



CDC National Prevention Information Network Public Reaction to the Information Related to Radiologic Terrorist Threats

DRAFT FINAL REPORT

Submitted by

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National Prevention Information Network Task Order Public Reaction to Information on Radiologic Terrorist Threats

I Purpose

The purpose of this task order was to assist the CDC's National Center for Environmental Health (NCEH) in the development of the best methods for the development and dissemination of public messages related to the emergency response to chemical or radiological terrorist events. The materials being developed by NCEH focus on increasing public knowledge and exposure prevention of possible chemical or radiologic terrorist agents, identifying resources for public use in case of chemical or radiologic events, and explaining recommended action steps in case of chemical or radiologic events.

1. Background

On behalf of the Centers for Disease Control and Prevention, Analytical Sciences, Inc. convened three (3) focus groups with adult consumers to review public information materials about radiologic terrorism issues. The groups were conducted as follows:

- Philadelphia, Pennsylvania: October 16, 2002
- Los Angeles, California: October 24, 2002
- Chicago, Illinois: March 5, 2003

All three groups included both male and female participants who were diverse in age (early 20s to mid-60s), educational backgrounds, and race or ethnicity (Caucasian, African American, Hispanic, and Asian). A total of 26 people participated in the three groups. The focus groups were moderated by a qualitative research consultant to ASI.

People with backgrounds that might have made them more knowledgeable than the general public about radiologic materials and/or health effects from exposure or who had military backgrounds or potential terrorism training were excluded from the groups. This included, for example, police, fire, EMTs, health professionals, x-ray technicians, and laboratory personnel.

Participants were aware from the focus group recruitment process that the study sponsor was the Centers for Disease Control and Prevention (CDC), and that CDC was interested in *“what information people may find most useful in the event of a radiological terrorist event; that is, an event involving the deliberate release of radiologic or nuclear material.”*

To help participants forecast what information they might be interested in having in the event of a terrorist event involving the deliberate release of radiologic material, CDC prepared a multi-part hypothetical scenario about a “dirty bomb” explosion at a mall. Different parts of the

scenario were introduced and discussed during the focus group alternately with excerpts from CDC public information materials that addressed terms and concepts mentioned in the scenarios. Participants then talked about their reactions to the scenarios and public information excerpts, reporting the actions they thought they might take, questions they might have, and their opinions about how helpful the informational materials were in answering questions and concerns.

2. Overview of Findings

While the three focus groups consisted of different participants from different locations across the U.S., there were many similarities found.

- In general, participants found the CDC information materials they reviewed extremely informative and often, reassuring. Questions and concerns of participants raised by the hypothetical dirty bomb incident often were addressed in the information materials to a significant degree. When people were asked to give a “thumbs up” or “thumbs down”, or a letter grade for how well different information excerpts addressed their concerns or questions, the feedback was generally very positive about most of the excerpts.
- Participants also indicated that the information generally was presented clearly and in appropriate tone, language and length.
- Feedback was similar in all three groups. There had been some concern that the nature of people’s questions and concerns might have changed between the first two groups completed in October 2002 and the third group completed in March 2003.
- Discussion revealed extremely low awareness and understanding among participants about keys concepts and terms such as dirty bomb; radiation; risks from radiation, especially those likely to occur from a dirty bomb; the difference between radiation exposure and contamination; what nuclear meant; and appropriate actions to take if a radiologic event occurs. In general, people seemed to over-estimate the risks and likely effects.
- Most people seemed likely to turn to television, Internet sources and radio for information in the event of a terrorist incident. No one seemed to think of CDC as a source for information, either during the focus group or in the event of an incident, except for a few people who said the focus group made them think of CDC.
- Participants were very interested in the information, and many stayed for a debriefing after their group with CDC representatives. Most seemed genuinely interested in and grateful for the information take-home kits that CDC provided.

II. Response to Scenarios and CDC Public Information Excerpts

This section summarizes results from all three focus groups, unless otherwise noted, for three hypothetical scenarios and CDC public information excerpts. The first scenario deals with the possibility of a dirty bomb being detonated at a shopping mall, and the second scenario confirms that indeed a dirty bomb has been set off. The third scenario presents a follow-up situation where an individual has heard about the dirty bomb incident, decides to stop by a pharmacy on the way home and encounters a victim of the blast. For each of the three scenarios, accompanying print materials, or excerpts, were shared with the participants.

1. Mall Scenario, Part 1: “Dirty Bomb Suspected”

Focus group participants were first presented with the following hypothetical scenario about a dirty bomb explosion. The scenario was read out loud by the moderator and given to the participants in written form. After presenting the scenario, the moderator provided several minutes for participants to think over the scenario and write down reactions and questions that it brought to mind.

Mall Scenario, Part 1: Initial News Report of Explosion at Local Shopping Mall

Late in the afternoon, you hear a special report on the radio or television that a bomb has exploded in a crowded shopping mall about 10 miles from your home or workplace, killing and wounding scores of people. The bomb has blown out windows in the roof and walls, started several small fires, and created widespread panic. The news report indicates it might be a “dirty bomb.” People are being asked to stay away from the site, and first responders are using Geiger counters to assess whether radiation might be present.

