – 5:00 pm Group
  - 5:00 – 6:00 pm Dinner Break
  - 6:00 – 7:30 pm Group
  - 8:00 – 9:30 pm Group
- Recruit 8 per group
- Numbers in parentheses in each question correspond to question numbers in "Health Message Testing System: Question Bank" – September 2010
  - Recruiters need not attend to these numbers.

Good evening. My name is _____ and I am calling from _____, a market research firm. Today we are talking with people as part of a study for the Centers for Disease Control and Prevention (CDC). We are not selling anything. We have a few brief questions that will take just two – three minutes of your time, and if you qualify and are interested, we will invite you to take part in a discussion group with other people in your area that will take place at a later date.

1. Have you participated in a focus group, intercept interview, telephone survey, and/or online survey in which you were asked your opinions regarding a product, a service, or advertising within the past six months? (B.2.b)

   01 Yes **[THANK AND TERMINATE]**
   02 No

2. Do you, or does any member of your household or immediate family work (B.1.b):

   01 For a market research company
   02 For an advertising agency or public relations firm
   03 In the media (TV/radio/newspapers/magazines)
   04 As a healthcare professional (doctor, nurse, pharmacist, dietician, etc.)

   [IF YES TO ANY, THANK AND TERMINATE]

3. What is your current job title? What term would you use to describe your current profession? (A.10.a)

_____

[IF ANY OF THE FOLLOWING, THANK AND TERMINATE

- **Employee of U.S. Department of Health and Human Services**
- **Employee of state or local health department**
- **Employee of Department of Homeland Security**
- **Employee of state or local emergency management agency**
- **Nuclear power plant employee, Radiation Safety Officer, health physicist or other radiation-related occupation**

4. In which of the following categories does your age fall? (A.2.a)

01 under 18 years of age **[THANK AND TERMINATE]**
02 18-24 years of age
03 25-34 years of age
04 35-44 years of age
05 45-54 years of age
06 55-64 years of age
07 65-74 years of age
08 75 years of age or older

[DOCUMENT ON GRID]
[RECRUIT A MIX WITHIN EACH GROUP]
[RECRUIT SO THAT GROUPS TOGETHER ARE REFLECTIVE OF THE COMMUNITY]

5. What is the highest level of education you have completed? (A.3.a)

01 Grade school **[THANK AND TERMINATE]**
02 Less than high school graduate/some high school **[THANK AND TERMINATE]**
03 High school graduate or completed GED
04 Some college or technical school
05 Received four-year college degree
06 Some post graduate studies
07 Received advanced degree **[THANK AND TERMINATE]**
08 Other: _____ **[THANK AND TERMINATE]**

[DOCUMENT ON GRID]
[RECRUIT A MIX WITHIN EACH GROUP]
[RECRUIT SO THAT GROUPS TOGETHER ARE REFLECTIVE OF THE COMMUNITY]

6. Document gender. (A.1.a)

01 Male

02 Female

[DOCUMENT ON GRID]

[RECRUIT ABOUT A 50/50 MIX]

7. Please indicate your race or ethnic background. Are you (A.5.a)

01 Hispanic or Latino

02 Non-Hispanic

01 White/Caucasian
02 Black or African-American
03 American Indian or Alaska Native
04 Native Hawaiian or Other Pacific Islander
05 Asian
- 06 Vietnamese
- 07 Cambodian
- 08 Filipino
- 09 Japanese
- 10 Korean
- 11 Chinese

[DOCUMENT ON GRID]

[RECRUIT A MIX ACROSS GROUPS REFLECTIVE OF THE COMMUNITY]

8. Number of children (under the age of 18) living in your household? (A.13.a)

01 None

02 1-2 children

03 3-4 children

04 5 or more children

[DOCUMENT ON GRID]

[NOT A SCREENING CRITERION]

9. In what city, state, and zip code do you currently live? (A.8.a)

[DOCUMENT ON GRID]

[LOS ANGELES:

- **1 GROUP (DOWNTOWN LA-URBAN)-PEOPLE WHO LIVE IN DOWNTOWN LA**

- **2 GROUPS (VENTURA COUNTY-SUBURBAN)-PEOPLE WHO LIVE IN VENTURA COUNTY**

CHICAGO:

- **2 GROUPS (DOWNTOWN CHICAGO-URBAN)-PEOPLE WHO LIVE IN DOWNTOWN CHICAGO**
- **1 GROUP (SUBURBS OF CHICAGO-SUBURBAN)-PEOPLE WHO LIVE IN THE SUBURBS OF CHICAGO**
- **EXCLUDE PEOPLE WHO LIVE IN BATAVIA, IL 60510**

10. **ASSESS AND VERIFY ABILITY TO SPEAK AND UNDERSTAND ENGLISH**

Those are all of my questions. You do qualify for our discussion group and we would like to invite you to join us on _____ at _____ PM. The discussion will last about 90 minutes. In appreciation for your time, you will be paid $XX at the time of the discussion.
Are you willing to participate?

