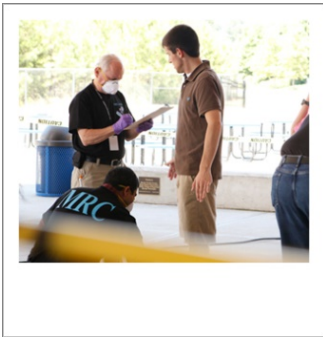


Psychological First Aid in Radiation Disasters Training

Introduction

Welcome to the Psychological First Aid in Radiation Disasters Training program. This program is designed to increase your awareness of the mental health consequences of disasters caused by a radiological or nuclear incident.



People are surveyed with equipment that can detect contamination.



People wait in line to be screened for radioactive contamination.



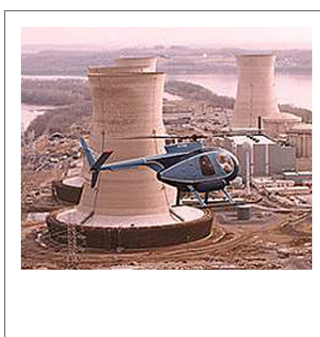
A woman talks with a Medical Reserve Corps volunteer at a community reception center.

In this program, we will hear people who have first-hand experience from real radiation emergencies. One is a tragic radiation exposure involving abandoned medical equipment in Goiânia, Brazil in 1987. Another is the accident at the Three Mile Island nuclear power reactor near Harrisburg, Pennsylvania in 1979.

We will hear their accounts and their observations of the psychosocial consequences of these events. We know from these incidents and others that the mental health consequences of radiation disasters are unique and serious, and in many ways can be even greater and longer-lasting than the physical or economic consequences.



Children are screened for radioactive contamination in Goiânia.



The Three Mile Island accident took place near Harrisburg, Pennsylvania in 1979.

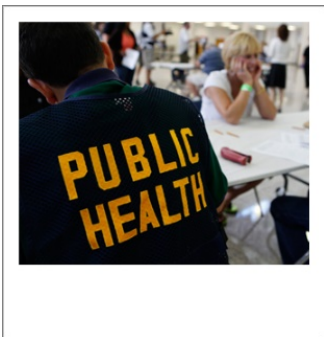


The unique aspects of radiation disasters can lead to increased anxiety and psychological issues.

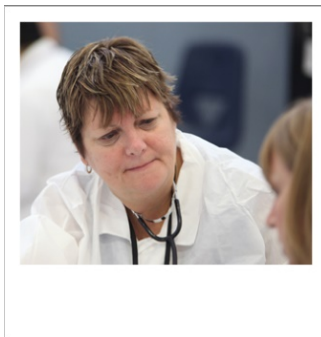
The Centers for Disease Control and Prevention have developed this program to help clinical and public health professionals better prepare to respond to radiation emergencies.

You don't have to be a mental health practitioner to benefit from this training: disaster mental health training is important for all public health professionals, clinicians, first responders, as well as volunteers who may respond to a radiation disaster. This program is meant to serve as a supplement for people who have had previous training or experience in psychological first aid or disaster mental health. For courses that will provide this basic framework please see the Resources section.

Research has shown that disaster preparedness training, along with other interventions, can reduce the risk of post-traumatic stress disorder for workers and volunteers who respond to disasters. We invite you to explore this training and consider the mental health component as a key part of your disaster planning and preparation for all types of radiation disasters—natural, technological, or terrorist incidents.



Public health and the medical community play a critical role in responding to radiation emergencies.



A clinician speaks with a patient affected by a radiation disaster.



Law enforcement provides security outside a community reception center.

Overview – Definition

The most feared radiation disasters are those caused by intentional or deliberate exposure of the public to radiation.

Nuclear disasters are caused by the explosion of a nuclear bomb that produces an intense pulse or wave of heat, light, air pressure, and radiation and causes widespread loss of life.

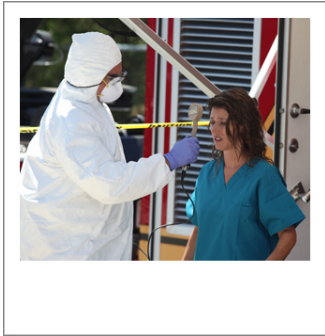
Radiological disasters include the use of a dirty bomb, or radiological dispersal device, the use of a hidden radioactive source, or the radiological contamination of food or water supplies.

Such disasters do not have to be widespread to have intense psychological effects. A relatively small incident can cause a general loss of confidence in the food or water supply that would be debilitating.

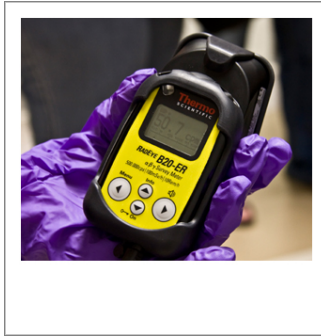
Radiation disasters are unique in large part due to the public's intense fear of radiation.

Unlike many other threats, radiation is invisible, silent, and odorless and can only be detected with specialized equipment. It is also unfamiliar and not well understood by the general public.

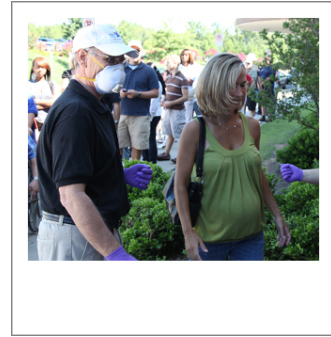
Even common radiological medical procedures are often referred to in terms that mask any reference to radiation. And, of course, there is great concern for possible long-term and delayed health effects, primarily cancers, many of which can only be diagnosed years after the exposure. For women who are pregnant, there is a fear of damage to the fetus.



A responder uses a radiation survey instrument to detect remaining contamination on a woman as she completes decontamination.



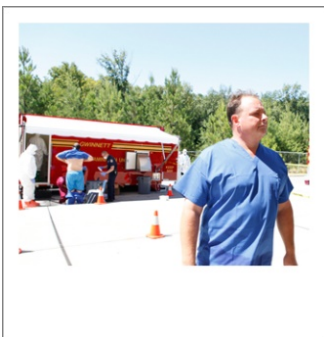
An example of a radiation detection instrument. Instruments may vary among jurisdictions.



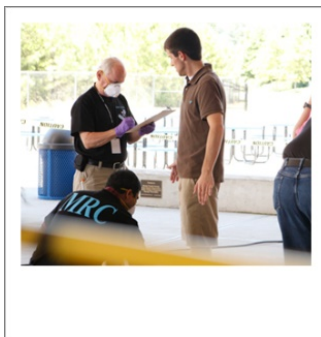
Volunteers assist a pregnant woman.

Social stigma is another consequence of radiation disasters. Social stigma can be experienced by those contaminated—or even those potentially contaminated—by radioactive material as people fear these people are “contagious.”

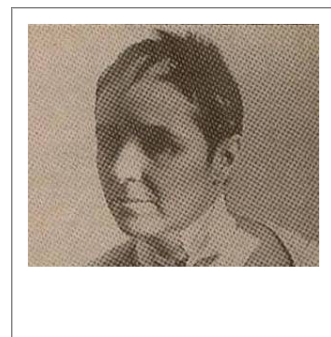
For more on the unique aspects of radiation disasters, let’s listen to Dr. Jose Rozental, who was working on the Brazilian National Commission of Nuclear Energy at the time of a major radiation disaster in Goiânia, Brazil. We will learn more about the Goiânia disaster later in the training.



A man exits the decontamination area after showering and changing clothes.



Volunteers screen people for contamination using detection equipment. Those who are contaminated may be asked to shower and change clothes.



A photo from a newspaper covering the Goiânia disaster.

Video

Video Transcript – Dr. Jose Rozental:

They didn't know nothing. This was a big problem we have to deal with. It was also a surprise for us, the ignorance of the...I'm referring to the majority of the common people, and this was also a lesson to be learned for us, you know how people could have no idea about sources of radiation, using common activity back then, nuclear medicine, for instance or gamma radiography, industrial application of radioisotopes. It's so common, and it was a surprise, completely ignorant.

Overview – Role of Public Health

In a radiation incident, public health may be involved in population monitoring to screen people for internal and external radioactive contamination and, in some cases, to determine the dose received. With this information, persons can be screened for external contamination and, if appropriate, given medical care for internal contamination.

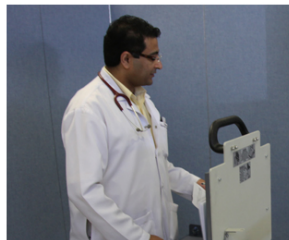
The establishment of a clinical registry to record key information about all persons screened following the incident will enable monitoring for long-term health effects, both physical and mental. This will put public health in an excellent position to screen for mental health needs and deliver, supervise, or secure mental health crisis services.

The registry may also provide important psychological benefits for affected communities, giving reassurance that follow-up service will be available.

Monitoring was a major component of the response to the radiation disaster in Goiânia, Brazil, as Dr. Rozental describes.



Public health workers take contact information in case follow-up services are needed. Population monitoring is a key function of public health in a radiation disaster.



Medical staff may be able to provide countermeasures for internal contamination, depending on the event and available resources.



Registration is an important part of population monitoring and can also provide information for follow-up mental health services.

Video

Video Transcript – Radiological Contamination and Exposure

When we are near a source of radiation, such as radioactive material, we can be exposed to the radiation emitted without

being contaminated by the source. One way to think about exposure is to consider x-rays. When you have a chest x-ray, for example, you are exposed to radiation but you don't become contaminated with radioactive material. We can reduce our exposure to radiation if we are shielded in some way, for example, by standing behind a concrete wall or keeping the radioactive source inside of a lead container. To become contaminated, radioactive material must get on the skin, clothing, or inside of the body. For example, consider a dirty bomb. That is a conventional explosive such as dynamite that is laced with radioactive material. When the device is detonated, people could not only be injured by the blast, but become contaminated. External contamination refers to radioactive material on the outside of the body. When a person becomes externally contaminated, simply removing the clothing could remove as much as 90 percent of the contamination. Gently washing the skin and the hair could remove most of that which remains. If a person ingests or inhales radioactive material, it can become incorporated in the organs of the body, and this is called internal contamination. Depending on the type of radioactive material which someone is contaminated with, certain medications can be administered to accelerate the rate at which the material is eliminated from the body. Examples of such medications include Prussian blue, and DTPA.

Video Transcript – Dr. Jose Rozental:

As I mentioned in the beginning, for me it was a shock when we went to the Olympic Stadium, and was there more than twenty people—children, old people—all of them, all of them contaminated, and we have to make advice, and we asked for the people in the surround, you know, to come to check. But, the people were so afraid, not only the people that we begin at least selected to come to the Olympic Stadium for the survey, but in all the city, you know, they are coming. You know, it was very difficult for us, because even at that moment we were not prepared to receive so much people. You know, at the total it was 112,000 people that we monitored in Goiânia.

Overview – Example

Let's learn more about the radiation disaster that took place in Goiânia, a city in central Brazil with approximately one million residents, in 1987.

Two individuals, while searching for scrap metal, found a radioactive source (cesium-137) in medical equipment located in an abandoned radiotherapy clinic. The protective shielding of the source was removed. The contaminated scrap metal was sold at a scrap yard, and the owner distributed radioactive fragments among relatives and friends.

For 16 days, the radiation source was moved to several locations around the city before it was recognized as radioactive. At first, the victims' symptoms were thought to be related to some tropical disease. Radiation was later identified as the cause and four people died from excessive exposure. Two hundred and forty-nine people were found to have been contaminated with radioactive material.

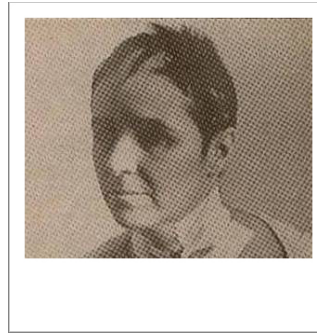
In the weeks after the radiation source was identified, over 112,000 sought medical evaluations, representing about 11 percent of the city's entire population. Of the individuals monitored for radioactive contamination, 74 percent had spontaneously sought monitoring due to fear of radiation. Many being screened had extreme anxiety.



Goiânia is a city located in central Brazil.



In 1987, at the time of the disaster, there were approximately one million people living in the city.



A photo from a newspaper covering the Goiânia disaster.



Children are surveyed for contamination in Goiânia.

Psychosocial Reactions to Radiological Disasters – Phases of a Disaster

Psychosocial reactions were also of major concern in a radiation incident that occurred at the Three Mile Island Nuclear Power Generating Plant in 1979.

The facility, located in Middletown, Pennsylvania, approximately 10 miles from the state capital, had an accident caused by mechanical problems and operator judgment errors. The resulting crisis unfolded in several days of uncertainty, during which experts disagreed about the potential for harm. One hundred and forty-four thousand individuals living in a 15-mile radius of the plant evacuated the area.