Overall Reactions to Mall Scenario, Part 1

There were three relatively common concerns among participants’ anticipated reactions to a real-life dirty bomb scenario:

- Whether family members and friends are safe:

I’d want to know if anybody in my family or friends got hurt or killed.

Where’s my family? Are they in a location considered safe? Is it a school environment? An environment that already has precautions in place?

First, is it in the middle of the day? [If so,] I would like to know if my family is there...and how I could get to them, and get away.

- The risk of contamination, not just for people at the mall, but also for people ten or more miles away. Questions and concerns about the risk of contamination were numerous and varied, often because of minimal understanding about what a dirty bomb is and about radiation in general, especially how large an area could become affected and pose a danger to people. Many people seemed to assume that they personally could be in danger, even if they were ten or more miles away. For example, participants' questions about the risk of contamination included:

What's the range in miles for contamination to occur, and what is the radiation intensity level, and what does that mean exactly?

How much area would be contaminated because of the dirty bomb? I'd want to know about the people who were there. Will they be quarantined and what really is the effect of the dirty bomb?

How close can you go to where it happened – since you don't know how far radiation might go.

If it was ten miles away, could I still be affected...then or later?

How far [was] the effect? Nationwide?

Can the weather affect the radiation, like the wind?

Which way is the wind blowing?

What are the adverse effects? What are the repercussions that some people may suffer?

- What actions should be/would be taken:

...Can you protect yourself from it, and how?

What do we do? Stay home? What is the best course of action?

Do we have a neighborhood bomb shelter? How fast does it spread?

...Should we leave town?

Where do I go to get away from the contamination, if there's any?

With respect to health concerns, am I in a car? Am I going to be able to roll up my windows and reduce some of the dirty effect, whatever that dirty may be?

What's the traffic report on the highways? Because I'm leaving and I'm sure everyone else is leaving too...If it's a dirty bomb, and we're screwed, I'm getting out of town.

If I heard there was a bomb, I'd want to leave Chicago...I'd go to another state where my family and friends were. Everybody would be running around.

Less frequently mentioned, but still noteworthy concerns and questions focused on the following.

- Whether there is danger of more blasts:

Are there any simultaneous events – to help you decide whether to sit right where you are to see if there is a score of them going off simultaneously to strike terror in hearts.

Are there any more threats?

Are we under terrorist attack? Are there going to be another flurry of dirty bombs?

What are the chances of another bomb being set off?

How did the bomb get in there? Because if they had left one in there, they can easily [have left] two or three others.

- Whether there would be reliable information/communication systems:

What would be our most reliable information source, not just the news that tends to work us up, but who's going to give us the best information?

Is the system going to be in place, communication-wise for people to turn on the radio, and [hear] what we should do?

Reactions to Specific Terms and Concepts in Mall Scenario, Part 1

Dirty bomb

Although some people thought they had heard of a dirty bomb before, most people either could not define it or had inaccurate impressions about it. For example, in one group, a couple of people thought that it was a bomb with biological contaminants. A few people thought it was similar to or even the same as a nuclear bomb. The following comments illustrate the range of confusing impressions about dirty bombs:

Is a dirty bomb a nuclear bomb? I would assume it was nuclear. Can they contain the contamination if there's any, or what do I do?

I assumed that a dirty bomb meant that it had a disease of some type in it, and is usually motivated by a terrorist or someone who has something against the government.

I'd say a dirty bomb is either radiation, or biological. It could be either.

All I can think of is it's something that's not good, but how bad is it?

I wasn't really familiar with the term dirty bomb. I never really heard that a lot so I was wondering, would that be just like a nuclear explosion?

I heard dirty bomb before, but I never heard it connected with radiation. To me, it's like two separate things...

More accurate impressions of a dirty bomb were rare, but did include the following:

A dirty bomb is a bomb that has radioactive material in it, and when it blows up, then it spreads the radiation.

[A dirty bomb is a] conventional explosive that has radioactive material in it, just so that will be strewn around and cause some amount of radiation. It can be very effective or ineffective, but it's not a nuclear explosion...If it was a nuclear bomb, you wouldn't even be hearing anything on the radio. You'd be gone.

[I heard] it was a not a nuclear bomb, but kind of like a homemade bomb that had some kind of radiation that could affect us in some way or another. But I don't know what the blast radius is for actual damage from the radiation.

Radiation

More people thought they knew something about radiation, especially because of awareness that microwaves, x-rays, cancer treatment, and even being in the sun on vacation all involve exposure to radiation and potential dangers. For example:

The only way I know that radiation is dangerous is when you take an x-ray. You can't have too many of those....And they say it kills [cancer] cells, [so] it must be very powerful. So, I figured...to be exposed to radiation, it has to be deadly.

The amount of radiation you're exposed to [is what matters.]...If you go through chest x-rays all the time, I'm sure you'd probably light up like a Christmas tree one or something.

My dad, he had radiation treatments and he was burned, over a certain amount of time....Maybe it could be deadly, being burned up like that.

There's radiation in everything we deal with – microwaves, copy machines...it's the quantity [that matters.]

We were always scared of radiation with microwaves, and when you go into the doctor's for x-rays, and things like that – were pretty much exposed to before....

...They say you should only get a certain amount of x-rays a year because the micro-electronics (sic) that's in the x-rays can do damage to the body.