01 yes
02 no

Prior to the start of the group discussion, you will receive an information sheet with such information as sponsorship of the study and contacts for more information. If after we hang up, you have a question about this group discussion or decide you can't participate, please contact me at _____.

Name_____
Address_____
City/State/Zip_____
Day Number_____Night Number_____

Appendix B. Participant Information Sheet

Media Message Testing Participant Information Form

Purpose of the Study	You are being asked to participate in a discussion being held by the Centers for Disease Control and Prevention (CDC), with the assistance of The Oak Ridge Institute for Science and Education. In the discussion, you will be asked your opinions about areas of concern after a nuclear detonation. Your answers can help efforts to provide accurate, helpful information to the public.
If you Agree to Participate	• This session should last about 90 minutes. • The session will be audio recorded and video streamed live. • You will receive a cash incentive for participating in the discussion. • We are eager to hear from you, but the discussion is voluntary and you may discontinue your participation at any time. • You are free to leave at any time without losing the cash incentive or other penalty.
Risks	The risks in taking part in the study are the same as you would face in daily life activities.
Benefits	You may benefit from participation by being more informed about an important public health issue. You may have a sense of satisfaction from contributing. Your comments may help better inform the public and others about a public health issue.
Confidentiality	We will keep the information you give us private and confidential to the extent allowed by law. Your name will not be used in the final report. No statement you make will be linked to you by name. Only members of the research staff will be allowed to look at the records. When we present this study or publish its results, your name or other facts that point to you will not show or be used.
Persons to Contact	If you have questions about this session, or taking part in it, you may call: **Carol McCurley (770-488-3800) at the Centers for Disease Control and Prevention, Atlanta, GA**. If you need more information about your rights as a study participant, you may contact: **Chair, Oak Ridge Site-Wide Institutional Review Board, Oak Ridge Institute for Science and Education, Oak Ridge, TN 37831-0117, 865- 576-1725.**

Appendix C. Moderator's Guide

CDC/ IND Media Message Testing

Moderator's Guide

I. Introduction

a. Introduce self

b. CDC sponsorship

1. Opportunity
2. Importance

c. Recording and observers

1. No personal identifiers used in reporting

d. Respondent introductions

1. First Name
2. How long lived in area
3. A favorite hobby

II. Scenario

a. *Today we will be talking about information you might receive following the explosion of what's called an "Improvised Nuclear Device" or "IND". An IND would be an atomic bomb built and set off by terrorists. I know that this is not a pleasant thing to think about, but like many natural and man-made disasters, it's better to be prepared than to go "off the cuff" in an emergency.*

b. *Today we will be working with some draft messages that might be issued in the event of the explosion of an IND. I'll be asking you what about them you thought was well done, and what would benefit from change, and some related questions. There are three things I'd like you to keep in mind as we proceed:*

1. *Keep in mind the messages you are seeing is a sample. There are many more messages – too many for one group to review in a reasonable amount of time. Please feel free to tell us other questions that occur to you, but remember you are not seeing them all.*

2. *Some things cannot be known now. For example, the exact size of the area affected. These details, along with others, would require more situation-specific information.*

3. *Remember that in the event of an IND detonation, there will be constant news coverage, many press conferences and interviews with public health officials, elected officials, and others. TV, radio, newspapers, the Internet*

and other sources will have lots and lots of coverage. You are likely to hear information repeated often.

c. *To try to give you a better feel for what we are talking about – and to help get you in the moment- I'm going to show you a short video.*

Show a short video describing what could be happening following detonation of an IND.

III. Message Testing -- 1

a. <u>Hearing the message</u>

First I would like you to listen to this script

MODERATOR will read the video script.

b. Response to hearing the script

1. What is the main idea that this message is trying to get across, in your own words? (D.1.d)
2. How would you sum up in just a few words your first impression of this message? Do you like it? Not like it? What makes you say that? (D.7.d)
3. What action would this message prompt you to take? (D.3.d)
    a. What makes it hard to do this? (D.41.d)
    b. What would make this easier for you to do? (D.51.d)
4. Is there anything confusing, unclear, or hard to understand? (D.6.d)
    a. Were there any words that were unusual or unfamiliar? (D.4.d)
5. Is this message believable or not? Why or why not? (D.15.d)
6. How could this message be improved? (D.33.d)
7. Is there anything you want to know that this item does not tell you? (D.29.d)

c. <u>Reading message</u>

Next I would l like you to read along with me as I read the message.
As I read aloud and you read along with me, please:

1. *Underline phrases, sentences or images you think are important. (D.36.d)*
2. *Circle phrases, sentences or images you think are unclear or confusing. (D36.d)*

Hand out a printed version of the message to each respondent.