Fortunately, the radiation exposure to the public was minimal. Two local residents who lived ten miles from the plant and within view of its towers will describe their reactions to the crisis—Dr. Peter Houts, a social psychologist at the Pennsylvania State College of Medicine, and his son, David, who was 12 years old at the time of the accident.

As they tell the story of what they experienced, listen for their psychological reactions. Bear in mind that they were not exposed to, or contaminated with radioactive materials, but experienced the threat of exposure and contamination.



Three Mile Island, Middletown, PA

Video

Video Transcript – Dr. Peter Houts:

Friday morning I remember driving in to work and seeing the towers as I drove in and thinking, 'I wonder if this is really a very safe situation,' [chuckle] So I was sort of mildly worried and came in to work at the medical center which as I said was seven miles away and late in the morning I decided to make a telephone call to a colleague in Rochester, NY. He had done some research that I was, that was similar to mine, I was interested in it and would like to talk to him but I had never talked to him before. So we chatted on the phone about the research and, at the end of which he said, "Well now um, where are you located?" And I said well, you know, near Hershey, Pennsylvania, near Three Mile Island. He said "Three Mile Island!" He said, "I was an officer on a nuclear submarine and I been reading the New York Times, and I can tell you that you're going to find out that you came within the skin of your teeth of a very serious nuclear accident." So I said, 'Really?! Well uh, what would you suggest I do?' He said, "Well if I were you I'd go visit Grandma." So that was pretty startling news. I got up and walked out into the general office area, we had a series of offices that were around a bigger area where the secretary was and I wanted to tell my colleagues what I'd just heard and just at that time, apparently just before I'd been on the phone, all the sirens had gone off and the governor had issued his statement. So as I walked out, instead of having new news, I saw people running from the medical center out to their cars, I saw people huddled around radios listening, and it was as if the third world war had started. Everybody was very tense, extremely worried, and quite upset.

Video

Video Transcript – David Houts:

I was 12 years old and in the 6th grade in March of 1979 when the accident at TMI. The news about the accident came out gradually over a period of days. On Wednesday evening, on the local news, there was an announcement that there had been some kind of unscheduled release of gas from the plant.

And then on Thursday there was more serious concern and people didn't quite know what was going on and it seemed public spokespeople for the plant were not being quite forthright with the public. By Friday everybody was very concerned and tense. I went to school as I would do normally, being in the sixth grade, but when we got to school all the kids were very concerned and my teacher in fact sat us down and talked to us about technology and how engineers are very well trained and they really know how to handle these things and she knew this because her father was an engineer for NASA and she had spoken to him on the phone last night and he had reassured her so, which in and of itself was a little off-putting. It was also a very warm day and one of the things that happened was that authorities put out the word that children were not to play outside. So for recess period we played inside, and we played this game where we were throwing balls, everyone got very hot and it certainly felt like something was wrong. Also, when you're 12 years old you're starting to have a sense of the world and certainly a sense of drama. I remember there was a point when our teacher was pulled out of the classroom to talk to some administrator and one of the children had brought a transistor radio to school, and everyone in the classroom—30 children—rushed to be around this boy who whipped out the transistor radio. We all kind of huddled around to see if we could hear any news, and that, aside from the inauguration of the President a couple of years earlier was the only time I think that public affairs had really made it into my consciousness, in terms of being at school.

This day progressed with this increasing sense of anxiety and we got, I got home and we had a family dinner as we always did, and they were being very calm and deliberate and saying "You know, I think we're going to go visit Grandma in Connecticut," a good 200 miles to the North. But I, by that point, had gotten myself into a fairly anxious state.

I wasn't hysterical or anything like that but I was pretty seriously convinced that something was pretty seriously wrong, and that when we left the house, we were probably not going to come back.

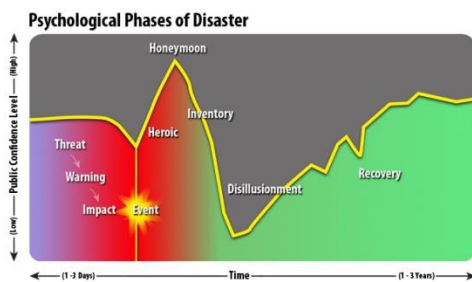
I had visuals of men in white suits kind of making their way into this remote [area], you know we lived on a farm and they would eventually get there and would be looking for signs of life and this kind of stuff. My parents had made arrangements with the neighbors who were farmers and were staying, to take care of the animals on the farm, and we were heading out of town, and I was convinced that we weren't coming back. I was impressing on my parents that we weren't coming back, we need the bank books, we need passports,

we're...this is serious! They were, I thought, pretty unresponsive to my concerns. The other thing that I did that afternoon before we left was I went up into my bedroom. I had a bunk bed that my father and I had built out of some old lumber that we had, and I scratched into the wood a message for these scientists who I thought would be coming in their white suits to test for radiation levels at some point in the future. I left a message about how I had lived here with my family and had left b/c the nuclear power plant was leaking radiation. I wanted people to know that someone—David Houts—had lived in this house before the terrible accident was unfolding. So I was you know, pretty freaked out by it.

Using the phases of disaster model, which you see illustrated, we can look at psychological reactions of survivors over time. Let's review each of these phases in more detail. The model begins with the threat, warning, and impact phases.

The threat phase is the time before impact and involves the hazards or threats that could potentially affect the community. During the warning phase, communities receive notice of a disaster. Disasters that happen with no warning, such as a terrorist attack, leave survivors feeling more vulnerable, unsafe, and fearful of the future as compared to survivors of disasters that have warning.

In addition to the speed of onset, the amount of destruction caused during the impact phase also affects the reactions of survivors. The greater the scope of community losses, the greater the psychosocial effects on the individuals.



Psychological Phases of Disaster

In the immediate aftermath of a disaster, there is an intense effort to rescue others, provide safety, and help individuals to survive the event; this is called the heroic phase. Altruism is prominent among both survivors and emergency responders, and adrenaline is high. Individuals do heroic deeds, disregarding their own personal safety. Therefore, safety issues are an important consideration for both survivor and responder.

During the honeymoon phase, which occurs a week to months following a disaster, governmental assistance becomes readily available. In addition, large numbers of volunteers offer help. Survivors experience a short-lived sense of optimism.

During the inventory phase, survivors recognize that disaster resources are limited. They become physically and emotionally exhausted due to multiple stressors. The optimism during the honeymoon phase gives way to discouragement and fatigue.

During the disillusionment phase, survivors may feel abandoned or resentful as they see disaster-assistance agencies and volunteer groups pull out. Gatekeeping regulations and red tape may discourage them from receiving assistance.

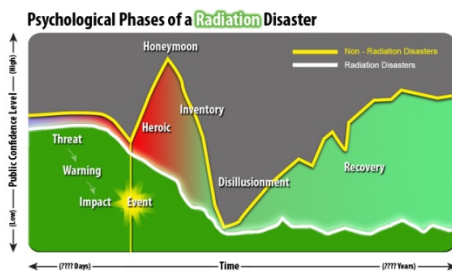
The final phase is reconstruction, or recovery. It is in this period that individuals and communities rebuild their physical property and recover their emotional well-being.

This phase can take years.

Now let's review these phases of disaster with a radiation event and note some of the differences. As we discussed earlier, public awareness of radiation threats can be low. In the warning stage, radiation events can be sudden or prolonged and difficult to detect.

In some radiation events, the immediate impact is difficult to assess. In Goiânia, the radioactive contamination went undetected for 16 days. Listen to Dr. Jose Rozental describe how little warning the population of Goiânia had.

The phases of disaster model for a radiation incident illustrate the differences pre- and post-event from other types of disasters.



Psychological Phases of Radiation Disaster

Video

Video Transcript – Dr. Jose Rozental:

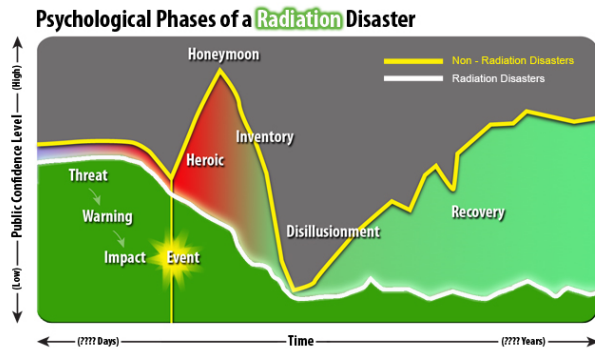
It took two weeks to feel the symptom. After two weeks, increased the number of diarrhea, vomiting, and but the physician didn't could get an idea this could be of radiation

When I arrived in Goiânia, the people...even the people didn't know what was happening. These people have no idea, you know, because one day a physicist was in Goiânia visiting the city, and someone told him probably something wrong is happening in some part of the city. It was a medical physicist. He asked for a detector, and the detector was at the end of the scale. He knew something is wrong here.

You know? And he went to the Secretary of State, Health Secretary of State, and told him, look, I have been in several parts of the city, and the detector was in the full of scales. Something is wrong with the city. But the people didn't learn about this.

We also find significant differences in the heroic and honeymoon phases. Because of extreme fear and the lack of familiarity about protection from radiation, some people may choose not to assist victims of radiation disasters, including medical personnel and even family members.

This is unfortunate since this fear is not founded in terms of factual information about radiation. The lack of social support systems may reduce the heroic efforts often undertaken to assist victims and decrease the sense of optimism. Dr. Jose Rozental describes how this happened in the Goiânia accident.



The phases of disaster model for a radiation incident illustrate the differences pre- and post-event from other types of disasters.

Video

Video Transcript – Dr. Jose Rozental:

In the beginning, again, everything is very difficult in the case of a radiological accident. I mean, like Goiânia and with contamination in the great part, again, because of the ignorance, the hospital did not accept the people, not very high contaminated, because they told, especially for me, how can I accept these people in the order that they are in the hospital? They are afraid. I cannot accept it, everybody in the hospital knows there was an accident here. We cannot accept. The nurse's strike, he told me, we are going to strike. We are not going to work. The physician is strike. I am not going to work.

No volunteer au contraire. They left the place. They were discriminated, because people were afraid. Disaster in radiological nuclear disaster is different. The number of victims, for instance, only four people died in Goiânia. In a disaster can die thousands of people, but they are sure they have no radiation contamination by radiation. The point is to be contaminated by radiation. This makes people not to be volunteer.

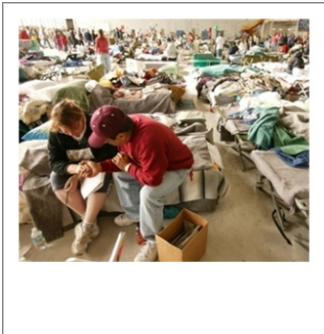
No. No. Many of the people of family, you know they live out of that folk of contamination, this refused to visit. They were afraid. How can I kiss my sister or my niece if they are contaminated? You know?

The situation was...I don't know if I can tell this is going to be the same all over the world. I am giving the experience of Goiânia, only the Goiânia. You know, this happened, and you know, I show yesterday that we are dealing with the waste near in our market, market and the market closed of course, because no one went to the market to buy something. The spread of the food contamination...that Goiânia was contaminated, it was very bad. The Goiânia have a very good cotton, export for other countries, and suddenly all contracts, all from foods or admission dies for Goiânia was broken. No more, no other country or even in Brazil wished to accept material from Goiânia or Goiaz. This was tremendous, because not only for Goiânia, but all the state. It was difficult, different. We have complete discrimination, not only people, but also main products. This was a tremendous economic drop in this.

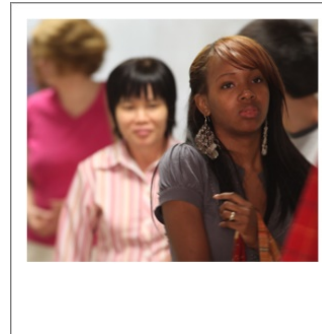
Psychosocial Reactions to Radiological Disasters – Stigma

The remaining phases of inventory, disillusionment, and reconstruction are difficult and prolonged in a radiation disaster. In cases of severe contamination, such as in the Chernobyl disaster, reconstruction in the immediate area is impossible and residents were permanently relocated.

Stigma of those exposed to radiation further isolates individuals and prolongs recovery. For victims of severe radiation events, the return to “normal,” or pre-event mental health, may not occur for generations; often one must define a new “normal.” This also occurred in Goiânia.



If people are unable to return home, and remain in shelters, such as this one, recovery can be more difficult and prolonged.



Social stigma can isolate those who need support services.

Video

Video Transcript – Dr. Jose Rozental:

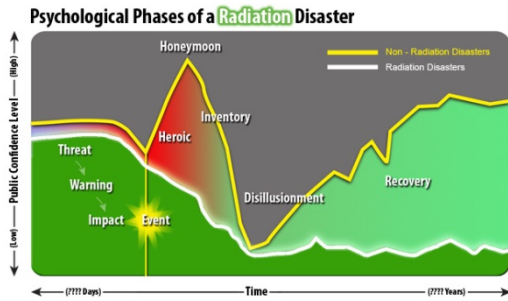
The discrimination continues from the end of the recovery phase, and I can tell you until now, 20 years later, for this specific people, for this specific people that was involved in the accident of Goiânia, they have problem. They are sad. You know, if you look for that people, every year they said, the next year will be worse. Never they said, the next year will be better.