...Cancer patients, they get radiation but even though it kills off the cancer cells, it also kills off their own cells too, so I'm thinking it must not be very good for you.

Difference between radiation emergency, radiological event and nuclear event

In the Philadelphia group, most people thought that these terms were synonymous, but in the other cities, participants generally thought that nuclear was distinctly different and definitely more serious. For example, when the moderator asked the Philadelphia group whether there were any differences between these three terms, people said:

They all seem similar.

It's a bomb, a nuclear bomb.

I imagine they would be the same thing.

In contrast, participants in other cities said:

A nuclear bomb is something [that causes] destruction of a city...[the scenario] was probably just a radiation emergency, like a reactor leak.

Nuclear would be the very, very most serious because that's what we're trying to prevent – certain countries from developing nuclear capabilities...

Nuclear, obviously, is way bigger than [the others.] Radiation emergency sounds like it's warning you that something could happen or it's about to happen. Something small could happen. Radiologic event [sounds like] something already occurred, like the first scenario here.

Radiation emergency and radiologic event fit the story we read.

Difference between exposed to and contaminated with radiation

Many people seemed confused about how exposure and contamination compare or contrast. Some believed that exposure automatically causes contamination. Others thought that contamination means that there have been adverse effects from exposure. Still others said that because so little is known about exactly how much radiation is dangerous, contamination should be presumed in the event of an explosion because of possible long term cumulative effects from what could get in the air and water. Few people seemed able to explain the relationships between the concepts very clearly. The following comments illustrate:

If you're exposed, you have to find out if you're contaminated.

If you're exposed, you're contaminated because your body has been in contact with it.

It might be the same thing because we don't really know that much about it, so we really don't know what levels cause diseases. We don't know if a little bit is going to harm you, or if a lot will harm you and it's different for every person. So I would tend to be inclined [to think] that, unless you've got full protective gear, it might be the same thing.

I would say contamination is based on an adverse effect, as opposed to just exposure itself.

If I have an x-ray, I don't feel like I'm contaminated...But if there was an explosion, I don't know that I'd want to eat the food or drink the water...Maybe that's contaminated, which has long reaching effects.

I do think there's a difference. If you're exposed to it, you'd be in the presence of it. But you can't really tell if it has affected you or not. I think when you're contaminated, you're basically diagnosed that it has affected you.

Exposed is certainly minimal compared to contaminated. [Then] I would say you're in serious trouble, because then you're talking about your organs.

If they say you're contaminated, then you've got it. If you're exposed, you were around the area, but they're not sure if you have it or not.

Contaminated says "you're there." And exposed means you're going to be checked to see if you're contaminated or if you've been exposed to a degree that will harm you.

Most Likely Information Sources After First Hearing About Mall Scenario, Part 1

The most common information sources people anticipated turning to for information in the event of a dirty bomb incident were television news, especially CNN, and Internet news. Radio was mentioned next most often. Other sources included:

- Police department
- Hospital
- Government spokespeople
- CDC (although people said they thought of this only because of the focus group)
- FBI

Comments included:

CNN [is] one of the best channels to sit back and find out... CNN will go over everything and...say, "OK, this is what is considered to be a dirty bomb, this is the reasons they had people tested, and they go about it that way." It keeps you up on its updates all the time too.

I would be flipping through different news channels from Fox to CNN to NBC.

If it's [a local event], I'd probably be listening to news radio and such mainly....When they're reporting on [a local event] nationally, they don't really get it right.

I would go to everything – from Internet to radio to TV – every source that I could find. [For Internet, would go to...] AOL, CNN on-line, NBC...those types.

The police force; they might know something.

I would look for our government spokespeople to be on the television to tell the public what has been going on, what we should do to make it easy.

I would think if it was a dirty bomb, that the FBI would be involved.

I don't know if you can probably get a chance to talk to anybody in a hospital. They're very busy, but...they should have somebody answering the phone, so people could be calling...

The media would start getting some experts on the news.

A few people raised questions about whether there would be electricity or Internet access.

Are we under the assumption that we have electricity at this time?

If it was an event going on right now, then you would probably have trouble getting onto the Net, and trouble getting phone calls through for awhile, so I think you'd probably be dependent on radio and TV.

2. CDC Public Information Excerpt on “Dirty Bombs” to Accompany Mall Scenario, Part 1

Following the discussion about the hypothetical dirty bomb explosion and the various terms and concepts it included, the moderator introduced a written excerpt from CDC's public information about dirty bombs to see how well it addressed participants' questions and concerns. The excerpt follows.

CDC Public Information Excerpt on “Dirty Bombs”

A dirty bomb, or radiological dispersion device, is a bomb that combines conventional explosives, like dynamite, with radioactive materials in the form of powder or pellets. The idea behind a dirty bomb is to blast radioactive material into the area around the explosion. This could possibly cause buildings and people to be exposed to radioactive material.

The nuclear explosions that occurred in Hiroshima and Nagasaki were conventional nuclear weapons involving a fission reaction. A dirty bomb is designed to spread radioactive material and contaminate a small area. It does not include the fission process necessary to create a large blast like those seen in Hiroshima and Nagasaki. A dirty bomb could be made from materials like those that were used on the Alfred P. Murrah Federal Building in Oklahoma City in 1995 with radioactive materials added inside.