1. What did you indicate as important? (D.36.d)
2. What did you indicate as unclear or confusing? (D.36.d)
    a. Were there any words used that were unusual or unfamiliar? (D.4.d)
    b. What other words can be used in their place? (D.5.d)
3. How could this message be improved? (D.33.d)
4. Is there anything you want to know that this item does not tell you? (D.29.d)

IV. Message Testing – 2

Repeat process for viewing another script.
[Messages will be rotated to give participants proper context for understanding messages.]

V. Sources

Next I would l like to ask you some questions about information sources.

1. Where do you get information about emergency preparedness? (D.69.d)
2. Who do you think would be a good spokesperson to use to convince you and your friends to take protective measures during an IND incident? (D.91.d)
3. What makes them a trusted source of emergency preparedness information? (D.75.d)

VI. Wrap-Up

1. Those are all of my questions for you.
2. Thank you.
3. I know thinking about this subject may have raised some questions. I'd like to introduce _____ who will come in to the room and talk with you for a few minutes.

Appendix D. Tested Messages

Helping Others (Script)

If an improvised nuclear device is detonated (goes off) in your area, what can **you** do to help? Here are some critical things to keep in mind.

If you're in or near the impacted area:

- **Stay inside** unless told otherwise by emergency responders—such as local police, fire, or health officers—or by government officials. This will keep roads clear for emergency vehicles and personnel.
- Unless it's a dire emergency, please **stay away from** of hospitals, fire and police stations. These facilities need to be available to respond and treat victims.
- **Keep phone lines clear** so that emergency personnel can do their work. You can help keep phone lines free by using text messaging to communicate with family and friends rather than landlines and cell phones. This will allow people in dire need can call for help.

If you're **outside** the impacted area, there are things you can also do to help.

- **Collect food items, clothing or blankets** in your community. It's a great way to support those in need.
- Be sure you collect only what is requested by relief authorities.

If you're able to take an evacuee into your home – whether family, friend or anyone needing assistance -- two simple steps will allow you to do this safely by keeping radioactive material out of your home:

- Ask your guest to remove their outer layer of clothing and place it in a plastic bag. Then stow the bag away from people and animals. Taking off this one layer of outerwear can remove 90 percent of contamination.
- Then, have your guest shower with warm soap and water to remove any remaining radioactive material. Make sure they pay close attention to exposed areas such as eyelids, eyelashes, ears and noses.

Stay tuned to television and radio broadcasts for important updates. Things will be changing fast and you'll need to stay informed. Be aware that phones and electricity may not work. Safety messages will be made by public announcements, television, radio and internet.

Small steps that can make a big difference...to protect yourself and help others.

Food and Water Safety (Script)

If a nuclear device is detonated in your area, what safety precautions should you take when it comes to food and water? You can protect yourself from contamination by paying close attention to what you eat and drink. The less radioactive material you eat or drink, the better.

When it comes to food, remember: radioactive material settles like dust. While every person responds differently to radiation exposure, the safety measures are the same for everyone, including children, pregnant women, and senior citizens. So your best bet is to eat food that's been sealed in a bag or container. Even if you think the outside of the package has been contaminated, the food inside is safe to eat as long as it's sealed tightly.

If you haven't lost power, any unspoiled food in your refrigerator and freezer is safe to eat, too. You can clean counters, plates, pots and utensils to remove contamination that may have settled from the outside. If you're unsure about contamination, then wash your food with water.

Tap water **can** be used for washing food. Your risk of consuming radioactive material is greatly reduced by washing food items. Any towels used for cleaning radioactive material should be sealed in a plastic bag.

You're probably wondering about the safety of drinking water. Until we know more about the impact of the nuclear explosion on the water system, bottled water is the only source you can be certain is free from contamination. Just like with food, you can safely drink juices or other drinks stored in a sealed container or in your refrigerator and freezer.

Taking these important steps can minimize your risk to radiation contamination. Simple steps to protecting yourself, saving your own life, and the lives of others.