Today the problem is only psychological. All of them have recovered, even that was very, as I show you, Louise showed a picture that people was in the beginning with the mark, and I show you the same 20 years later. All of them, in terms of contamination, we follow until the second generation, because it's part of the procedures, but until now they are no problem at all. The only problem is mental health.

The only problem is psychological. The only problem is discrimination against these people.

The psychological phases of a radiation disaster might be drawn differently than for other disasters. The green curve on this image shows how a serious radiation disaster might unfold with no perception of the threat, little warning, and a delayed impact.

In this interpretation, we see no heroic or honeymoon phases and prolonged disillusionment and recovery phases, which do not result in a return to the pre-event psychological state.

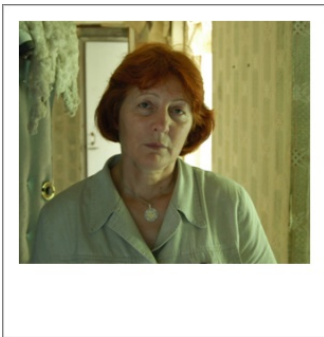


The phases of disaster model for a radiation incident illustrate the differences pre- and post-event from other types of disasters.

In this photograph (below), we see a physician standing in the doorway of what was once her apartment before the Chernobyl disaster. During radiation disasters, both people contaminated by radiological material, and those without contamination, can suffer adverse psychological effects.

Several factors may contribute, including a lack of understanding of radiation and the screening process, the delayed impact of exposure, and mistrust of who are unable to provide consistent and clear-cut guidance regarding safety measures.

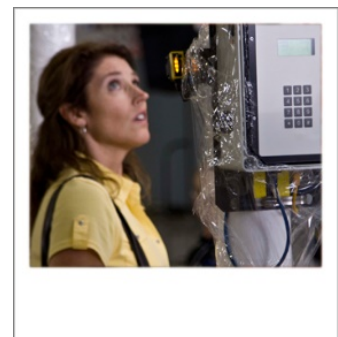
In Goiânia, Brazil, the fear was so intense that some people fainted in the lines as they approached their moment of monitoring, and many complained of vomiting and diarrhea. This reaction was also found in those who had not been exposed to radiation, or contaminated, but were experiencing severe physical effects from the fear of radiation.



A physician stands in the doorway of what was once her apartment following the Chernobyl disaster.



Radiation detection instruments, like this one, can be used to detect contamination.



Lack of knowledge about radiation and the screening process can contribute to increased anxiety.

The immediate physical effects of a radiation disaster will vary greatly depending on the person's distance from the source and the severity of the radiation exposure. Psychological distress will be great for individuals suffering intense exposures, serious contamination, and who may have had other physical injuries. Psychological consequences may include panic, grief, and questions such as "Why has God done this to me?" However, even in radiation disasters, distress lessens with time.

And it is important to remember that in many disasters, the majority of survivors

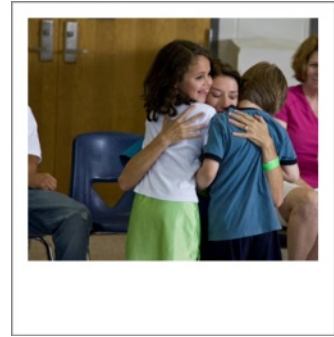
experience normal psychological responses to the abnormal disaster event and recover without mental health interventions. Dr. Peter Houts explains more about the recovery phase that he and his team studied following the Three Mile Island incident.



Even the intense fear of radiation can lead to physical symptoms.



The level of psychological distress is expected to be high at the beginning of the incident, and gradually lessen over time.



The majority of survivors experience normal psychological responses and recover with no need for mental health interventions.

Video

Video Transcript – Dr. Peter Houts:

During the crisis, as well as 3 and 9 months later, the general population surveys"—[aside] now those were the ones that we were doing for the Nuclear Regulatory Commission and the Pennsylvania Dept of Health—"and most other studies of subpopulations showed that a higher percentage of people living close to TMI were upset and reported more stress-related symptoms than did those living farther away. Then 18 months after the crisis"—a year and a half—"the general population surveys did not show significant differences between persons living close to TMI and those living farther away, though the subpopulations which were most upset at the time of the crisis"—that would be mothers of young children, people living very close to the reactor—"continued to show heightened distress near TMI for more than 2 years after the accident, and there's some evidence that it even persisted longer.

First, people with poor coping strategies"—that is, denial or using drugs for example to deal with stress—"they were especially likely to experience the stress following the crisis. Second, attempts to cope actively, that is, problem-oriented coping or attending community meetings"—in other words, these are people when they were upset about the situation tried to do something about it and this could mean talking to other people or going to meetings, and these people tended to remain upset over time.

I think was that this was a situation that they couldn't do anything about as a single person. You had to depend again on these experts and these technicians and they would go to these meetings and express their feelings but they never had the feeling that they were being listened to or that what they were saying was affecting things.

Following radiation disasters, large numbers of the area's population may feel concern about the amount and significance of their exposure and/or contamination to radioactive materials and the effect of exposure and/or contamination on their future health. For some, there is ongoing stress due to the uncertainty about the cause of any future illness and the fear that the radiation exposure and/or contamination will be responsible.

Some develop a lack of trust in authority due to conflicting information from experts and the lack of certainty of outcomes. Because the effects of radiation can be long-term, the consequences for health of future generations can mean an ongoing burden of anxiety and stress.



Survivors wait to be surveyed outside a community reception center.



A survivor walks through a portal monitor. Portal monitors are another way to detect contamination.



A child is surveyed for external contamination. Special considerations may need to be taken when working with children, as they may be especially frightened of personal protective equipment or survey equipment.

Those who are evacuated during a radiation event may have difficulty re-establishing trust in the safety of their homes and neighborhoods. Lingering fears of contamination from objects and places they once held dear will need to be addressed.

Public and widespread use of radiation detection devices, even to the point of excess, and examinations by unbiased experts may be necessary to help returning survivors re-establish comfort in their surroundings.



Cooling towers of a nuclear power plant.



Goiânia is a city located in central Brazil.



People wait in line to be surveyed for contamination.

Let's hear how this occurred in Goiânia from Dr. Rozental:

Video

Video Transcript – Dr. Jose Rozental:

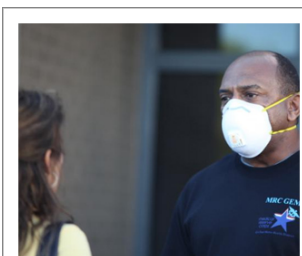
The people was afraid, because even after we mentioned there is nothing with the people, because also another word, because the expression of late effect of radiation, because most of people, including the contaminated people, and especially non-contaminated people, because of ignorance as I mentioned in the beginning, knowing radiation risk, the worried late affect made them worried about the future. I am not feeling now, nothing now, but how can I expect next year, next five year? What I need to do? You know, it was a human fare, just this, even for people were contaminated, and the common people of the city not contaminated.

The question, all of them involved with cancer. Please Doctor, what is going to happen with me? What is going to happen with my generation? They are really afraid for this, and no words that I could tell them, it was reason for come in this sense, because this was true. We have to follow during the second generation, and if I have to follow the second generation, they are afraid. Until the second generation, I can get cancer, my family get cancer, my children get cancer, my grandchildren also have possibility to get cancer. They make people fear. It was very sad. It was a transformation in the mentality of the people. The sadness, it was very high. If you follow me, this is important lesson for the future, the people will take a reaction to response to accident, to pay attention for this situation.

We have already mentioned the challenge of stigma for victims of a radiation disaster. In past instances, such as in Goiânia, Brazil, because of the fear of radiation, assistance to victims was denied from physicians and other health providers, and even family members. In addition, neighbors, community members, and potential volunteers were unwilling to provide aid.

In Goiânia, Brazil, social stigma was widespread. Area residents protested against caskets being buried in the local cemetery. When residents from the region traveled to other parts of the country, they were turned away from hotels and their cars were stoned. Agricultural products from the region were banned. These reactions are unfortunate and, hopefully, will not be repeated in the future.

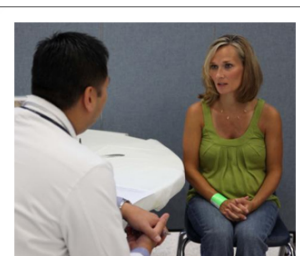
Those knowledgeable about radiation understand that there is no need to deny help to survivors reporting to community reception centers or health facilities. Social distancing is unnecessary and fear-based.



With proper training and safety precautions, there is no need to withhold help from survivors of a radiation disaster.



Providing instructions and information to people affected by radiation disasters is an important part of psychological first aid.



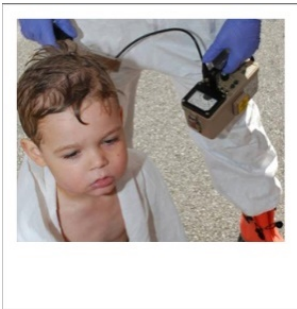
Public health and the medical community can help to prevent stigma by providing accurate information regarding radiation.

Psychosocial Reactions to Radiological Disasters – At Risk Groups

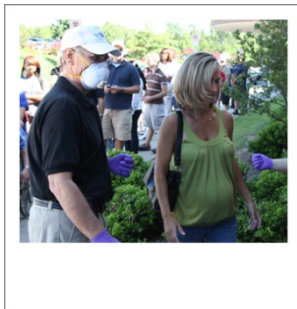
The groups who are most at risk following a radiological disaster are children, pregnant women, and mothers with young children. Educational materials and counseling are recommended for pregnant women who are concerned about birth defects.

Emergency workers, including first responders and cleanup crews, also warrant special attention as they can encounter severe stress due to handling contaminated bodies, risk their own health due to exposure, and working long hours in uncomfortable protective equipment.

Others at risk include evacuees, particularly those who are displaced, older persons and people with mental illness, as a radiological event may greatly reduce their social and economic support networks. In his research on the Three Mile Island incident, Dr. Peter Houts illustrates the need to look at these at-risk populations.



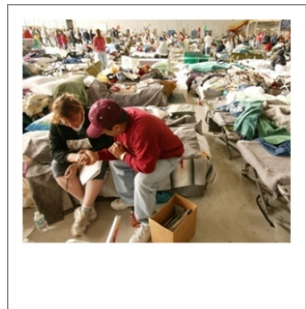
A child is surveyed for external contamination. Special considerations may need to be taken when working with children, as they may be especially frightened of equipment used.



A pregnant woman is surveyed for external contamination. Pregnant women may be concerned about possible birth defects.



Responders help decontaminate a survivor.



People in shelters may have limited access to support networks, which can cause additional stress.

Video

Video Transcript – Dr. Peter Houts:

There's also evidence that certain demographic and personal characteristics were associated with the stress following the crisis. These included being pregnant at the time of the accident, not surprisingly, being younger, being married, being female, living in large households, having a chronic illness, being introspective, being frequently upset, having low self-esteem, and having a prior psychiatric illness.

Several of these things are items that are commonly associated with reporting high stress symptoms. It would seem that these people, such as people with emotional psychiatric illness for example were more vulnerable to the stresses of Three Mile Island. But then the other group were the people such as mothers of young children, people living close to the reactor; these are people most affected by it so they tended to respond more strongly

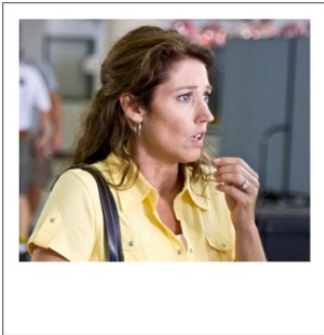
as well.

There's also evidence that certain demographic and personal characteristics were associated with the stress following the crisis. These included being pregnant at the time of the accident, not surprisingly, being younger, being married, being female, living in large households, having a chronic illness, being introspective, being frequently upset, having low self-esteem, and having a prior psychiatric illness.

Several of these things are items that are commonly associated with reporting high stress symptoms. It would seem that these people, such as people with emotional psychiatric illness for example were more vulnerable to the stresses of Three Mile Island. But then the other group were the people such as mothers of young children, people living close to the reactor; these are people most affected by it so they tended to respond more strongly as well.

In addition to the serious mental health consequences discussed for survivors of all disasters, such as generalized disorder, post-traumatic stress disorder, major depression, and alcohol and medication abuse, people who experience radiation disasters may face an additional consequence.

In studies of past radiological disasters, some survivors have experienced "psychosomatic bind," in which the cause of every illness is attributed to their radiation exposure. This chronic state of alarm finds victims linking even the mildest symptoms to a decline in their overall health and an anticipation of their own death.



A woman shows signs of visible distress as she seeks assistance. When helping those affected by a radiation disaster, it is important to manage intense emotions.



A community reception center worker answers questions.



A woman is reunited with her children. Keeping families together helps promote connectedness among survivors.

Listen to Dr. Peter Houts describe his observations of psychosomatic bind following Three Mile Island.