It is hard to predict where radioactive materials for a dirty bomb would come from; however, because of the dangerous and difficult aspects of obtaining high-level radioactive materials from a nuclear facility, there is a greater chance that the radioactive materials used in a dirty bomb would come from low-level radioactive sources. Low-level radioactive sources are found in hospitals, on construction sites, and at food irradiation plants. The sources in these areas are used to diagnose and treat illnesses, sterilize equipment, inspect welding seams, and irradiate food to kill harmful microbes.

If low-level radioactive sources were to be used, the primary danger from a dirty bomb would be the blast itself. Gauging how much radiation might be present is difficult when the source of the radiation is unknown. However, at the levels created by most probable sources, not enough radiation would be present in a dirty bomb to cause severe illness from exposure to radiation.

Reactions to “Dirty Bombs” Excerpt

The information in this section generated considerable discussion among participants in all three groups because it addressed some of the key questions and concerns that were stimulated by the scenario. In general, people thought that this excerpt was well done. Suggestions focused mainly on clarifying certain information. Compliments included:

I like the tone. It's to the point, and it says things to which most Americans can relate...

It's very clearly written, and the words are simple enough so that everyone can understand.

Explains very well.

I thought [this] explained it pretty well...

One of the primary messages participants gleaned from the excerpt was that dirty bombs contain low level radiation. This contrasted with many participants' previous perceptions and assumptions and therefore, was reassuring for quite a few people. For example:

I didn't realize the small potency of dirty bombs...so, a dirty bomb doesn't sound so serious anymore to me...I'd still leave town [but in less of a hurry]...It might just be contaminated for a brief period of time, and you're all cool after that.

It's not as drastic as I thought when I read the first page [scenario]...

When you read this, you go from, "Oh, my gosh, we're all going to die"[to] "Let me see. Is it safe for me to eat my food? What can we do? Should I wash in something special?" So you get back down to a little more practical stuff, and the big panic feeling is gone.

When I read the first [scenario], it was like, whoa, way beyond me. This is like a calming effect. It simplifies it, so I'm not as upset as I was.

However, a few people seemed confused by, or skeptical about, the information about the primary danger of a dirty bomb coming from the blast rather than from the radiation. This did not seem possible to some participants, including one who seemed to believe that **all** bombs have radiation. Comments included:

If the primary danger is from the blast, why would anyone go to all the trouble to make it radioactive?...Maybe it's more dangerous than they're leading us to believe... Here it says "not enough radiation would be present in a dirty bomb to cause your illness from exposure to radiation." How could they gauge that? You can't.

They're trying to explain the difference between the dirty bomb [and a regular bomb.] It says "the purpose of a dirty bomb is to blast radioactive materials into an area around the explosion." Well, that's kind of the same thing any other bomb would do, so they should add a good definition of a nuclear bomb or a dirty bomb. I mean, they're both to blast radioactive material into an area.

As with the Mall Scenario, Part 1, this excerpt also stimulated questions about the effects of radiation – what they might be, how long they could take to occur, etc., even if the radiation is from low level sources. Participants said:

Even if it's from low level sources, I would still want to know possible health effects.

What does it do to your body, and how can you get it out of your body?

What are the symptoms of radiation exposure?

How long does it take to know how much you have?

Is it something like you might develop cancer in ten years, or 20 years?

My concern is that it says here "not enough radiation would be present to cause severe illness from exposure." Then what would it cause? Any physical harm? I would assume it would.

Do we have any access to either household remedies, exterior preventative materials – on the exterior of our houses, cars, or person?...How accessible is this material to be put together, such as...Oklahoma City?

...if I heard that a dirty bomb went off ten miles from my house, I would be concerned and I wouldn't be thinking, "Oh, there's not enough there to cause severe illness."

I would like an example of a typical adverse effect after contact.

What are side effects of being exposed to bombs? It says here that the dirty bomb can cause severe illness from exposure to radiation. What are those side effects? What would happen to you if you were exposed?

In addition to information about health effects, some people voiced interest in more information or clarification about the following:

What a fission reaction is:

I didn't know if they explained fission reaction.

What "small area" means in reference to contamination:

There's just one thing. They say, "contaminate a small area." Well, small is what size? Is that a few miles? Is that like a couple of blocks? Is that ten miles?

How easily information about making dirty bombs can be located:

Can it be shown on the Internet, how to design one, a dirty bomb? Because you can get stuff from hospitals and construction sites, so I know people can sneak and grab this stuff, so I want to know if they take this, can they go on the Internet and find out how to make it.

3. Mall Scenario, Part 2: "Dirty Bomb Confirmed"

Next, the moderator introduced the following addition to the mall explosion story (Mall Scenario, Part 1: "Dirty Bomb Suspected"), again providing participants with time to think about what they might do and want to know.