Protective Actions

What should **you** do if there's a nuclear bomb explosion in your area? A nuclear detonation is survivable. There are simple steps you can take to protect yourself and your loved ones from this radiation threat. These steps are the same for **everyone** in the impacted area.

First: quickly **get inside, stay inside, get clean, and tune in to get more information**. Once inside, close your windows and doors. It can save your life.

Being inside any building – especially one made of **brick** or **concrete** -- is better than being outdoors or in a car. Cars do not provide good protection from radiation. A basement -- or the center of the middle floors of a multi-story building -- is the **safest** spot. Try to keep as much distance as possible between **you** and any **exterior** wall, roofs or ground where radioactive material is settling. It can **greatly** lower your risk of exposure.

It's natural to want to leave to find family and friends after such an event … but **don't**. Going outside puts you at risk of getting dangerous levels of radiation. Remember: your friends and family have been instructed to **stay inside**, too.

While radiation is extremely dangerous right after the explosion, levels drop rapidly…so plan to stay inside for at least 12 to 24 hours or until more information on the explosion is available. Watch or listen for updates from officials as well as radiation experts. They will tell you when it's safe to evacuate.

Be aware that phones and electricity may not work. Safety messages will be made by public announcements, television, radio and internet.

IF YOU WERE OUTSIDE WHEN THE BLAST HAPPENED OR YOU'RE WORRIED YOU MIGHT HAVE RADIOACTIVE MATERIAL ON YOUR BODY, TAKE THESE SIMPLE STEPS TO REDUCE YOUR EXPOSURE (or *REMOVE CONTAMINATION*).

Remove your clothes and shoes to keep material from spreading …you should act as if you've come home covered in dust that you don't want to track inside. Put everything in a plastic bag. Seal the bag … and place it away from people and animals. When possible, take a shower with lots of soap and warm water to remove contamination. Don't scrub or scratch the skin. Wash your hair with shampoo or soap and water, but **don't** use conditioner: it will cause radioactive material to stick to your hair.

If you can't shower, use a clean wet cloth to wipe skin that was exposed. The same information that applies to getting yourself clean also applies to your pets.

Make sure you clean your eyes … and ears …and don't forget to gently blow your nose.

Get inside. Stay inside. Get clean. Simple steps to protecting yourself, saving your own life, and the lives of others.

Response to a Nuclear Event (Message)

After a nuclear detonation, the number one priority of responders at all levels of government is saving lives.

We are using special equipment to measure how much radioactive material there is and identify where it is located. This will tell us:

- Where it is safe for responders to enter and where they need to use special protective equipment
- The safest roads, with the least radiation, for leaving the area.
- Where food and water have become contaminated and where it is free of radioactive contamination.
- The types of radioactive material involved in the explosion so that we can determine how quickly the radioactive materials will lose their strength and how to clean it up.

Responders may use protective equipment, like masks and suits, to provide barriers between them and the radiation outside so they can work in contaminated areas for longer periods of time.

We are doing everything possible to identify those responsible for this malicious, tragic event.

- The United States Government is using all available means, including law enforcement, intelligence and technical nuclear forensics, to determine who is responsible for this attack.
- It will take time to determine those responsible and we will take whatever time is necessary to do so.

Radiation Basics (Message)

Radiation is the release of energy from unstable atoms in the form of particles or waves.

- Radiation affects people by depositing energy in body tissue.
- While every person responds differently to radiation exposure, the protective actions are the same for everyone, including children, pregnant women and elderly.

Radiation exposure and contamination are not the same thing.

- Exposure occurs when radiation interacts with the body.
- Contamination occurs when radioactive material settles on or in a surface.
    - That surface could be your body or clothing, a structure, or an object.
    - If a person is contaminated with radioactive material, they are being exposed to radiation and can contaminate and exposure other people.
    - It is important to remove radioactive contamination to reduce risk of health effects from exposure.
- You can be exposed to radiation without being contaminated.
    - Having a medical x-ray is an example of being exposed but not contaminated.
    - During an x-ray, you are exposed to radiation but you don't have radioactive material on your skin or clothing.
- It takes a very large dose of radiation to cause noticeable health effects.

There are three basic concepts to reducing radiation exposure:

- **Time:** Limit your time spent near a radiation source. The amount of radiation exposure increases as the time spent near the source of radiation increases.
- **Distance:** Increase distance from the radiation source. The farther you are from a radiation source, the less exposure you will receive.
- **Shielding:** Shield yourself from a radiation source with protective barriers such as walls, soil and building materials. The greater the thickness and density of shielding material between you and the radioactive material, the smaller the exposure.

Radioactive Decay

- Radioactive material becomes less intense or decays, over time.