Video

Video Transcript – Dr. Peter Houts:

We also studied peoples' attitudes and opinions of people living in the vicinity of 3 mile island. And I remember talking to people who had very strong opinions, not surprisingly. One very poignant event was a pediatric oncologist who studies or treats children with cancer, showed me a picture of one of his patients, a

little five-year-old child, who had on a t-shirt that said 'I Got My Cancer at Three Mile Island'. And if people had illnesses following the accident then many were likely to attribute it to, 'was this due to 3 mile island', I think almost anybody who got cancer in that area was wondering whether it was due to 3 mile island.

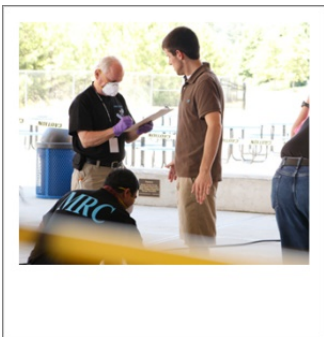
One lady called me—she had somehow found out that we were doing this research on the follow-up of TMI and she wanted to tell me what had happened to her and she described an absolutely classic phobia. In other words, as she would drive closer and closer to Three Mile Island she would become more and more anxious and her hands would sweat, she had all physical symptoms of extreme anxiety to the point where when she got very close to the reactor she was practically immobilized. Now if she had walked into a psychiatrist's office and said "This is what happens to me when I get close to bridges," the psychiatrist would say well this person has a bridge phobia, she's phobic. And this lady absolutely had all the classic symptoms.

Another experience I had was at the time of writing the book, which was 7 years after the crisis, our library at the medical center had accumulated a collection of materials from Three Mile Island: newspaper articles, magazines...and so I wanted to go over these so as to include some of the information in the book. So I took a selection of them and was checking them out of the library and I walked over to the circulation desk and put them down and the lady who was checking me out was somebody I knew and who from my experience was a very reasonable, calm person. She looked at that and she immediately became very anxious and said, "Oh, every time I look at that I get terribly upset!" And this is really quite a different reaction than you usually get from librarians (very calm people for the most part) and so I said "Why? What is it that's so upsetting?" And she said "Well I had young children at Three Mile Island, and every time they have any kind of an illness I think this must be due to some kind of radiation of illness, and it still upsets me."

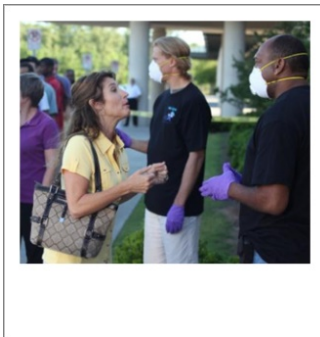
In the aftermath of a radiation release, it is critical to conduct population monitor to determine the impact. Four parameters should be assessed: contamination, dose received, the level of anxiety felt, and the physical symptoms, both explained and unexplained.

The interaction of these four will determine the initial treatment and on-going monitoring. For example, one group could be uncontaminated and unexposed with high levels of concern and unexplained physical symptoms, such as chest pain, sweating, or diarrhea. For this group, immediate treatment is recommended rather than ignoring the symptoms with no physical cause.

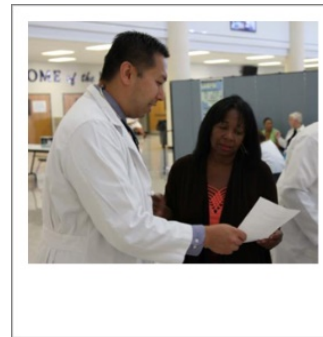
A team approach to monitoring may be an ideal means to address both the mental health and physical needs of the public during a radiation emergency.



Workers use survey instruments to determine contamination levels at a community reception center.



A woman asks questions of a community reception center worker. Monitoring anxiety levels is an important component in determining appropriate treatment.



Medical staff should be prepared to address explained and unexplained physical symptoms.

Video

Video Transcript – Dr. Jose Rozental:

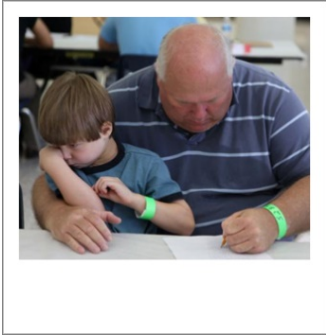
You know, this accident, it was terrible experience for the people of Goiânia, a terrible experience, because as I mentioned, a telephone call to the governor at six in the morning, and I told him, we have to admit gently, because you have to transmit this by news in the morning for TV and, when the population woke up, and listened to the information on the TV, it was worried. It's a bad dream for them. You know? The government called the press to transmit the information, and he said, it is really an accident, a very bad accident, and we have to make survey in all the city, especially in the main folks who are contaminated in the center part of Goiânia, and they gave me the words. I explained to the people from the media, I told them to take care of the information, and not to alarm so much the population, but at the same time, they have to inform the places where the main focus of contamination to avoid the spread, the fact of all this the population of Goiânia to be afraid. We did this, and in the coming days, the coming days it was very bad, because it was the news that spread in not a good way, because the press asked for many people information. The people in Goiânia understand the scene, people that had ever saw before using stranger clothing, masks, detectors, you know, they became afraid. Not only for the situation of Goiânia, not only for the central part where the accident was located, but we have several districts in Goiânia. They came from several districts in Goiânia. You know? And, because the ignorance of that people, they didn't have any knowledge on risk, radiation risk. For this reason, they come. Another reason is the people, the nuclear people it's picked by means of obstruct words for people. You know, people started to listen to Becquerel (Bq), stochastic, non-stochastic affect. There isn't this people to come to make a measurement, but because of the information, and someone comes to the TV and said, this...the possibility to cancer is very high. How to expect another situation for these people, even they live far away the local of the accident. They are afraid.

When we consider radiation disasters, the consequences include stigma from community and family members, leaving survivors with a loss of social supports that are vital to resilience and recovery. We also see prolonged stress regarding the future health of one's self and children.

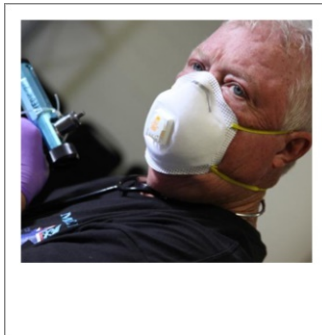
In some cases we also find survivors living with psychosomatic bind, in which even

minor symptoms are attributed to the radiation exposure and can signal imminent death to the survivor. For evacuees returning to their home, there can be lingering doubts as to the home's safety.

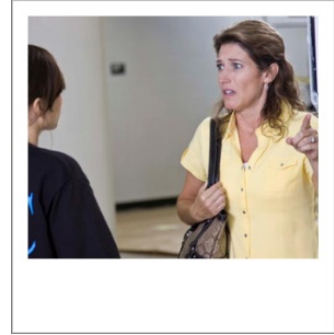
As we look at the waste repository from the accident in Goiânia, Brazil, we recognize that radiation disasters have long-term environmental, physical, and mental health consequences.



Personal protective equipment, such as this worker's mask, can be strange and unfamiliar.



Concern regarding the future health of children can result in additional stress.

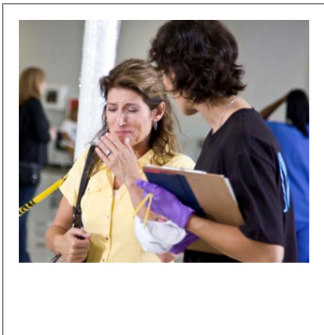


An anxious survivor questions a volunteer.

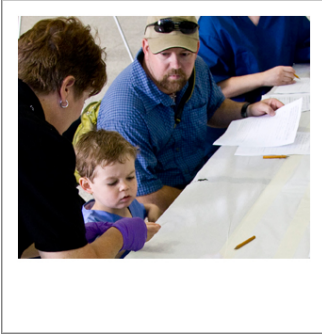
Psychological First Aid – Steps

Now that you have a better idea of the needs and typical responses of a disaster survivor, what can you do to help? You actually already have many essential attributes and skills that you can bring to assist survivors! They are basic skills that help us in relating to family, friends, and work colleagues - many are common sense.

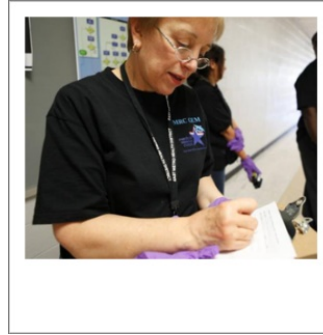
As you can imagine, good listening skills, patience, and a caring attitude are invaluable in working with disaster survivors. Trustworthiness and being approachable, culturally sensitive, and non-judgmental are other essential attributes and skills. And finally, the ability to be flexible and tolerant in the inevitable chaos created by a disaster event is obviously critical in successfully working with survivors.



A volunteer escorts a survivor through a community reception center. Having a caring attitude is vital in psychological first aid.



Workers take information from people during a radiation disaster. Good listening skills are important for gathering critical information for response efforts and in psychological first aid.

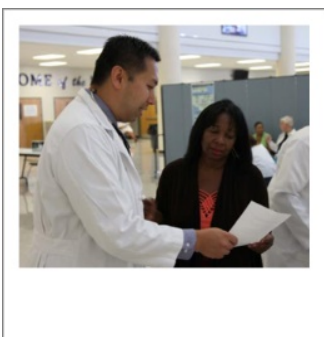


Many of the skills and abilities you use everyday to relate to people are used in psychological first aid.

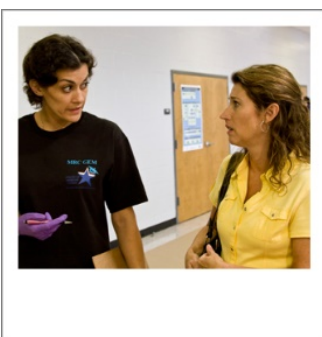
As a responder in a radiation disaster, there are several steps you can take in providing psychological first aid to survivors. First and foremost, you must get the person to actively engage with you. Introducing yourself and stating your intent should also occur immediately. Once you have engaged the survivor, you can best help by being an attentive listener and being “present” with the survivor.

Trying to think of a response or solution to his or her immediate problem while the person is still talking will only interfere with this process. It is more important to attend closely to what the person has to say than to present an immediate solution. It is when you are truly “with” a person that you will be able to pick up on his or her behaviors, attitudes, and needs.

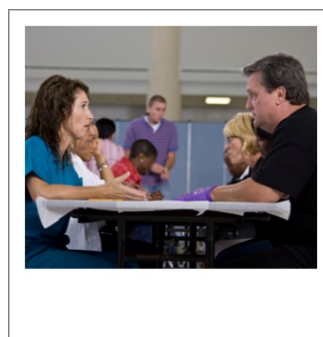
In addition, you can promote safety, calm, connectedness, self-efficacy, and help. Let’s look at each of these.



A clinician counsels a patient. Everyone responding to a radiation disaster should work to actively engage with survivors.



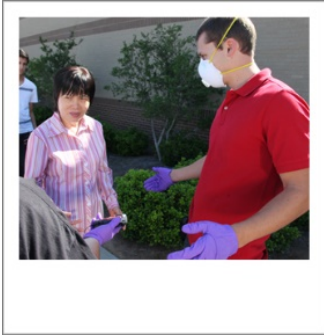
Being an attentive listener can help you pick up on behaviors, attitudes, and needs that you can use to assist people.



When providing psychological first aid, make sure you immediately introduce yourself and state your intent. This will help you actively engage with the person you want to help.

Promote safety. You can do this by helping people meet their basic needs. You also promote a sense of safety by providing repeated, simple, and accurate information on how survivors can get their basic needs met.

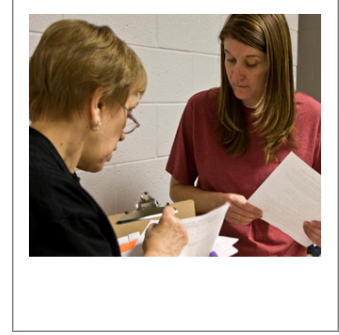
Under highly stressful situations it is difficult for people to follow complex directions. Diplomatically asking the person to repeat your instructions “to be sure I gave that to you correctly” can be a good means of ensuring the message was received.



During highly stressful situations, it may be necessary to ask people to repeat complex instructions back to you to ensure they are understood.



A clinician consults with a patient. Information may need to be repeated clearly and calmly several times to ensure comprehension.

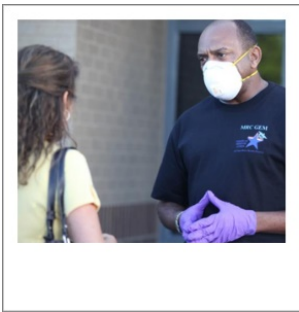


Workers should be able to explain any written material, such as forms or brochures.