Mall Scenario, Part 2: "Dirty Bomb Confirmed"

Now we find out from the news reports that officials have confirmed that it was a dirty bomb that exploded. Many people who were near the site have gone to hospitals or clinics to get treatment for wounds and with concerns about radiation exposure and contamination. Some others have gone home because they don't seem to have any injuries and may not know whether they were exposed to any radiation. Officials are still keeping people away from the mall area, because there is still falling debris and possible radiation. There is no word on what type of radioactive materials were contained in the bomb, but officials are asking people who were at the mall at the time of the explosion and who were not injured to report to the nearby high school gymnasium to be screened for exposure and contamination. Officials are asking those people who actually left and went home to shower, wash their hair, and put their clothing into a plastic bag and bring it with them to the gymnasium.

Overall Reactions to Mall Scenario, Part 2

This scenario raised numerous questions and concerns. Participants seemed confused, especially about perceived risks of following the advice mentioned in the scenario. In particular, participants were fearful that:

- People who left the site would expose or contaminate people on their way home, once they got home, and then at the gymnasium:

... Who's to say that when you go home, you won't expose your family? So, we need information that tells us immediately what do we do.

You go home, you're going to touch the shower, the curtains and all that. You're going to expose all that.

It kind of surprised me that they'd have them put their clothes in a plastic bag. It sounds almost more like biological... I would have thought that radiation would be something that you breathe, and it's inside you, but it wouldn't be on your clothes to spread to other people. So then I thought, "Are the people at the gymnasium being quarantined because there is something that's contagious about it?"

Is it true that if you're exposed to radiation that you can pass it on to somebody else?

- Is it contagious?

If I was exposed, and I had been with my friends after that, do I need to bring the people... with me [to the gym]?

For the people who didn't get injured, how do you know that they're going to go to the gymnasium with their clothes in a plastic bag. They might be scared, and just hide in the house because they might contaminate somebody else.

How can radiation spread? Human touch? On the air? Through the nose? Your ears? Eyes? Is it an open part of your body? It sounds like it gets on you, but then it sounds like it's in the air as it spreads... If one of my next door neighbors was out there [at the mall], comes home and I see him, and he's like, "Oh, jeez, it's good to see you," and he gives me a hug, "You won't believe what happened" and now I have it on me.

Why would you bring it into a high school so someone else can be exposed and contaminated?

... How can they contain it in a safe manner?

Why would they take it to a nearby school? Shouldn't it be at a hospital?...Kids go to that high school.

Why don't they set up like an area with tents instead of contaminating another area that you have to decontaminate later?

- The safety of storing clothing in plastic bags would be inadequate:

They're telling you if you did get some exposure and the stuff is on your clothes, the last thing you want to do is put it in a plastic bag and keep handling it while you go over to the local school...I'd throw all the stuff in an ally and leave it somewhere they could pick it up if they wanted to see it...It might be on your clothing and not on your body and you could actually get some of it on you [from handling it.]...You would want a guy in a suit [to handle it.]...I wouldn't want to be carrying it around.

- Bathing could spread contamination all over the house and to the water supply:

You can just wash it off? There's no more exposure in the air or in the gym? Or in the water?

They want [people who were at the mall] to shower and wash their hair. Is this going to take care of it?

You're going to screen that person, but what about the air and water and everything that's surrounding you....You're saying it's shrapnel or particles. Well, where you're washing, it's going down the drain into the water system, so it's still radioactive...How are they going to clean it out of the water?

In addition to concerns about how the radiation could be spread, participants also had more questions about:

- Adverse health effects and how long they might take to occur:

I don't know anything about the symptoms. Is that something you know right away, or is it a long term effect?

What future effects will there be...[like] the people [who] went to the Gulf War.

How long does it take for them to find out you've been exposed and how much you've been exposed?

- How exposure or contamination are determined:

How do you determine if someone has been exposed or...the level of exposure someone has had?...How do they go about finding out the source of the radioactive materials, whether it was high level or low level?

How do they test or tell how much you're contaminated?

- How exposure is treated:

[Is] there a way for doctors to effectively treat radiation exposure?

What are the remedies besides showering?

Is there a time limit to wash up? If you were at the mall and you didn't get injured, and you go home but you think you're fine and you didn't even turn on the TV...is there a time limit?

I personally would try to find out if there were vaccinations or anything that would help, because I know before, they used to give out vaccinations for different germs and smallpox...

They were saying on the news if you live in a certain radius of a nuclear plant, there's a pill that you could take. Well, could you take that same pill if something exploded at the mall?

Most people assumed that the mall site where the bomb blast occurred would be off-limits for a long time. In addition, several people thought that they would never go back to that mall, even if it opened again. Comments included:

I would say that's shut down for awhile because they've got reconstruction to do.

I can't imagine anyone saying, "Gee, I want to run back to that mall."

I would never go back to mall.

I won't go to that mall anymore...I'm not going anyplace where something bad happens.

4. CDC Public Information Excerpt on Radiation Exposure/Contamination to Accompany Mall Scenario, Part 2

Next, the moderator introduced information about radiation, exposure, and contamination in written form for participant feedback. The excerpt follows.

CDC Public Information Excerpt on Radiation Exposure and Contamination

People are exposed to small amounts of radiation every day, both from naturally occurring sources (such as elements in the soil or cosmic rays from the sun), and man-made sources. Man-made sources include some electronic equipment (such as television sets), medical sources (such as x-rays, certain diagnostic tests, and treatments), and from nuclear weapons testing.