You can find additional information on radiation and radiation health effects on CDC and EPA's websites.

Nuclear Detonation Basics (Message)

Nuclear Explosion

- A nuclear explosion involves a blast that produces an intense wave of heat, light, air pressure, and radiation.
- As the fireball cools, it condenses, and falls back to the earth in the form of particles composed of the material that was vaporized; this is known as fallout.
- Radiation levels are extremely dangerous after a nuclear detonation but the levels decrease rapidly, in just hours to a few days.
    - This does not mean that the fallout is not harmful.

Fallout

- Fallout is dangerous because it contains radioactive material.
- The radioactive material in "fallout" can be carried long distances by wind currents before it falls back to the earth.
- Any type of precipitation, such as rain or snow, will take the radioactive material that was raised into the atmosphere from the blast – commonly called fallout – and deposit it on the ground.
- It is important to note that the farther away you are from the point of the explosion, the less airborne radioactive material will reach your area.
    - The larger particles, containing greater amounts of radioactive material, fall to the ground in the area closest to the explosion.
- People within the path of radioactive material should pay attention to local and state officials and responders for instructions.

EMP – Electromagnetic Pulse

The combination of the blast impact and the nuclear detonation created electromagnetic pulse will impact communications equipment in the blast area and may cause far reaching electrical outages.

- If you are having trouble with your cell phone or PDA, removing the battery and putting it back may reboot the equipment.

Protective Structures

While every person responds differently to radiation exposure, the safety measures are the same for everyone, including children, pregnant women and senior citizens.

- **Quickly Go Inside:**
    - This may feel like it goes against your natural instinct to evacuate from a dangerous area, but it is much, safer inside than outside. Reduce your danger from radiation exposure by:

        - Putting building walls, brick, concrete, or soil between you and the radioactive material outside, and
        - Increasing the distance between you and the exterior walls, roofs and ground, where radioactive material is settling.
    - If you are in a car, find a building for shelter immediately. Cars do not provide adequate protection from radiation from a nuclear detonation.
    - Go to the basement or the center of the middle floors of a multi-story building (for example the center of the 5th floor of a 10 story building or the 10th to 20th floors of a 30 story building).

- **Stay Inside:**
    - Staying inside, where you are, is what is best for you and your family.
    - It is natural to want to leave and find your families and friends after this horrible event, but here are two reasons why you should stay in place and wait:
        - First, all children and adults are taking the same protective actions that you should take – they have been instructed to stay inside until told otherwise by authorities.
        - Second, you can't help your family if you're really sick. Going outside now puts you at risk of getting very dangerous amounts of radiation. Radiation is strongest right after the explosion and levels reduce rapidly. So, wait at least 24 hours or until you get official notice that it is okay to be outdoors.

Appendix E. Message Rotation Schedule

Message Rotation Schedule

What	Los Angeles, CA	Chicago, IL
Focus Group 1	• Helping Others • Food and Water Safety • Protective Actions	• Protective Actions • Helping Others • Food and Water Safety
Focus Group 2	• Radiation Basics • Nuclear Detonation Basics • Response to a Nuclear Event	• Food and Water Safety • Protective Actions • Helping Others
Focus Group 3	• Protective Actions • Helping Others • Food and Water Safety	• Nuclear Detonation Basics • Radiation Basics • Response to a Nuclear Event

Appendix F. In-Depth Feedback for Tested Messages

Response to a Nuclear Event	Participant Feedback and Suggestions
After a nuclear detonation, the number one priority of responders at all levels of government is saving lives. We are using special equipment to measure how much radioactive material there is and identify where it is located. This will tell us: • Where it is safe for responders to enter and where they need to use special protective equipment • The safest roads, with the least radiation, for leaving the area. • Where food and water have become contaminated and where it is free of radioactive contamination. • The types of radioactive material involved in the explosion so that we can determine how quickly the radioactive materials will lose their strength and how to clean it up. Responders may use protective equipment, like masks and suits, to provide barriers between them and the radiation outside so they can work in contaminated areas for longer periods of time. We are doing everything possible to identify those responsible for this malicious, tragic event. o The United States Government is using all available means, including law enforcement, intelligence and technical nuclear forensics, to determine who is responsible for this attack. o It will take time to determine those responsible and we will take whatever time is necessary to do so.	Participants did not perceive this message as a priority. The message was perceived as "filler" because no actions items were provided in this message. Participants did not care what actions government officials were taking unless it had direct impact on personal safety. However, some participants were reassured that government was functioning and responding. ➢ Provide more personal action items. ➢ Delete last paragraph. Participants saw little value in it.

