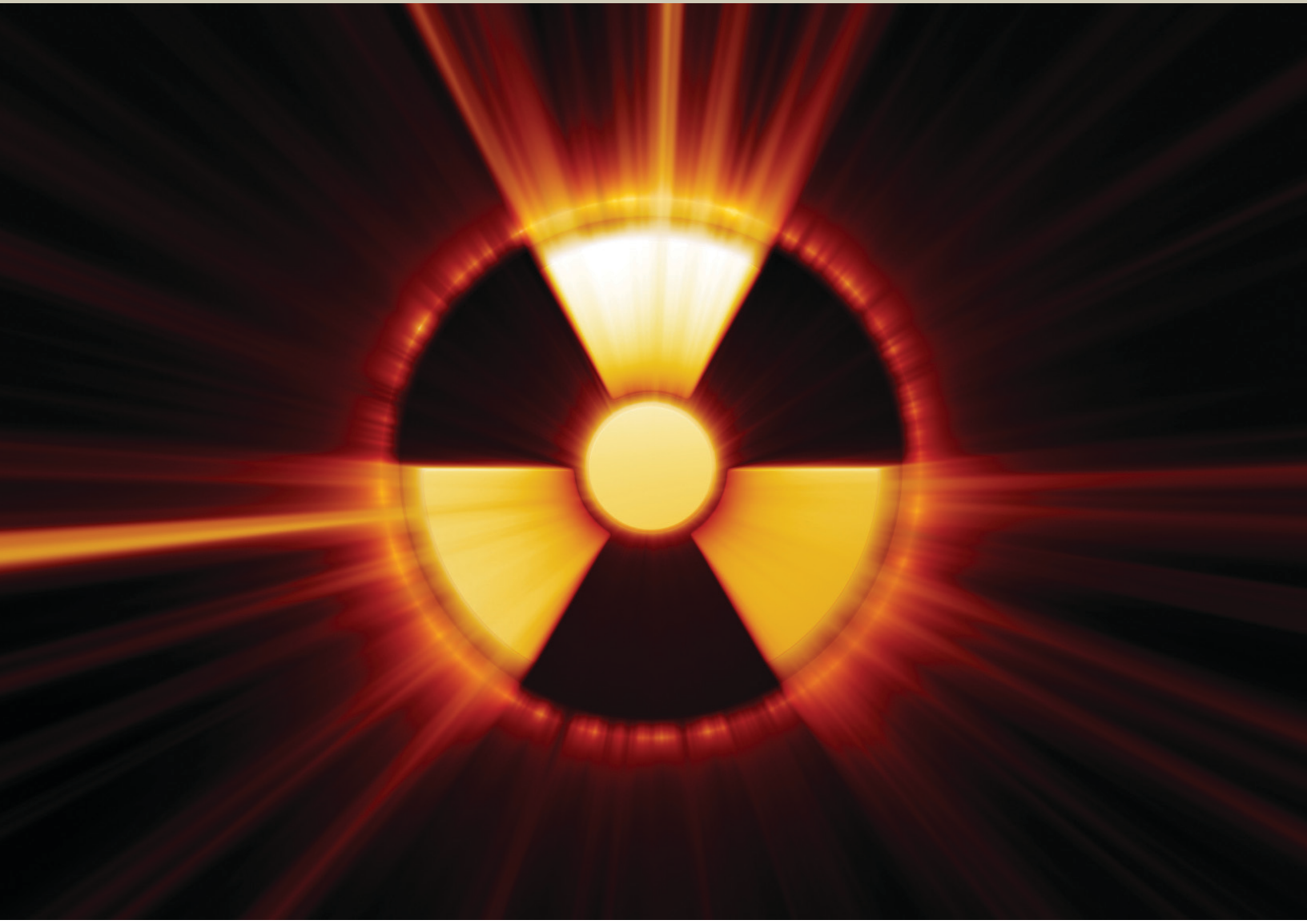
Disaster Mental Health:
Assisting People Exposed to Radiation



Instructor Manual

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Acknowledgments

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Note to Instructors

Many disaster mental health professionals are unfamiliar with the concepts taught in this module that are specific to radiation events. Public health professionals may have completed basic training modules related to surge capacity and the medical aspects of radiation exposure, but are unlikely to have considered the psychosocial consequences. Therefore, much of this information may be quite new to your participants.

Because we anticipate that many participants will be unfamiliar with this topic, we have provided more extensive background information in this manual than is typically offered to seasoned instructors. We do not expect that you will provide all of this information within the time allotted for the workshop, but rather have included it to assist you in familiarizing yourself with the topic. It may be helpful for you to review the more technical aspects of this module several times in order to feel comfortable that you have sufficient background knowledge to be able to respond to participants' comments and questions.