The amount of radiation from natural or man-made sources to which people are exposed is usually small; a radiation emergency (such as a nuclear power plant accident or a terrorist event) could expose people to small or large doses of radiation, depending on the situation.

Scientists estimate that the average person in the United States receives a dose of about one-third of a rem per year (a rem is a measure of radiation dose—the dose in one chest x-ray is about one-tenth of a rem). About 80% of human exposure comes from natural sources and the remaining 20% comes from man-made radiation sources – mainly medical x-rays.

Internal exposure refers to radioactive material that is taken into the body through breathing, eating, or drinking. *External* exposure refers to an exposure to a radioactive source outside of our bodies. *Contamination* refers to particles of radioactive material that are deposited anywhere that they are not supposed to be, such as on an object or on a person's skin.

If you believe you have been exposed to radiation, try to remove clothing and shoes and place them in a plastic bag. During severe weather, such as extreme cold, remove at least the outer layer of clothes before entering your home to avoid bringing radioactive material into your shelter. Leave clothing and shoes outside. Shower and wash your body with soap and water. Removing clothing will eliminate 90% of radioactive contamination. By taking this simple step, you will reduce the time that you are exposed and also your risk of injury from the radiation.

Reactions to Radiation Exposure/Contamination Excerpt

This excerpt was reassuring to many participants. They seemed to be calmed both by the reminder that some radiation exposure already occurs in normal life and also by learning about some steps to take if a dirty bomb event occurs. This excerpt drew the most positive comments. For example:

This is very good information....

Yes, it is calming.

Sounds like for the most part, it wouldn't be a huge emergency from what they're saying.

I thought it was calming because it starts right out with "you all get exposed a little bit [anyway]" so it starts out calming and then gives you more information. I didn't know whether "extreme cold" intends to mean something... What if it's summer and I'm

wearing shorts and a tee shirt? Wouldn't I still be best to get those off as soon as possible?

That answers all my questions about if there's somebody that left the mall and comes to your house, that that meant that you really got the radioactive stuff.

For me, it takes away the fear...It may not be 100%, but at least you know you can do something about it – taking off your clothes, showering, and all that.

Before, we didn't know what to rate it by, so the x-ray gave us a way to chart it. I like the sound of the 90% being gone. That makes me feel a lot better.

That was pretty informative about removing your clothes – the 90% of contamination is taken off you. That's pretty important.

What it says here about what you should do – try to remove clothing and shoes and place them in a plastic bag outside your home – now that makes sense.

Some people were not reassured, but they seemed to be in the minority. Comments included:

It's scary.

I think that it's more serious than this portrays it to be.

It states, "removing clothing will eliminate 90% of radioactive contamination." What about the other 10%? It doesn't answer.

They always say there's not enough radiation to hurt you, but it still worries me.

Key questions this raised were about the following:

- Exposure:

Where it says... "X-rays, certain diagnostic tests, and nuclear weapons testing" – I put: Is that harmful? Is the level we're exposed to harmful to our body?

What level of exposure is dangerous?

Is there such a thing as a higher dose, and what should you do in the case of a higher dose than the smaller doses we've been talking about?

With the cosmic rays from the sun – just think about it – you go on vacation, you go to Mexico and the sun burns you....How much radiation are you getting from the sun into your body? That's a question mark for me.

- Actions to take:

What if you can't get home to take a shower?

It's pretty good, except, I still would have a question about what I'm supposed to be looking for if I don't feel anything.

It says "90 percent." What about the other 10 percent. They don't tell you to go to a hospital...Are you supposed to stay home?...If I do this, do I still have to go anywhere?

- Rems:

It was very informative. A rem is what? What's it supposed to be? A measure of a radiation does?

Never heard rem. Would like more information.

Very informative. Very straight to the point. I probably would elaborate on the rem part.

One person suggested modifying the opening of the excerpt to help alleviate fears. He said:

It should start off with – there's a polite way of saying, "Don't panic. Let us explain what is going on and why we're doing it...You've been exposed to radiation all your life. Now we're taking some precautions to let you know exactly what's going on" and take it from that point. In some way, at the beginning, it should say "We don't mean to cause alarm, but we just want to let you know that this is going on, this is the kind of radiation you are dealing with. Don't panic. Everything is fine.

5. Pharmacy Scenario: "Trip to the Pharmacy"

Next, the moderator introduced another part to the dirty bomb scenario, about someone from the blast site standing in line at a pharmacy.

Pharmacy Scenario: "Trip to the Pharmacy"

You decide to go home (if you are at work) but you think you might go by the drugstore to stock up on a few essential items and to see if the pharmacist knows of anything you can take to counteract radiation in case another event happens and you are affected. You had heard something about a pill that can be taken to prevent radiation exposure or damage. It turns out that the person in front of you in line is asking about the same thing because he has just come from the mall where the explosion occurred. He was not in the main blast area and was not injured, but he thinks he might have been exposed and contaminated and does have dust all over himself.

Overall Reactions to Pharmacy Scenario

This scenario upset participants. They were very fearful about the risks involved in being near someone who had been at the blast site. Most people seemed to assume that being in the same room with this person would pose a danger to them. The following comments illustrate:

Being exposed to the guy in the pharmacy, I'm wondering, "Oh my goodness... First of all, I'm being exposed, but am I being contaminated by just standing right behind this guy because he's all full of dust, and it could be airborne. I want to know: now what – jeez, do I scream? Do I run out of the pharmacy? What do I do here?"