Helping Others	Participant Feedback and Suggestions
If an improvised nuclear device is detonated (goes off) in your area, what can **you** do to help? Here are some critical things to keep in mind. If you're in or near the impacted area: • **Stay inside** unless told otherwise by emergency responders—such as local police, fire, or health officers—or by government officials. This will keep roads clear for emergency vehicles and personnel. • Unless it's a dire emergency, please **stay away from** of hospitals, fire and police stations. These facilities need to be available to respond and treat victims. • **Keep phone lines clear** so that emergency personnel can do their work. You can help keep phone lines free by using text messaging to communicate with family and friends rather than landlines and cell phones. This will allow people in dire need can call for help. If you're **outside** the impacted area, there are things you can also do to help. • **Collect food items, clothing or blankets** in your community. It's a great way to support those in need. • Be sure you collect only what is requested by relief authorities.	Participants believed this script contained two different messages: 1. What to do to protect myself? 2. How to help others? They also perceived this as an altruistic message, but several participants were skeptical about helping strangers. Participants did not consider this information a high priority in an emergency situation. ➢ Keep the instructions at the beginning of the script about staying inside, staying away from the hospitals and keeping the phone lines clear. ➢ Write different messages for the audience in the blast zone and for the audiences outside the blast zone ➢ Correct typo: ▪ Should be warm water not warm soap ➢ Remove rhetorical question ➢ Remove "flowery and storytelling" language: ▪ Remove "If you are outside the impacted area…" • Participants did not know how to tell if they were within the impacted area

Helping Others	Participant Feedback and Suggestions
If you're able to take an evacuee into your home – whether family, friend or anyone needing assistance -- two simple steps will allow you to do this safely by keeping radioactive material out of your home: ➢ Ask your guest to remove their outer layer of clothing and place it in a plastic bag. Then stow the bag away from people and animals. Taking off this one layer of outerwear can remove 90 percent of contamination. ➢ Then, have your guest shower with warm soap and water to remove any remaining radioactive material. Make sure they pay close attention to exposed areas such as eyelids, eyelashes, ears and noses. **Stay tuned** to television and radio broadcasts for important updates. Things will be changing fast and you'll need to stay informed. Be aware that phones and electricity may not work. Safety messages will be made by public announcements, television, radio and internet. Small steps that can make a big difference...to protect yourself and help others.	➢ Address the following questions: ▪ How updates will be delivered in the absence of electricity? ▪ Should all clothing be removed, or just the outer layer? ▪ How can relief agencies collect supplies if instructions are not to go outside? • Seems premature to talk about to talk about collecting items, especially if relief authorities have not requested items and if people are suppose to stay indoors for 12-24 hours ➢ Address unfamiliar terms: ▪ "Improvised nuclear device" (IND) ▪ "Detonated" ▪ "Dire" ▪ "Evacuee" ▪ "Contamination"

Radiation Basics	Participant Feedback and Suggestions

Radiation is the release of energy from unstable atoms in the form of particles or waves.
• Radiation affects people by depositing energy in body tissue.
• While every person responds differently to radiation exposure, the protective actions are the same for everyone, including children, pregnant women and elderly.
 	
Radiation exposure and contamination are not the same thing.
• Exposure occurs when radiation interacts with the body.
• Contamination occurs when radioactive material settles on or in a surface.
  o That surface could be your body or clothing, a structure, or an object.
  o If a person is contaminated with radioactive material, they are being exposed to radiation and can contaminate and exposure other people.
  o It is important to remove radioactive contamination to reduce risk of health effects from exposure.
• You can be exposed to radiation without being contaminated.
  o Having a medical x-ray is an example of being exposed but not contaminated.
  o During an x-ray, you are exposed to radiation but you don't have radioactive material on your skin or clothing.
• It takes a very large dose of radiation to cause noticeable health effects.
	Participant thought the concept of "shielding" was the most helpful, and therefore, the most important concept. However, they found the concept of "distance" contradictory to the directive to stay inside. Participants were confused about the exposure and contamination information, since no steps were provided in the message on how to reduce exposure or contamination.
	
	➢ Need website or contact information for CDC and EPA
	➢ Add more instructions for people to protect themselves
	➢ Remove "depositing energy in body tissue"
	➢ Remove "While every person responds differently…"

Radiation Basics	Participant Feedback and Suggestions
There are three basic concepts to reducing radiation exposure: • **Time:** Limit your time spent near a radiation source. The amount of radiation exposure increases as the time spent near the source of radiation increases. • **Distance:** Increase distance from the radiation source. The farther you are from a radiation source, the less exposure you will receive. • **Shielding:** Shield yourself from a radiation source with protective barriers such as walls, soil and building materials. The greater the thickness and density of shielding material between you and the radioactive material, the smaller the exposure. Radioactive Decay • Radioactive material becomes less intense or decays, over time. You can find additional information on radiation and radiation health effects on CDC and EPA's websites.	