This topic may raise anxiety in participants, just as it raises anxiety in the general public when we consider the potential consequences of radiation events. As always, a skillful instructor will gauge the reactions of the participants and adjust the depth and intensity of the material accordingly. It may be important to leave more opportunity for questions, discussion, and processing, allowing time for participants to absorb the material and consider how they will apply it to their respective functions. Participants' needs for processing the material, however, will need to be balanced with the time allotted for the training, as well as consideration of the fact that it is an awareness level training, so skill development is not expected. Please use your judgment and skill in determining whether the exercise section needs to be abbreviated or modified in some way, or other modifications of the material need to be made in order to maximize the participants' ability to achieve the learning objectives.

Thank you!

PROGRAM OVERVIEW

"Fear has powerful public health implications."
(Gray & Repeik, 2002)

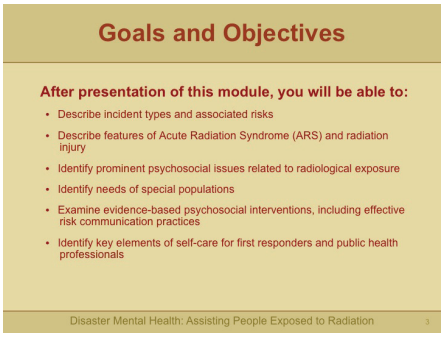
This quote incisively summarizes the central aspect of psychosocial issues related to the public response to potential radiation exposure: fear. Whether the source is related to concern over toxic waste at Superfund sites, the long-term anxieties of communities affected by accidents at nuclear plants, or the ongoing threats of "dirty bombs" or attacks on nuclear sites as implements of global terrorism, the public has developed a deeply held fear of exposure to substances that can cause "invisible" harm – not simply over a lifetime but over generations (U.S. Environmental Protection Agency & Agency for Toxic Substances and Disease Registry (ATSDR), 1999; US Department of Health and Human Services and ATSDR, 1995; Center for Study of Traumatic Stress (CSTS); Becker, 2004).

Although the threat of radiological terrorism is not new, it has received increased federal and media attention since the terrorist attacks of September 11th, 2001. Apprehension about the possibility of further attacks, which may include biological, chemical, or radiological weapons, remains a primary concern of the public preparedness system. The threat of radiological exposure from terrorist attacks poses unique challenges for this system because of the unconventional form of such attacks; this lack of knowledge serves to accentuate public fear. Adding the potential for nuclear accidents raises public apprehension about the risk of exposure to toxic substances that are neither visible nor avoidable in such circumstances. Increasing the knowledge base of public health professionals about the probability, effects, and consequences of such events will contribute to an organized response that will serve to calm fear and reduce panic should such events occur.

Training Program Goals/Objectives (Participant Competencies)

After presentation of this module, you will be able to:

- Describe the different types of events and risks associated with radiological exposure
- Describe features of Acute Radiation Syndrome (ARS) and radiation injury
- Identify the prominent psychosocial issues related to radiological exposure
- Identify needs of special populations
- Examine evidence-based psychosocial interventions for these events, including effective risk communication practices
- Identify key elements of self-care for first responders and public health professionals



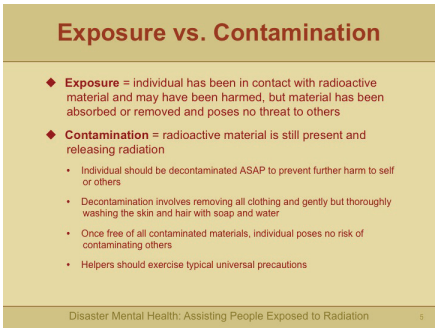
- Introduce yourself and provide a brief background of your qualifications.
- Ask participants to state their names, their professions, their experience in disaster response if any, and their primary reason for taking the training.
- Explain the role of the instructor comments in the margins of the Train the Trainer manual version.
- Encourage participants to take an active learning approach and to ask questions or contribute comments throughout the course.
- Solicit questions from participants about what is planned and expected.

- Emphasize that understanding the difference between exposure and contamination is critical to assisting people with their psychosocial reactions, as much of the general public will misunderstand the differences between these consequences.
- If all participants are already familiar with the difference between exposure and contamination you may move through this section quickly, but do be sure the distinction is clear to everyone.

RADIOLOGICAL INCIDENT OVERVIEW

Radioactive materials have many important and legitimate uses in industry, food treatment, research, and in particular, in healthcare facilities. While exposure to dangerous levels of radiation is possible through miscalibration of equipment, mishandling of materials, or transportation accidents, these cases are rare and their impact is typically limited to one individual or a small number of people. Therefore, this training will focus on the incidents with the most potential for mass casualties and even wider psychological impact: radiological terrorism and nuclear accidents. The training will focus primarily on addressing the mental health needs of survivors and responders following exposure to radiation, but because these events are so outside of the realm of typical experience for most healthcare workers and mental health professionals, we will begin with a brief overview of the various dispersal devices and the physical impact each is likely to produce before moving on to their mental health effects. For more detailed materials on these physical effects, please refer to the resources listed in Appendix B.

Before proceeding to specific event types, it is essential to understand the two primary ways radiation may impact us: exposure and contamination.