[They shouldn't] release anybody. This guy done walk all the way from the blast to the pharmacy and done exposed everybody that's he's walked up and down the street [near] and been in contact with... [There] needs to be information right there: what exactly do we do?

I'm running.

[I would] get a plastic bag and put it over him. He's already been there standing in front of you, breathing in and out, talking to the pharmacist so everything that comes out of his mouth is squirting all over the place. He's already contaminated the whole building.

How much was I exposed to? By standing here, I would panic.

I would go to another pharmacy... go home, follow some of these directions (from the PI), take your clothes off... I would get out of there.

The best thing they can do is tell them to take their clothes off.

I'm going to find a bathroom and wash up.

Where's the nearest place I can go to get checked out because I may be contaminated now.

I wouldn't go to a pharmacy [at a time like this.] I would call the doctor or go to the emergency room at the hospital... It probably wouldn't be an over-the-counter pill that you take.

Is he contagious?

If he looked funky, like he'd been in it, he shouldn't be there [in the pharmacy.] He should have been stopped before that, but there he is. I would say it is my unluck (sic) to be standing in line behind him... You don't feel radiation... I would go and have myself checked out... because you don't know if it's really serious. As far as I know, that could give you some exposure.

The people in the pharmacy would probably lock up the store and say, "OK, now we have to stay here because something happened".

Somebody [official] comes in and everybody takes their clothes off and changes into something appropriate. And also try and investigate since they are at the pharmacy, what medicines you can take and fight this exposure to radiation.

Even if you don't touch him, are you still somehow contaminated?

A few people said that they would probably want to talk to a doctor, not a pharmacist, to find out what to do:

[I would] call one of my doctors who knows my case because taking [something] could cause me more problems depending on what it is.

I don't want the pharmacist to give me a pill to take...I don't even want to know from the pharmacist if there is a pill for me to take. I think they should be directed to someone in the medical field.

Most people had not heard that there was any preventive measure such as KI, to protect against radiation. A few people had heard about the pill, including that that this is available now to people who live near nuclear power plants. For example:

I already know about the fact that if you live in a ten mile radius of a nuclear power plant, that the pill was readily available to you...Actually, I do live near [a nuclear plant] but I didn't go and get the pill, and that probably would have been smart, because if something like this does occur, you already have it readily available to you instead of running to the pharmacy...Once it happens, your first thought is to get to the pharmacy...I'm thinking maybe this could be readily available to everyone, so in a case like this, they wouldn't have to run to the pharmacy and wonder.

I think you're referring to the...what is it? The iodine pill that can stop you from thyroid damage. It's very limited what it can do. Isn't that what they're implying.

Other people said:

No, I never heard that.

That would be the question I would ask the pharmacist right there...Is there any effective remedy? What should I do?

One of the participants in California indicated that she already takes a vitamin to help eliminate contamination from the environment. She said:

I actually take this...vitamin supplement...that has a lot of green algae that's supposed to get rid of contamination that you can get in the environment.

6. CDC Public Information Excerpt on Radioactive Iodine and Potassium Iodide (KI), to Accompany Pharmacy Scenario

Next, the moderator introduced the following information on radioactive iodine and potassium iodide (KI) in written form for participants to review and give feedback on.

CDC Public Information Excerpt on Radioactive Iodine and Potassium Iodide (KI)

Local emergency management officials will tell people when to take potassium iodide, or KI, a salt of iodine. If a nuclear incident occurs, officials will have to find out which radioactive substances are present before recommending that people take KI. If radioactive iodine is not present, then taking KI will not protect people. If radioactive iodine is present, then taking KI will help protect a person's thyroid gland from the radioactive iodine. Taking KI will not protect people from other radioactive substances that may be present along with the radioactive iodine.

Some types of radioactive incidents release radioactive iodine. The thyroid gland, which will use any iodine that is in a person's bloodstream, cannot tell the difference between radioactive and non-radioactive forms of iodine. Because of this, the thyroid would rapidly absorb radioactive iodine just as it does iodine from a person's diet. The radioactive iodine releases energy (radiation) that, in high concentrations, can damage the cells of the thyroid gland. In some people, especially young children, this damage can cause thyroid cancer or other diseases of the thyroid within a few years of the exposure.

Because the thyroid will rapidly absorb any iodine that is in the body, people may need to take KI tablets soon after an incident that involves radioactive iodine. The KI will saturate the thyroid gland with iodine and help prevent it from absorbing radioactive iodine. However, KI does not prevent the effects of other radioactive elements. Using KI will only protect the thyroid gland from radioactive iodine. It will not protect other parts of the body from radioactive iodine, and it will not protect a person from other radioactive materials that may be released. People should remember that taking a higher dose of KI, or taking KI more often than recommended, will not offer more protection and can cause severe illness and death due to allergic reaction.

Reactions to Radioactive Iodine and Potassium Iodide (KI) Excerpt

Some people found it reassuring that something was available for some circumstances. For example:

I think I would be much more calmer where we're at right now as to what to do.