Protective Actions	Participant Feedback and Suggestions
What should **you** do if there's a nuclear bomb explosion in your area? A nuclear detonation is survivable. There are simple steps you can take to protect yourself and your loved ones from this radiation threat. These steps are the same for **everyone** in the impacted area. First: quickly **get inside, stay inside, get clean, and tune in to get more information**. Once inside, close your windows and doors. It can save your life. Being inside any building – especially one made of **brick** or **concrete** -- is better than being outdoors or in a car. Cars do not provide good protection from radiation. A basement -- or the center of the middle floors of a multi-story building -- is the **safest** spot. Try to keep as much distance as possible between **you** and any **exterior** wall, roofs or ground where radioactive material is settling. It can **greatly** lower your risk of exposure. It's natural to want to leave to find family and friends after such an event … but **don't**. Going outside puts you at risk of getting dangerous levels of radiation. Remember: your friends and family have been instructed to **stay inside**, too. While radiation is extremely dangerous right after the explosion, levels drop rapidly…so plan to stay inside for at least 12 to 24 hours or until more information on the explosion is available. Watch or listen for updates from officials as well as radiation experts. They will tell you when it's safe to evacuate.	Participants responded positively to directives that provided personal actions (e.g., avoid use of conditioner) in the script. Several participants were surprised to learn a nuclear detonation was survivable. Participants liked the example of radioactive material settling like dust and were reassured that radiation levels would decrease in 12-24 hours. However, most participants thought the script was too long. ➢ Write a shorter and more concise script ➢ Move cleaning information to the beginning of the script ➢ Remove rhetorical question ➢ Remove "flowery" language and confusing terminology: ▪ "Detonation" ▪ "It's natural to want to leave…" ▪ "Don't forget…" ▪ "Remember friends and family have been instructed to stay inside…" ▪ "First.." • Or, continue to use time-order transition words in the message

Protective Actions	Participant Feedback and Suggestions
Be aware that phones and electricity may not work. Safety messages will be made by public announcements, television, radio and internet. **IF YOU WERE OUTSIDE WHEN THE BLAST HAPPENED OR YOU'RE WORRIED YOU MIGHT HAVE RADIOACTIVE MATERIAL ON YOUR BODY, TAKE THESE SIMPLE STEPS TO REDUCE YOUR EXPOSURE (or *REMOVE CONTAMINATION*).** Remove your clothes and shoes to keep material from spreading …you should act as if you've come home covered in dust that you don't want to track inside. Put everything in a plastic bag. Seal the bag … and place it away from people and animals. When possible, take a shower with lots of soap and warm water to remove contamination. Don't scrub or scratch the skin. Wash your hair with shampoo or soap and water, but **don't** use conditioner: it will cause radioactive material to stick to your hair. If you can't shower, use a clean wet cloth to wipe skin that was exposed. The same information that applies to getting yourself clean also applies to your pets. Make sure you clean your eyes … and ears …and don't forget to gently blow your nose. Get inside. Stay inside. Get clean. Simple steps to protecting yourself, saving your own life, and the lives of others.	➢ Address the following questions: ▪ How will updates be delivered in the absence of electricity? ▪ What types of plastic bags? ▪ What can be used if plastic bags are unavailable?

Nuclear Detonation Basics	Participant Feedback and Suggestions

Nuclear Explosion
• A nuclear explosion involves a blast that produces an intense wave of heat, light, air pressure, and radiation.
• As the fireball cools, it condenses, and falls back to the earth in the form of particles composed of the material that was vaporized; this is known as fallout.
• Radiation levels are extremely dangerous after a nuclear detonation but the levels decrease rapidly, in just hours to a few days.
  o This does not mean that the fallout is not harmful.
 	
Fallout
• Fallout is dangerous because it contains radioactive material.
• The radioactive material in "fallout" can be carried long distances by wind currents before it falls back to the earth.
• Any type of precipitation, such as rain or snow, will take the radioactive material that was raised into the atmosphere from the blast – commonly called fallout – and deposit it on the ground.
• It is important to note that the farther away you are from the point of the explosion, the less airborne radioactive material will reach your area.
  o The larger particles, containing greater amounts of radioactive material, fall to the ground in the area closest to the explosion.
• People within the path of radioactive material should pay attention to local and state officials and responders for instructions.
	Participants found the instructions provided in the message about removing cell phone/PDA battery helpful. The scientific explanations of fallout, fireballs, and electromagnetic pulse (EMP) had limited appeal among participants.
	