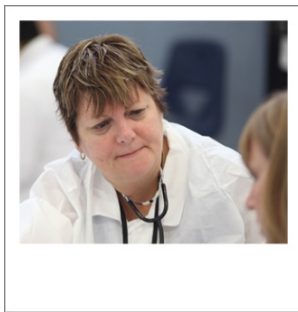
Promote calm. Disasters create anxiety. Being calm yourself and creating an atmosphere of calmness can go a long way in helping. You can promote calmness by listening to people who wish to share their stories and emotions. Do not force people to share if they are not ready to do so. As people are talking, remember that there is no right or wrong way to feel.

You can be compassionate and friendly to people even if they are being difficult. It is also calming to offer accurate information about disaster and relief efforts underway to help survivors understand the situation. Rumors can cause anxiety. Giving accurate information to thwart rumors is an important strategy in promoting calmness.

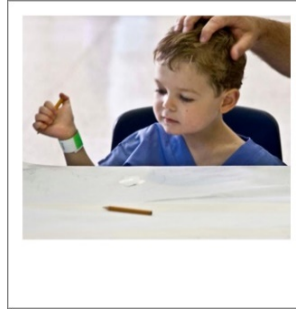
Promote connectedness. You can also help by keeping families together and children with their parents or other relatives whenever possible.



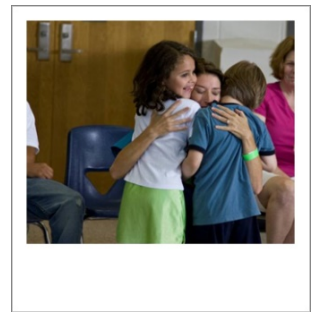
Those wearing personal protective equipment, such as masks, should be especially conscious of non-verbal communication. Keep an open posture and maintain eye-contact.



Listening to people who wish to share their stories will help to promote calm, but do not force people to talk.



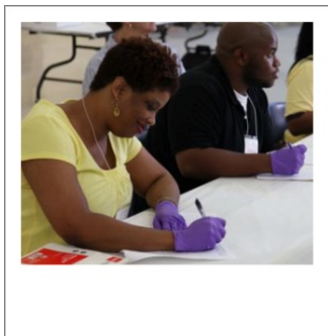
Small children, especially those who are separated from family, will require extra attention.



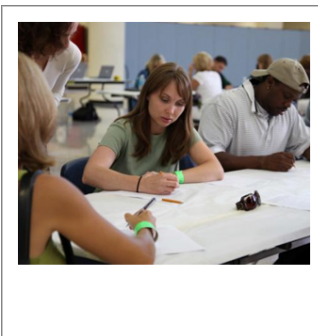
Keeping families together promotes connectedness.

Promote self-efficacy. Self-efficacy is the sense of power or control people feel they have. Often a disaster strips individuals' sense of personal control. You can help by "giving" control back or empowering survivors. You can do this by giving them practical suggestions that steer them toward helping themselves and by engaging survivors in meeting their own needs.

Promote help. You can do this by finding out types and locations of services that are provided as part of the disaster response; then you can direct people to those available services. If survivors are expressing fear or worry, remind them that more help is on the way. But only say this if only if you know that is in fact the case. Never make a promise you cannot keep.



One way to promote self-efficacy is to give people power and control over simple things, such as filling out paperwork.



Help people to meet their own needs, by giving simple instructions and directions to available support service.



A worker provides information to a survivor. Only provide information that you know to be true, and never make promises you cannot keep.

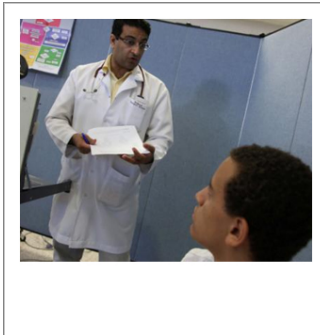
We have just reviewed a number of ways you can help in providing psychological first aid. We need to take a minute to look at a few things you should not do while working

with survivors.

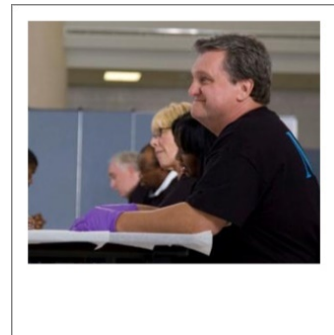
First and foremost, do not force people to share their stories with you; it can re-traumatize them. They will offer to share their story when they are emotionally able and ready to share it with you.



People wait for assistance at a community reception center



A clinician counsels a patient.



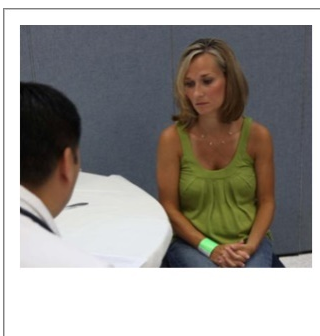
A public health worker takes information at a community reception center.

Next, do not give simple reassurances like, "Everything will be OK" or "This will be over before you know it." These statements might make you feel better, but they are not helpful for the survivor and often are not true. For the survivor, things aren't OK and won't be OK for some time. It's much better to listen empathetically and just "be" with them.

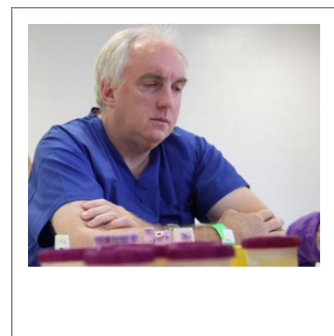
It is always inappropriate to explain why you think they have suffered. A survivor may even try to get you to make a hypothesis on why the event occurred. You might respond that you don't know what caused the disaster but that you do know that you are very sorry that it happened. And then return to helping the survivor deal with her or his immediate concerns.



Listening to survivors, then helping them deal with immediate concerns is much better than providing simple reassurances.



Be prepared to communicate instructions repeatedly in a clear and calm manner.

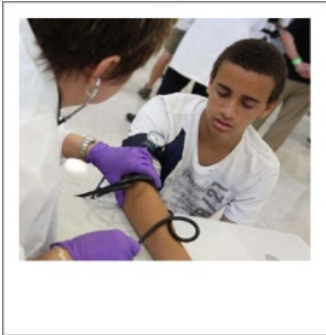


Survivors may have questions about why the event occurred, or why they are suffering. Use psychological first aid principles to address these concerns.

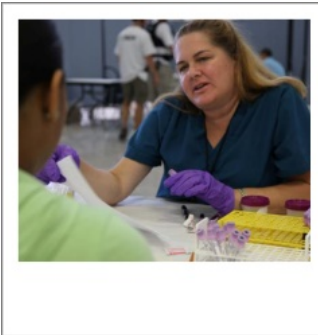
It is easy in a disaster situation to make promises to survivors that cannot be kept. We

think that we are bringing hope and being helpful if we can tell survivors what they want to hear, but it is never the right or best thing to do if those promises cannot be kept. It backfires and ultimately causes a lack of hope and distrust of you and the system. It is always more helpful to provide accurate facts as you know them.

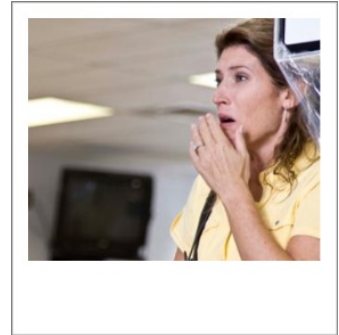
Finally, never criticize existing services or relief efforts in front of people in need of those services. Tension is high in a disaster response, and, as we have witnessed in past disasters, there are problems in communication and provision of services to survivors. In other words there is plenty to complain about but criticizing these services and relief efforts in front of the survivors is never beneficial. Survivors are better served when those helping them portray a unified effort.



A clinician takes the blood pressure of a patient. Everyone responding to a radiation disaster should work to actively engage with survivors.



A technician explains a laboratory test to a survivor.



Never criticize response efforts in front of people who need those services.

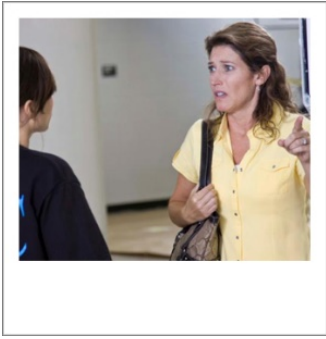
Psychosocial First Aid – Managing Emotions

Disasters provide many opportunities for the expression of intense emotions. Individuals can become extremely agitated and aggressive or extremely emotional. Remember, you can be the most helpful by remaining calm yourself and communicating calmly.

This can be enhanced by a number of nonverbal strategies. For instance, stand or sit squarely facing the survivor. Keep your posture open – meaning try not to cross your arms or legs. Both of these techniques communicate your openness and total attention. Lean forward, and keep eye contact. These strategies communicate your interest and care as the survivor is speaking.

Being attentive does not mean allowing yourself to verbally or physically abused. Sometimes there are personality conflicts and it may be best if you walk away and try to get another worker to assist that survivor.

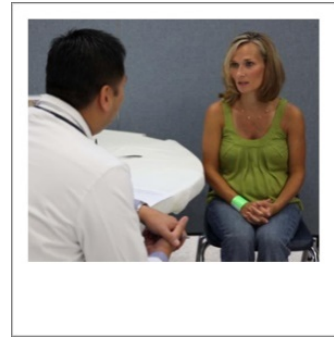
Next, communicate warmth. You can do a lot to defuse intense emotions by using a soft tone while speaking. Remember to give survivors their personal space and allow them to dictate the physical distance they want from you. Do all that you can to quickly establish a relationship with the survivor.



People may express intense emotions after a disaster. Remaining calm and communicating calmly can help to diffuse tense situations.

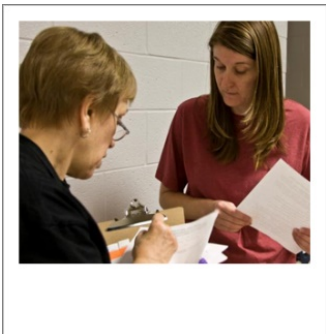


One non-verbal strategy to reduce intense emotions is to maintain an open posture facing the survivor.



Leaning forward and maintaining eye contact, as this clinician is doing, communicates caring and interest.

You can do this by introducing yourself and asking the survivor what name he or she would like to be called. Let the survivor know you are there because you want to help. One strategy to defuse intense emotions is to lead the survivor to focus on concrete, closed-ended questions or questions that involve a straightforward answer. Always explain why you are asking the question. Simple questions require simple responses from the survivor and often defuse high emotions.



It is important to give survivors appropriate personal space when possible.



Quickly establish a relationship with survivors by introducing yourself and using soft tones to explain who you are and what you are doing.



Try and ask closed-ended questions. Using simple questions with simple responses can diffuse intense emotions and help to focus survivors.

Intensely emotional survivors often feel they are not being heard. You can de-escalate the situation by finding something you can agree on. For example, if the person is extremely frustrated and angry over his or her ability to move quickly through a line, maybe you could agree that waiting in long lines is frustrating and is a very valid concern and needs to be addressed. Then let her or him know that you will work with her or him to help solve this problem.

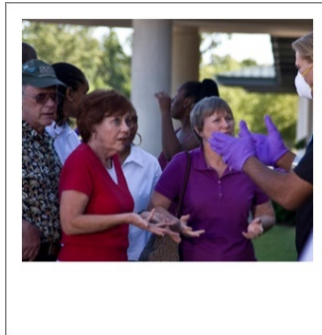
Sometimes when emotions are intense and directed at you, it is easy to forget to be

respectful. Remember to continue to speak in a respectful way. Use “please” and “thank you,” use positive language, don’t generalize or make global statements, and don’t lavish praise. Your respectful treatment gives survivors a sense of dignity and self-efficacy.

However, after trying these management strategies, if the individual becomes threatening and intimidating and does not respond to your attempts to calm him or her, seek immediate assistance.



People wait for assistance outside a community reception center. Long lines are often a source of frustration.



Even though intense emotions may be directed at you, remember to continue addressing people with respect.

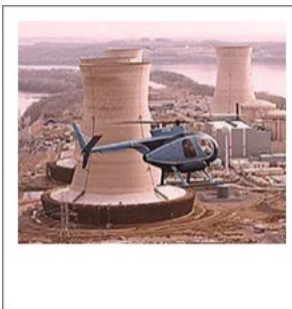


If you feel threatened or intimidated, seek assistance immediately.

Now we will return to the first-hand accounts of two radiological disasters for examples of handling intense emotions. David Houts, who was a child at the time of the accident at Three Mile Island, will share what he found most comforting as he coped with the stress of the crisis.

Then Dr. Jose Rozental, who was the director of the Department of Nuclear Installation and Materials at the Brazilian National Commission of Nuclear Energy, will discuss his interactions with victims of the Goiânia disaster.

Listen for how each manages emotions—both his own and others.



Intense emotions were observed during the Three Mile Island accident.



Media seek information at Three Mile Island.



The Goiânia disaster caused widespread psychological effects, even outside the affected area.



A photo of a child being screened for radiological contamination in the Goiânia, Brazil incident.