I found it kind of reassuring because I would assume it said that if you'd been exposed, then you'd have to be tested to see if you have the radioactive iodine. And if you do, then they'll recommend that you take the KI...

I'm just happy that they know something to do.

However, people wanted more information about KI's appropriate use, the fact that it could have side effects, and that is useful only if radioactive iodine is present. For example:

This is not [calming] and clear like the other [information excerpts.]

Participants had a variety of questions about KI.

- Questions about KI accessibility and use:

After thinking about the whole story, I'm just not that panicky any more...My fear is not knowing what to do and maybe doing something that would cause even more harm.

I think it does pretty well explaining the differences between the iodine and how it would affect the thyroid gland and how it would absorb it and blah, blah. I would want to know how I can go about getting this KI tablet. How would I know if I should be taking the KI tablet?...This tells that I should be taking something soon after I'm exposed.

In the third paragraph, it says some people may need to take a KI tablet soon after...A couple of hours? Within a few days? A week? I see people racing to the pharmacy trying to get their KI tablets when it's all gone...[And] does it expire?

Beyond the thyroid, what other body functions are adversely affected?...Is KI widely accessible? I know they were doing some stuff on smallpox and it was real tough for them to produce enough to have access for everybody...What's the shelf life of [KI]?...And is there a supplement available to take on a daily basis to build up immunity from radiation?

Will it be accessible even before something happens, so we could prepare ourselves and get this KI?

- Questions about KI risks and limitations:

Not very clear. It didn't say anything as to whether I should, shouldn't take it, or how much. It sounds like if you take it, you don't know whether you should. If you take it, it doesn't say how much, and maybe...you take too much and that can hurt you.

It's not really saying that in a case of devastation, if a dirty bomb would occur that this is really going to help you. It's too much jumble and not enough information for me.

It would make me not even want to take it.

That one protects your thyroid. It doesn't protect anything else.

It's useless.

You're between a rock and a hard place.

You're damned if you do, damned if you don't.

It doesn't tell you what to do if there's a different type of radioactivity there. What do you do for that type?

Why would you even have a pill if it didn't do anything?

What are the negative causes if you take the pill and you don't have it? Is it like, you really shouldn't take it unless you really have to?

When 9/11 happened, people started buying this by the truckload and storing it and people were trying to warn them that if they give this to their kids, it would hurt them.

7. CDC Public Information Excerpt on Assessing Radiation Contamination to Accompany Pharmacy Scenario

The last excerpt introduced in the group dealt with assessing radiation contamination. Participants were given a written version to review and comment on.

CDC Public Information Excerpt on Assessing Radiation Contamination

Since radiation cannot be seen, it is impossible to tell for certain if someone is contaminated with radiation without screening them with an appropriate radiation monitoring instrument. If a person has external contamination, most of the contamination can be removed by having the person remove his/her clothing and place it in a plastic bag, then shower thoroughly with soap and water. In general, a person who has external contamination is not likely to contaminate others around him or her, unless there is close person-to-person contact.

Reactions to Assessing Radiation Contamination Excerpt

Most people seemed to find this information reassuring. For example:

I like the fact that it's confirming that actually most of it can be removed...calming.

That answers the question about standing behind the guy in gentleman in the pharmacy...The answer would be that you would not be contaminated.

However, some were skeptical:

That's nice to read, but I don't know how much I believe it.

...If it contaminates you like that, just from exposure, what makes me think it won't contaminate me just from exposure? It's not like I ate or consumed anything...I don't see how that makes any sense.

Questions focused on:

- Airborne risks:

What I worry more about is the breathing. Not so much the clothing. Not so much the clothing, [but] what goes in your lungs.

...The bomb goes off, you're at the mall, you smell it. You get contaminated and your breathe it back out. Can you contaminate somebody else [then?] Say, [from] talking [to them]?

What if it was in a vent or something. We could breathe it in, and we could get it. But if it's outside and it's in the air, the particles all depend on how the wind's blowing. People are going to be contaminated.

- What “close personal contact” means:

I would like to define close personal contact.

Like shaking hands...or having sex?

What do you consider close person to person contact? Are you like standing behind the guy in line – that's pretty close.

III. Recommendations

This series of focus groups provided extensive and helpful feedback on the CDC public information excerpts being developed for consumers around the country. It also yielded rich data on how people view individual risk, general knowledge levels about chemical or radiologic terrorist agents, what people might do in the event of a chemical or radiologic event, and what people feel about these agents and potential threats.

While the population sampled for these focus groups was representative of the locations in which the meetings were held, it was not representative of the entire nation. For example, rural populations were not included and there was not a strong focus on literacy levels and how that might affect information needs. And, the focus was on consumers, excluding groups such as public health professionals and emergency medical workers and first responders. Given the changing and ever present nature of the risks America faces regarding terrorism, the need exists for further research into developing targeted educational materials for consumers and a variety of other groups. In the event of an emergency, with the potential for loss of access to electricity, the need for effective print materials only increases.

Further research might focus on the development of materials for:

- Health care professionals, emergency workers and first responders;
- Parents, school teachers and school administrators;
- Populations with low literacy levels.

A formative research process could also be utilized to produce educational videotapes and/or training videotapes for these audiences, as well as for the general public.