	➢ Shorten the message
	➢ Add directive language, action items
	➢ Replace "detonation" with "explosion"
	➢ Delete information about Electromagnetic Pulse (EMP)
	➢ Remove "While every person responds differently…"
	➢ Move protective actions (Go inside and Stay inside) to the beginning
	➢ Add sources for further information

Nuclear Detonation Basics	Participant Feedback and Suggestions
<u>EMP – Electromagnetic Pulse</u> The combination of the blast impact and the nuclear detonation created electromagnetic pulse will impact communications equipment in the blast area and may cause far reaching electrical outages. o If you are having trouble with your cell phone or PDA, removing the battery and putting it back may reboot the equipment. <u>Protective Structures</u> While every person responds differently to radiation exposure, the safety measures are the same for everyone, including children, pregnant women and senior citizens. • **Quickly Go Inside:** o This may feel like it goes against your natural instinct to evacuate from a dangerous area, but it is much, safer inside than outside. Reduce your danger from radiation exposure by: ▪ Putting building walls, brick, concrete, or soil between you and the radioactive material outside, and ▪ Increasing the distance between you and the exterior walls, roofs and ground, where radioactive material is settling. o If you are in a car, find a building for shelter immediately. Cars do not provide adequate protection from radiation from a nuclear detonation.	

Nuclear Detonation Basics	Participant Feedback and Suggestions
○ Go to the basement or the center of the middle floors of a multi-story building (for example the center of the 5th floor of a 10 story building or the 10th to 20th floors of a 30 story building). • **Stay Inside:** ○ Staying inside, where you are, is what is best for you and your family. ○ It is natural to want to leave and find your families and friends after this horrible event, but here are two reasons why you should stay in place and wait: ▪ First, all children and adults are taking the same protective actions that you should take – they have been instructed to stay inside until told otherwise by authorities. ▪ Second, you can't help your family if you're really sick. Going outside now puts you at risk of getting very dangerous amounts of radiation. Radiation is strongest right after the explosion and levels reduce rapidly. So, wait at least 24 hours or until you get official notice that it is okay to be outdoors.	

Food and Water Safety	Participant Feedback and Suggestions
If a nuclear device is detonated in your area, what safety precautions should you take when it comes to food and water? You can protect yourself from contamination by paying close attention to what you eat and drink. The less radioactive material you eat or drink, the better. When it comes to food, remember: radioactive material settles like dust. While every person responds differently to radiation exposure, the safety measures are the same for everyone, including children, pregnant women, and senior citizens. So your best bet is to eat food that's been sealed in a bag or container. Even if you think the outside of the package has been contaminated, the food inside is safe to eat as long as it's sealed tightly. If you haven't lost power, any unspoiled food in your refrigerator and freezer is safe to eat, too. You can clean counters, plates, pots and utensils to remove contamination that may have settled from the outside. If you're unsure about contamination, then wash your food with water. Tap water **can** be used for washing food. Your risk of consuming radioactive material is greatly reduced by washing food items. Any towels used for cleaning radioactive material should be sealed in a plastic bag.	The script directed participants to eat food in sealed packages and containers and to drink bottled water. Participants liked the example of radioactive material settling like dust. However, participants felt the tone of the script was advisory, with no sense of urgency. ➢ Delete rhetorical question ➢ Shorten the script ➢ Address the following questions ▪ Are certain food packages better than others cans? Plastic packages? ▪ Does boiling water help remove radioactive contamination? ▪ What type of cleaning products should you wash your counters, plates, pots and utensils with? ▪ If it is safe to rinse food with tap water, why is it unsafe to drink? ▪ Will cleaning counters spread radioactive dust and further contaminate the home?

Food and Water Safety	Participant Feedback and Suggestions
You're probably wondering about the safety of drinking water. Until we know more about the impact of the nuclear explosion on the water system, bottled water is the only source you can be certain is free from contamination. Just like with food, you can safely drink juices or other drinks stored in a sealed container or in your refrigerator and freezer. Taking these important steps can minimize your risk to radiation contamination. Simple steps to protecting yourself, saving your own life, and the lives of others.	➢ Delete wordiness ▪ "Until we know…" ▪ "While every person responds differently…" ▪ "You are probably wondering…" ▪ "So your best bet…" ➢ Remove the word detonated; replace with exploded

Appendix G. Contacts for More Information

Contacts for More Information

CDC Technical Contact:

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