Video

Video Transcript – David Houts:

As a child, the most comforting thing to me during the whole incident was in fact the calm, measured response my parents had to what was unfolding. I think my pre-adolescent sense of drama was quelled a bit by the extremely measured response that my parents took. I felt like I was telling them that this was a very serious incident and they weren't taking it that seriously. Of course now I understand that they were very concerned and were putting on a brave face for my brother and I. But at the time, the orderly measured response of the adults around me really made a difference in how upset or how upset I didn't get, really, in response to all this kind of alarming news that I was hearing.

Video

Video Transcript – Dr. Jose Rozental:

I decided to visit people by my own, because my main duties going to respond to accident, but my feeling that people, even that people was not contaminated are afraid, it's very easy to understand the situation for the contaminated people that are directly involved with this accident. I decide to devote part of my time to talk with them, and I went everyday to four or five families, visiting. They were happy, offered me a chair. They look everything that I doing if I accept, if I can set in that chair, they were calm, because it was nothing. They could sit in the chair. They offered something to eat and to drink, and this was also reason for calm. It's very important, this was a lesson personally for me, because I never was involved with any such situation before. The decision was myself. I talked with my colleagues. Look, I am going to divide my responsibility, because I have to save time to go to talk to these people. This make these people more calm, emotionally more calm.

As you can see, managing emotions in a disaster can be difficult. Ideally, a disaster response team will include mental health professionals trained in disaster response who are part of the assessment, treatment, and follow-up for survivors.

However, in many locations, mental health professionals, particularly those with disaster response training and experience, may not be available, especially in the first hours or days after an event. If mental health services are not available at your location, identify community resources that may be called upon to assist survivors prior to any need. This should be part of your community's all-hazards response plan.



A volunteer assists survivors outside a community reception center.



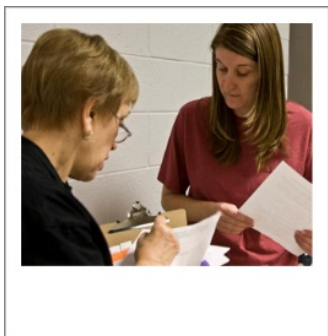
Mental health resources may be overwhelmed during a radiation disaster, which is why all responders should have some knowledge of psychological first aid.



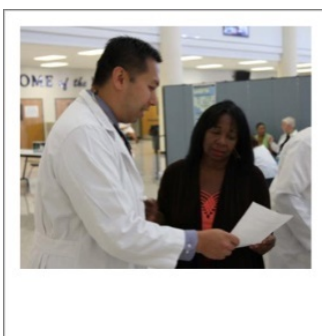
Volunteer groups, such as Medical Reserve Corps, are an important part of a community's all-hazards plan.

Sometimes you can serve the survivor best by making what is known as a referral. A referral is recommending that a survivor speak to a professionally trained expert who is more competent to handle the difficulties and complexities of their needs. As a responder, you would refer the survivor to a person in consultation with your site supervisor or the overall person in charge at your emergency location.

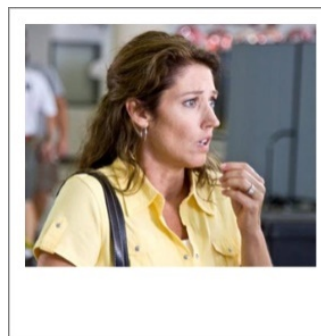
There are situations that would warrant making a referral. Three examples of extremely serious situations that would require a referral are: when a person hints or talks openly about suicide, when the possibility of child abuse exists, or when the possibility of criminal activity exists. A person appearing socially isolated or having imaginary ideas or feelings of persecution should also be referred for more care. Always refer if you feel the problem is beyond your training or capabilities.



Site supervisors can provide assistance in determining if a referral is necessary.



If a survivor's needs are beyond your training or capabilities, make a referral.

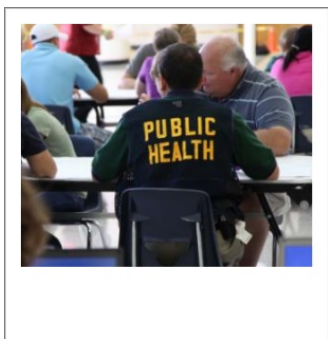


Discuss potential reasons or situations that may indicate a referral with your supervisor.

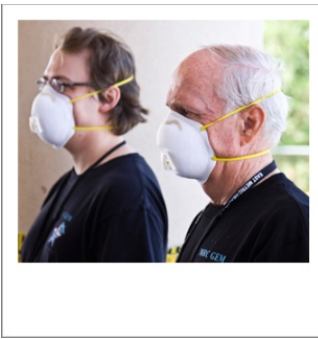
Finally, always make a referral if you are aware that the survivor is drug- or alcohol-dependent, if the person is engaging in risky or threatening behavior, or if you have difficulty maintaining real contact with the person.

You might need to seek help for yourself from a mental health professional if you become restless or confused, having negative recurring thoughts or dreams about work, or feel that you are the only one who can help. As a responder, you must take care of yourself before you can help survivors. Remember, the survivor always has the right to refuse any and all social or behavioral services including a referral.

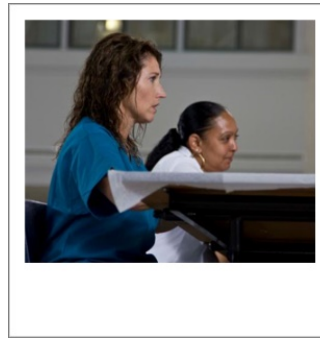
Nevertheless, all states have laws governing the commitment of individuals who are deemed dangerous to themselves or others and laws governing the protection of children. Short of these issues or the presence of criminal activity, no one can be forced to accept any services.



Remember to take care of yourself first!



You may need to refer yourself, or a colleague to a mental health professional.

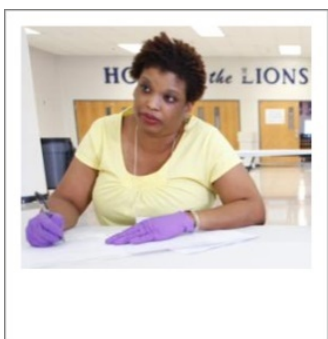


Be aware of additional mental health support services both for survivors and yourself.

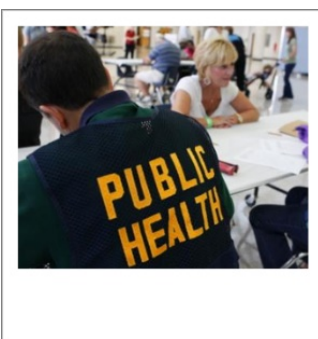
Confidentiality is a right held by the survivor and it involves information regarding the identity of the survivor and services he or she receives. Helping a person is a privileged position and builds on trust and respect. You build that trust and respect as you keep discussions you have had with survivors confidential and private.

You should not share discussed information without the survivor's consent. The exception would be if you believe the person will harm himself or herself or others, or is participating in criminal activity or if there is the possibility of child abuse.

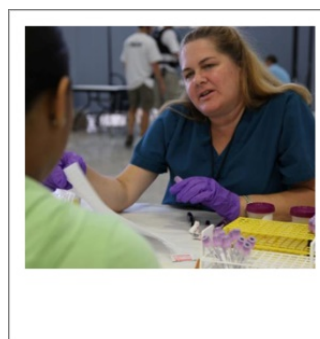
There are several important considerations when assisting survivors of radiation disasters. Social stigma, or the unwillingness to interact with persons exposed, or potentially exposed, to radiation, can reduce social supports and hinder resilience and recovery.



These workers are compiling information for a clinical registry. Registration workers should be especially aware of confidentiality issues.

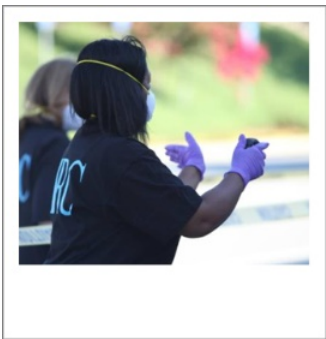


Keeping discussions with survivors private helps to build trust and respect.



A technician explains a laboratory test to a survivor. Ensuring confidentiality is critical if medical services are provided.

In addition, for some, stigma or shame is associated with receiving mental health services. This may also affect a survivor's ability to recover.



Community reception center workers direct survivors to services.



A volunteer answers questions outside a community reception center.



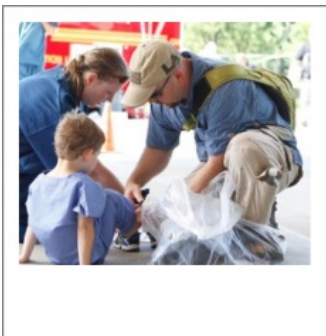
Survivors have the right to refuse social or behavioral services.

In radiological disasters, the groups who are most at risk include women with young children, pregnant women, children, first responders, evacuees, individuals with limited social support, those with a prior trauma history, and those with mental illness.

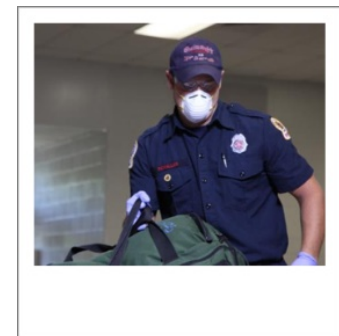
It should be noted that Emergency Medical Service professionals, fire personnel, and police officers often have extensive exposure to trauma, from which they have survived and recovered. This may give them a false sense of confidence. The scale of the disaster may be so great that their previous resilience factors may be insufficient to help them cope.

No matter the scale of the disaster, even the most experienced public safety personnel should be committed to examining themselves and peers for signs of psychological trauma.

Now that we have learned some strategies, let's see how they might be used in an actual radiation disaster.



Young children are especially at risk in radiation disasters.



Everyone working in a radiation disaster should continually examine themselves and their colleagues for signs of psychological trauma.



Emergency responders work to set up a community reception center.

Video Scenarios

The following are scenarios illustrating responses to a radiation disaster. They are designed to demonstrate principles that have been discussed throughout the program.

These fictitious scenarios take place at a health department call center, a community reception center, and a local hospital following an explosion at a local university football game. In each scenario, the appropriate level of personal protective equipment has been determined by the site safety officer. As you watch the scenarios, notice how the personnel use principles of psychological first aid to promote:

- Safety
- Calm
- Connectedness
- Self-efficacy
- Help

Video Scenarios – Introduction

Video Transcript: Jeffrey Nemhauser

[Narrator:] Hello. I'm Captain Jeffrey Nemhauser, a medical toxicologist for the Centers for Disease Control and Prevention. Townsend State University is located in a city with a population of about 600,000. Our story begins on a September Saturday, as 87,000 enthusiastic fans filled the University stadium for the season's first home football game. During the half time show a high-powered explosive device detonates near the stadium's south entrance. Police immediately evacuate people from the detonation site, as first responders provide emergency medical treatment. An assessment of the detonation site reveals elevated levels of radiation, indicating the presence of a radiation dispersal device. Rumors spread that an unknown terrorist group was responsible for the explosion. The health department quickly establishes a community reception center at the local high school to assist people who were contaminated or thought they were contaminated with radioactive materials. The health department also begins to staff hotlines to address questions from the public and health care providers. Public service announcements on television and radio encourage people who are not injured, but still feel they need help, to come to the center rather than to already overcrowded emergency departments.

EMS transports injured persons to the local hospital. The following scenes take place in various response locations: the public health department call center, the community reception center, and the hospital.

Video Scenarios – Health Department Call Center

Video Transcript:

[Narrator:] Our first scenario takes place at the Health Department Call Center following the explosion. The hotline number has been broadcast through local media, and has been given to persons leaving the Community Reception Center and the hospital. As you watch the scenario, notice how the responder uses principles of psychological first aid to promote safety, calm, connectedness, self-efficacy, and help.

[phone rings]

[Helper:] Public Health Hotline, this is Carol, how can I help you?

[Survivor:] Yeah. I want to know what's going on.

[Helper:] May I ask your name?

[Survivor:] It's Rick. Can you tell me what's going on here?

[Helper:] Well, Rick, my name is Carol and I want to help answer your questions. How can I assist you?

[Survivor:] Do you people know anything? I don't think you really know what's going on! I'm getting bogus information!

[Helper:] Rick, I want to help you. What have you been hearing?

[Survivor:] The stadium blew up and the crap got all over everything and everybody. I don't want that crap on me!

[Helper:] That's understandable. The explosion at the stadium is devastating.

Most people don't know anything about radioactive material. Were you at the game?

[Survivor:] No. I was with friends at home, we were watching the game and then we saw it happen on TV. Man, people were screaming and running everywhere.

[Helper:] Yeah, it was scary to watch. How far do you live from the stadium? [Survivor:]

About seven miles. But I work at Joe's Bar and Grill nearby.

[Helper:] Rick, since you weren't at the game, how do you think the radioactive material got on you?

[Survivor:] My friend Bob was at the game and he got it on him and he had to strip down and shower and get other clothes. And then he came back to work where I was, and we were touching the same stuff, and I don't want to get that crap on me.

[Helper:] Okay. So Rick, you think that by being around Bob and by touching the same things that Bob touched that you could get radioactive material on you?

[Survivor:] Yeah.

[Helper:] Well, I can see how you'd be concerned. It would be scary to think that could happen, but I want to give you some information that can help. Okay? Think of radioactive material as mud. Once you wash it off, it's gone. So Rick, did you say that Bob had a shower and put new clothes on?

[Survivor:] Yeah, he had to take off everything and they gave him different clothes.

[Helper:] Right, well they did that to make sure that he was clean. That he didn't have any radioactive material on him. So that means when he came back to work, there was no way that any radioactive material could get on you.

[Survivor:] You mean I can't get anything from him? I'm not crazy for worrying about this?

[Helper:] That's right, you cannot get any radioactive material on you and you're not crazy.

[Survivor:] That's a relief. I thought I was going nuts.

[Helper:] Rick, this is a tragic event. Have you been able to talk with any family and friends about what happened?

[Survivor:] No, not really. I have family out of town, and friends have been calling, but I haven't called them back yet. I had too much on my mind.

[Helper:] That's understandable. Well look. Maybe when you're ready you can call some of your family and friends and you can talk to them a little bit about what's been going on.

[Survivor:] Okay. That's a good idea.

[Helper:] Well, Rick, do you have any other concerns or questions? [Survivor:]

Did we catch the people that did this to us?

[Helper:] No, the suspects have not been found, but the local and state police are on the case. Now they have the FBI involved. Very soon we are going to find who is responsible for this.

[Survivor:] Hmmmm...

[Helper:] Well, Rick, if you don't have any other questions I'd like to ask you a couple. [Survivor:]

Yeah. Sure.

[Helper:] What have you been doing to deal with the stress?

[Survivor:] Well, I have been glued to the TV, watching all latest news on the bombing, and honestly I've been drinking some.

[Helper:] Rick, we've found that spending time with family and friends really helps reduce stress. Drinking alcohol and constantly watching the news coverage does not.

[Survivor:] I hear you.

[Helper:] I just wanted to leave you with a couple of thoughts. I will be here from ten to six for a week. Please feel free to call me if you should have any questions. You can also go to our website if you want to learn more about radioactive material.

[Survivor:] Thanks. I appreciate it.

[Helper:] Well, whenever you call, someone will be at that number. We have some good people here to talk with you. Remember that none of us are experts on how to handle a shock like this in our lives. Sometimes it's helpful just to bounce your thoughts off someone else who's had training in the subject.

[Survivor:] You know, it's really been good talking with you. You've been helpful.

[Helper:] No problem. You just keep taking care of yourself, okay? You can call us if you have any questions.

[Survivor:] Thanks.

[Helper:] Okay. Bye-bye.

Video Scenarios – Community Reception Center

Video Transcript:

[Narrator:] The following scenario takes place at the Community Reception Center. When the explosion occurred, Mary Smith, a single mother of two, was walking in her neighborhood near campus. Her children were on the TSU campus attending a weekend science camp. Mary has been advised to report to the Community Reception Center at the local high school, and has been informed that her children will be brought there as well. As you watch the scenario, pay attention to how everyone at the Community Reception

Center utilizes psychological first aid.

[Greeter:] Hello ma'am. My name is Joe. I work with the health department. May I ask your name? [Mary:]

My name is Mary.

[Greeter:] Mary, are you feeling okay?

[Mary:] I'm not hurt, I'm just really worried. My kids were at the TSU science camp. Do you know where they are, because I was told they would be here.

[Greeter:] Mary, I understand you're concerned about your children. I've gotten reports that Emergency Medical Services are there, and they're trying to get everyone on a bus who was on campus and bring them here.

[Mary:] What is this reception center? What's going to happen to me?

[Greeter:] We have devices here that can detect radiation. If you have any radioactive material on you, we will clean it off. Mary, have you had a shower or changed clothes?

[Mary:] No, I've been looking for my kids! Somebody told me that they were here.

[Greeter:] If I hear anything further about your kids, I will let you know. Mary if you could just go through the doors to the line inside, we will get you checked out.

[Mary:] Thanks.

[Greeter:] Thank you, Mary. Next? [Woman:] When can we get in-- (trails off)

[Surveyor:] Could you step forward please? Thank you. If you could stop right here. You may proceed on, thank you. Hey, ma'am. If you could just step forward, please. Thank you. Just stop right about here, please. [radiation monitor beeps]

[Surveyor:] Ma'am, could I ask you to step back please?

[Mary:] What's happening? Why is that beeping? What's wrong with me?

[Surveyor:] Ma'am, our monitor has indicated that you have some contamination that needs to be removed. If you could go with Susan, she will walk you over to the wash station and explain what to do.

[Mary:] Are you serious?

[Susan:] Hello, my name is Susan, and I am a volunteer with the Health Department. What's your name?

[Mary:] It's Mary. What's going on? Am I going to be sick?

[Susan:] I want to explain what's going to happen next and answer all of your questions. Your concern is perfectly understandable. The monitor indicated that you have some contamination on you, so we're going over to the wash station where you will be asked to shower.

[Mary:] What? Why?

[Susan:] Well, think of radiation contamination as if it were mud. You can wash off the contamination with soap and water, just as you can wash off mud. In case any of the contamination got on your clothes, we'll give you some clean clothes to put on, and then we'll check you again for contamination.

[Mary:] What about my handbag? Because all my kid's information is in here... [Susan:]

You may keep your handbag, and we'll give you a moist wipe to clean it off. [Mary:] Okay.

[Susan:] Are you from around here, Mary?

[Narrator:] Communicating instructions clearly and calmly is an important part of psychological first aid. When using unfamiliar equipment, such as radiation survey instruments, explaining what the equipment does and why it is being used can help provide the public with a level of comfort. If you are wearing personal protective equipment, such as a mask, communicating with people can be difficult. Remember to speak slowly in simple, concrete terms, and be ready to repeat and clarify information as many times as is necessary. Address people directly. By showing interest and calm concern, you will be most helpful to people who may be feeling overwhelmed. To help orient people to disaster response activities, provide information about what is being done, what is known about the event, and what services are available to help, what they should expect may happen next.

[Surveyor:] That looks very good. Now if you'll just step through that door right over there, okay? Hello. My name is Bob. Now what I'm going to do with this device is I'm going to scan you for any radioactive material. We're going to make sure there's no contamination left on you. Okay?

[Mary:] Okay.

[Surveyor:] Would you put your purse down, please? Well, looks like you got all the contamination off at the wash station.

[Mary:] That's some good news.

[Surveyor:] What I'm going to ask you to do now is step over to the registration area. The folks there will collect some information from you just in case we want to get in touch with you later, okay?

[Mary:] Okay. When I see my kids, is it okay if I hug them? I mean, am I gonna make them sick?

[Surveyor:] Well, I can understand your concern. It would be very scary to think that you could make your children sick. Let me explain what's going on, all right? When you walked through the monitor the first time, it indicated that you had some level of contamination. So, we had you shower and change clothes at the wash station. Now this monitor clearly indicates you're no longer contaminated. You cannot contaminate anybody. So if you want to give your kids a great big hug, that'd be fine. Only after they've been checked out, okay?

[Mary:] All right, well that's a relief. Do you know when they're gonna get here, because they were on the campus?

[Surveyor:] That I do not know, but I do know the people in registration area are staying in constant contact with the local responders. Hopefully they will have some information for you, okay?

[Mary:] Okay.

[Surveyor:] All right, you can just go right through that door. [Mary:]

Okay.

[Surveyor:] Right through there.

[Registrar:] Hello ma'am, have a seat. My name is Tony. We're collecting some contact information in case we need to get in touch with you later on. Could I please get you to fill out this form?

[Mary:] I can't believe you're asking me to fill out all this paperwork now. I can barely think! Where are my children? I demand to know now!

[Registrar:] Ma'am, I understand that you're upset--

[Mary:] I want to see your supervisor. I'm not filling anything out until I see my children! I got stripped down, showered, put into these awful things on, and now you want me to fill out forms?

[Registrar:] I know this is a scary situation, and I know that you are worried about your kids. Were they at the game?

[Mary:] No! They were at the science camp, and I keep asking people when are they gonna get here and nobody will answer me!

[Registrar:] We just got a report from the first responders that the buses carrying the kids from the science camp have left the college and they're on the way here.

[Mary:] Well, how long until they get here?

[Registrar:] We anticipate their arrival in about 35 minutes, but it could take a little bit longer. The roads are busy and there's a lot of debris.

[Mary:] Are they okay?

[Registrar:] They wouldn't be brought here if they were injured. The camp counselors are with them now, and are gonna remain with them as they go through the reception center. Now if you choose, you can wait in the family reunification area.

[Mary:] Do I have to?

[Registrar:] No. If you'd like, you can exit the reception center and meet your kids and go through back through with them. But if you do choose to go back through, you may risk some additional contamination. It's your choice.

[Mary:] I'm not sure that I understand what you're saying. What's gonna happen to my children? Where are they gonna go?

[Registrar:] They are gonna go through exactly the same process that you went through. We want to make sure if they have any radioactive material on them; that we get it off. Now, is there anything I can do to make this a little bit easier for you so you can complete this form for me?

[Mary:] No. Thanks. I'm sorry that I yelled. It's just with the explosion, and my kids were so close, and this is very overwhelming.

[Registrar:] Well, having emotions and reactions are perfectly normal, especially since you're not with your kids right now. Now, when you leave here, we're gonna give you a brochure. It's gonna have some information about radiation. It's gonna have a contact number for the health department, and you can contact that number anytime between 7am and 7pm and they'll be able to answer all the questions that you may have.

[Mary:] Okay. All right. Here's your form. Is it all right if I go over there and call my sister and let her know I'm okay?

[Registrar:] Oh absolutely. You should contact friends and family for support. I'll be sure to let you know when your kids arrive.

[Mary:] Okay.

[Registrar:] And if you have any needs or any questions, just any staff member in the family reunification area. Okay?

[Mary:] Okay. Thanks.

[Narrator:] Notice that none of the reception center workers made promises to Mary that they would be unable to keep. Notice, too, that the workers used non-verbal strategies to communicate calm. Workers kept open postures, kept their arms and legs uncrossed, and they leaned forward, maintaining eye contact with Mary. Workers were attentive to what Mary was saying, and answered her questions before delivering the information they needed to communicate. If you have mental health professionals available to work within the community reception center, consider placing them strategically throughout the center. However, everyone working in the community reception center should have some training in psychological first aid.

Video Scenarios – Hospital

Video Transcript:

[Narrator:] The following scenario, which takes place at the local hospital, is taken from the Centers for Disease Control and Prevention's "Just in Time Training Video for Hospital Clinicians." It illustrates the importance of dealing with psychological needs as well as medical needs. Remember that life-saving care takes priority over treatment of any radiation exposure or contamination.

[Patient:] Help me! I'm covered in radiation! Someone help me please!

[Nurse 1:] Okay, calm down. You're going to be all right. But we have to help you so you have to calm down first so we can help. Come with me. We need to wash this dust off. Okay? Come on. Are you hurting anywhere?

[Patient:] No, I was inside during the explosion, but afterwards I came out and I walked through this cloud of dust. Everybody's saying that it's radiation! I've been breathing this stuff in! Please help me. I'm really scared!

[Nurse 1:] We will, we will. We're going to get the contamination off and you'll be fine. Okay?

[Nurse 2:] Okay, sir, please put your valuables in this red bag. Then take this white gown and put it over your clothes. I'm going to have you undress underneath the gown and put your clothes in this orange bag. Then you're going to go through the shower. I want you to scrub well especially where you had no clothes covering your body. Someone will help you on the other side.

[Patient:] Okay. Okay. [Nurse 3:] Are you okay, sir?

[Patient:] I'm worried. Look, there's radiation in this stuff, isn't there?

[Nurse 3:] You're going to be all right. I know this is very upsetting. We need for you to walk over to our staff member over here. They're going to survey your body and make sure the contamination is gone. Then they're going to take you to another area where other staff members will talk to you about all of this and about radiation.

[Narrator:] Note that even in the stressful atmosphere, the hospital staff remained calm, and communicated calmly to the patient. This can go a long way in helping diffusing a stressful situation. Managing emotions in a disaster can be difficult, but respectful and calm treatment gives people a sense of dignity and self-efficacy. The staff also actively engaged with the patient, and used task-oriented language to explain what was happening. Remember that staff may

also have questions that require a degree of psychological first-aid. (End of Scenarios)

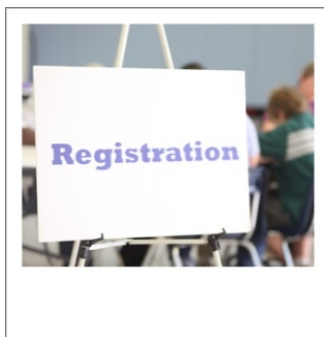
Conclusion

As we conclude Psychological First Aid in Radiation Disasters, let's summarize what we have covered.

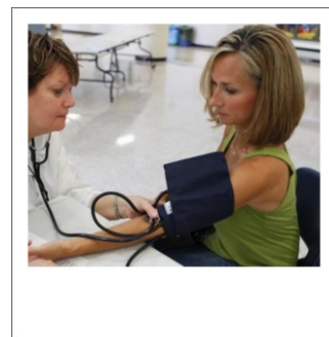
You have learned the unique concepts regarding mental health preparedness for radiological disasters. In radiation disasters, we learned that population monitoring and registry are key roles for public health. People have an intense fear of radiation, which can intensify the psychological response. Therefore, monitoring and treating the mental and physical symptoms of survivors is vital for short and long-term health. The social stigma experienced by victims in radiological disasters increases their need for services and makes response and recovery difficult. One of the most significant aspects of major radiological disasters is the long-term effect of radiation on the individuals and the environment.



Responders prepare to decontaminate survivors.



Registration is a key component of population monitoring.

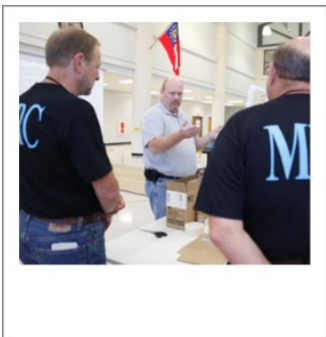


Clinicians may be asked many questions regarding long-term health effects after a radiation disaster.

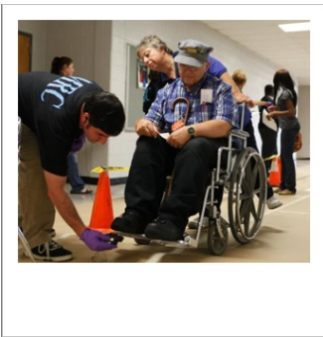
Finally, you are vital in the response to a disaster event! You can make a difference in a disaster as you are aware of the physical and psychological consequences of survivors. You can make a difference as you prepare yourself by anticipating survivors' normal stress reactions and their natural resilience. And you can make a difference as you anticipate your own emotional and physical responses to disaster, and those of other responders.

We hope that the lessons we have shared from past radiation incidents will raise your awareness of the importance of incorporating a mental health component into your preparations for disasters, and particularly for a radiation emergency.

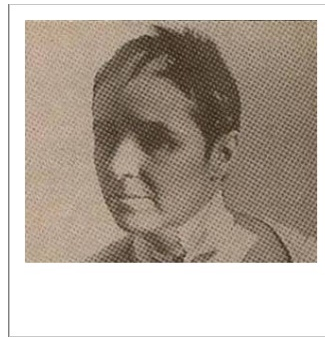
Dr. Luiz Bertelli was working as an Internal Dosimetrist during the radiation disaster in Goiânia. He talks about how important it was for the response community to pull together:



Volunteers prepare to use radiation detection equipment.



A community reception center worker performs a survey to check for contamination.



A photo from a newspaper covering the Goiânia disaster.

Video

Video Transcript – Dr. Luiz Bertelli:

We were not specialized or not ready, let me say, for a major emergency event like that, but everybody knew that it was very important. People that were not there, the laboratory was composed by a few people, less than ten, but we multiplied ourselves to one hundred, because we had to attend. We knew the lives were in there, and it called for our duties. That was like a soldier. We didn't think about anything, and people gave everything they could, but the rewarding thing is that you could see that your work was being used. You know you're really helping all that.

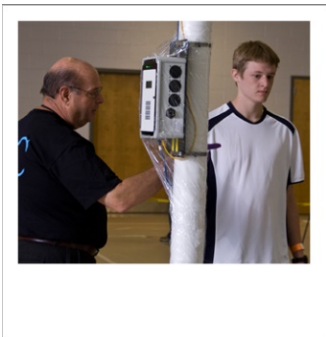
Thank you for your time and attention to this important topic. We hope that you now have a greater awareness of the specific psychosocial consequences of radiological disasters. And beyond this awareness, we hope that you see ways that you can plan for, and respond to, the mental health needs of disaster survivors and first responders.

This program doesn't conclude here. We have selected additional resources for you to learn more about radiation and how you and your organization can prepare for radiation emergencies.

We encourage you to complete the recommended training on topics, such as developing psychological first aid skills, learning about the special needs of children and other populations, and caring for first responders. This is not an easy topic to engage in, so we commend you for taking this first step and encourage you to continue learning about this important topic.

If you have questions or suggestions, please contact the Radiation Studies Branch at CDC. Our Web address, phone, and e-mail contact information are provided in the resources section.

Again, thank you for your participation in this program. Please remember to complete the test at the end of the program.



A survivor walks through a portal monitor. Portal monitors are another way to detect contamination.



A community reception center worker performs a survey to check for contamination.



Law enforcement provides security outside a community reception center.

Test

The following is a ten-question, multiple choice test, based on the information contained in this program. There are four possible answers for each question.

After reading the question and answers, click on the answer you think is correct. If your answer is incorrect, you may try again until the correct answer is selected.

Instructions: Read each statement, and check the correct response.

1. **Research has shown that post-traumatic stress disorder for workers and volunteers who respond to disasters by can be reduced by:**
 - a. Hiding their emotions from victims
 - b. Resisting the urge to personalize victims
 - c. Engaging in disaster preparedness training
 - d. Limiting contact in disaster situations
2. **The psychological consequences of radiation disasters are different from natural disasters due to:**
 - a. Killing and injuring more people
 - b. Undermining the sense of safety and security of the whole community
 - c. The public's intense fear of radiation
 - d. The potential of a delayed illness
3. **In a radiation disaster, public health will be involved in:**
 - a. Population monitoring to screen people for radioactive contamination
 - b. Setting up triage at the disaster site

- c. Psychological profiling
- d. Establishing a genealogical record of exposed victims

4. The groups who are at greatest risk in radiation disasters are:

- a. Middle-aged men due to increase risk of prostate cancer
- b. Children, pregnant women and women with young children
- c. Homeless
- d. Elderly

5. When using psychological first aid, first responders should first and foremost:

- a. Get them an internal screening
- b. Get the person to actively engage with you
- c. Provide legal aid
- d. Encourage people to meet their own needs

6. When offering psychological first aid, the types of things you should not do are:

- a. Force people to share their stories with you
- b. Promote a sense of safety
- c. Establish a relationship
- d. Listen to people who wish to share their stories

7. An effective strategy for dealing with a survivor who exhibits intense emotions is:

- a. Asking many questions
- b. Hold your ground and do not back down
- c. Come to an agreement about something
- d. Diverting their attention by having them fill out forms

8. When using psychological first aid, you aid people in giving them back a sense of control in their lives by:

- a. Insisting they take care of themselves

- b. Give them task-oriented activities
- c. Finding out types and locations of services provided
- d. Giving them practical suggestions that steer them toward helping themselves

9. Social stigma or the unwillingness to interact with persons exposed or potentially exposed to radiation can reduce a survivor's:

- a. Willingness to learn
- b. Social support from family and friends
- c. Initiative
- d. Short term physical symptoms

10. Survivors may sometimes be best served by:

- a. Making a referral to a competent professional
- b. Asking survivors if their affairs are in order
- c. Being treated for internal contamination
- d. Isolating survivors from each other

Answers

The answers to the above test questions are provided here with a link to the rationale located in the program text.

Answer 1

Correct answer: c.

Introduction

Research has shown that disaster preparedness training, along with other interventions, can reduce the risk of post-traumatic stress disorder for workers and volunteers who respond to disasters.

Answer 2

Correct answer: c.

Overview of Radiological Disasters - Definition

Radiation disasters are unique in large part due to the public's intense fear of radiation.

It is also unfamiliar and not well understood by the general public. Even common

radiological medical procedures are often referred to in terms that mask any reference to radiation.

Answer 3

Correct answer: a.

Overview of Radiological Disasters – Public Health Role

In a radiation incident, public health may be involved in population monitoring to screen people for internal and external radioactive contamination and, in some cases, to determine the dose received.

Answer 4

Correct answer: b.

Psychosocial Reactions to a Radiological Disaster – At Risk Groups

The groups who are most at risk following a radiological disaster are children, pregnant women, and mothers with young children.

Answer 5

Correct answer: b.

Psychological First Aid in Radiological Disasters – Steps

As a first responder in a radiological disaster, there are several steps you can take in providing psychological first aid to survivors. First and foremost, you must get the person to actively engage with you.

Answer 6

Correct answer: a.

Psychological First Aid in Radiological Disasters – Steps

First and foremost, do not force people to share their stories with you. It can re-traumatize them. They will offer to share their story when they are emotionally able and ready to share it with you.

Answer 7

Correct answer: c.

Psychological First Aid in Radiological Disasters – Managing Emotions

Intensely emotional survivors often feel they are not being heard. You can de-escalate the situation by finding something you can agree on.

Answer 8

Correct answer: d.

Psychological First Aid in Radiological Disasters - Steps

Self-efficacy is the sense of power or control people feel they have. Often a disaster strips individuals' sense of personal control. You can help by "giving" control back or empowering survivors. You can do this by giving them practical suggestions that steer them toward helping themselves and by engaging survivors in meeting their own needs.

Answer 9

Correct answer: b.

Psychosocial Reactions to a Radiological Disaster – At Risk Groups

When we consider radiation disasters, the consequences include stigma from community and family members, leaving survivors with a loss of social supports that are vital to resilience and recovery.

Answer 10

Correct answer: a.

Psychological First Aid in Radiological Disasters – Managing Emotions

Sometimes you can serve the survivor best by making what is known as a referral. A referral is the act of recommending a person speak to a professional who is more competent to handle the difficulties and complexities of the survivor's needs.

Glossary

Conference of Radiation Control Program Directors (CRCPD): an organization whose members represent state radiation protection programs. For more information, see the CRCPD website: <http://www.crcpd.org>.

Contamination (radioactive): the deposition of unwanted radioactive material on the surfaces of structures, areas, objects, or people where it may be external or internal. See also decontamination.

Decontamination: the reduction or removal of radioactive contamination from a structure, area, object, or person.

Dirty bomb: a device designed to spread radioactive material by conventional explosives when the bomb explodes. A dirty bomb kills or injures people through the initial blast of the conventional explosive and spreads radioactive contamination over a potentially large area—hence the term "dirty." Such bombs could be miniature devices or large truck bombs. A dirty bomb is much simpler to make than a true nuclear weapon. See also radiological dispersal device.

Dose (radiation): the amount of radiation absorbed by a person's body.

Exposure (radiation): a measure of ionization in air caused by x-rays or gamma rays only. The unit of exposure most often used is the roentgen. See also contamination.

External exposure: exposure to radiation outside of the body.

Geiger counter: a radiation detection and measuring instrument consisting of a gas-filled tube containing electrodes, between which an electrical voltage but no current flows. When ionizing radiation passes through the tube, a short, intense pulse of current passes from the negative electrode to the positive electrode and is measured or counted. The number of pulses per second measures the intensity of the radiation field. Geiger counters are the most commonly used portable radiation detection instruments.

Prenatal radiation exposure: radiation exposure to an embryo or fetus while it is still in its mother's womb.

Radiation: energy moving in the form of particles or waves. Familiar forms of radiation are heat, light, radio waves, and microwaves. Ionizing radiation is a very high-energy form of electromagnetic radiation.

Radioactive contamination: the deposition of unwanted radioactive material on the surfaces of structures, areas, objects, or people. It can be airborne, external, or internal. See also contamination, decontamination.

Radioactive material: material that contains unstable (radioactive) atoms that give off radiation as they decay.

Radiological or radiologic: related to radioactive materials or radiation. The radiological sciences focus on the measurement and effects of radiation.

Radiological dispersal device (RDD): a device that disperses radioactive material by conventional explosive or other mechanical means, such as a spray. See also dirty bomb.

Resources

The following topics can deepen and broaden your understanding of mental health preparedness in radiation disasters:

Psychological First Aid Training

Psychological and Behavioral Issues Healthcare Providers Need to Know when Treating Patients Following a Radiation Event

Disaster Response Education and Training Project, Center for the Study of Traumatic Stress: A Program of Uniformed Services University, Bethesda, Maryland

https://www.cstsonline.org/assets/media/documents/CSTS_issues_radiation%20event.pdf

Psychological First Aid: A Field Operations Guide

Brymer, M., Jacobs, A., Layne, C., Pynoos, R., Ruzek, J., Steinberg, A., Vernberg, E., and Watson, P. (July 2006). Psychological First Aid: Field Operations Guide, Second Edition.

<http://www.ptsd.va.gov/professional/manuals/psych-first-aid.asp>

Substance Abuse and Mental Health Services Administration (SAMHSA)

<http://www.samhsa.gov>

Radiation Emergency Training and Information

Centers for Disease Control and Prevention, Radiation Studies Branch

<http://www.emergency.cdc.gov/radiation>

rsbinfo@cdc.gov

Conference of Radiation Control Program Directors

<http://www.crcpd.org/>

Oak Ridge Institute for Science and Education Radiation Emergency Assistance Center/Training Site

<http://orise.ornl.gov/reacts/>

Armed Forces Radiobiology Research Institute

<http://www.afri.usuhs.mil/>

U.S. Department of Health and Human Services Radiation Event Medical Management

<http://www.remm.nlm.gov/>