Radiation Exposure vs. Radioactive Contamination

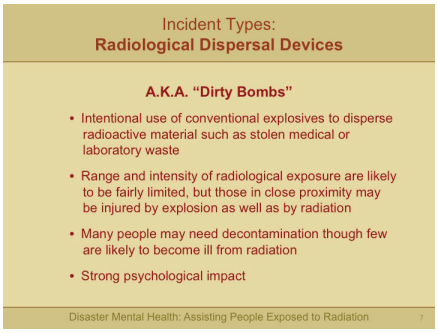
Ionizing radiation is typically invisible and odorless, and can only be detected using specialized equipment. This presents two opposing threats: First, people may be exposed to radiation without realizing it, increasing the dose received and/or delaying treatment. Alternatively, if a release of radiation is known or suspected, helpers may unnecessarily avoid entering impacted areas out of exaggerated fears of the amount of material present. In particular, emergency responders and healthcare workers may hesitate to treat people who have been exposed to radiation out of concerns for their own safety, so responders must be educated about the difference between exposure and contamination – and the minimal threat presented to helpers by either.

Basically, **exposure** means that a person has come close enough to radioactive material to have received a possibly harmful dose of radiation, but the energy has been absorbed by that person or removed and presents no threat to anyone

else – just as someone who has received a sunburn can't pass it on to others. **Contamination** means that the radioactive material (typically in the form of dust) is still present on the patient's skin or clothing, in body orifices (ears, nose, mouth) or wounds, or internally (via damaged skin, inhalation, or ingestion). Internal contamination should be assessed at a medical facility and treated if extensive; precautions must be taken in handling body fluids from internally contaminated people as these may expose others to radiation.

If a patient has been externally contaminated with radioactive dust, it is important to decontaminate them as soon as possible to limit their own period of exposure, to help them avoid ingestion or inhalation of material, and to avoid having them contaminate ambulances, emergency departments, and disaster responders and others in contact with the contaminated individual. The word decontamination may elicit images of being scrubbed down with harsh chemicals, but that is far from the truth. Since the goal is simply to remove any remaining radioactive materials, the process generally involves no more than removing all clothing and gently but thoroughly washing the skin and hair with soap and water. If possible, clothing should be stored in a sealed container for later assessment of how large a dose of exposure was received. People in contaminated areas (helpers as well as survivors) should not eat, drink, or smoke anything to avoid ingesting radioactive materials, and should use a mask or hold a tissue or damp cloth over the mouth and nose to prevent inhalation.

Even before decontamination, the amount of radiation contaminated survivors might expose others to following a dirty bomb or from fallout after a nuclear accident typically would present little serious threat, so healthcare workers need take only universal precautions before treating any urgent physical needs. And once patients are free of radioactive substances, they create absolutely no risk to anyone else. In other words, patients may experience health effects from their own exposure, but if they were never contaminated or have been decontaminated, they do not become radioactive themselves and they pose no danger to helpers (Karam, 2003). Therefore, emergency responders and medical professionals should take care not to inflict a "second assault" by withholding attention or taking unneeded measures that delay care or increase patient anxiety.



- In cases of an RDD, contamination, rather than exposure, is the most prominent concern.

Radiological Event Types

The malevolent use of radioactive material can be divided into three distinct types: radiological dispersal devices, radiation exposure devices, and nuclear weapons. Nuclear accidents can also cause widespread harm and distress.

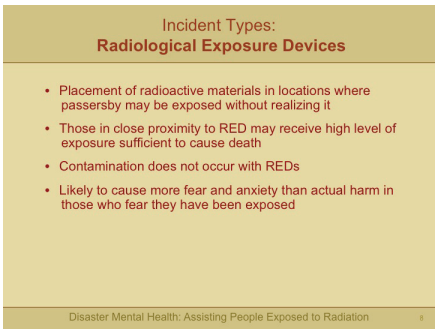
Radiological Dispersal Devices

The most likely form of intentional release of radiation would come through Radiological Dispersal Devices (RDDs), commonly referred to as "dirty bombs." According to the US Department of Homeland Security, a dirty bomb would use a conventional explosive device to disperse radioactive material such as stolen medical or laboratory waste. Alternatively, RDDs could include the use of airplanes, or material could be spread by hand, such as simply emptying a container over the targeted area or depositing materials into a building's ventilation system. The goal of RDDs is to distribute radioactive material in the form of a fine powder, a liquid mist, or a gas, thereby contaminating the bodies and clothing of people in the area. Usually an explosive device will have the potential to spread the material over a larger area initially than manual dispersal. However, delayed discovery of covert contamination via a non-explosive RDD could result in significant distribution of the radioactive material beyond the initial release site.

Construction of an RDD with a commonly used radioactive source is not difficult. They can be made using lower-radioactivity sources such as those in nuclear medicine clinics, or by using higher-radioactivity sources such as those used in industrial radiography or in radiation oncology clinics. However, it is difficult to disperse such materials widely at high enough levels to cause significant exposure, so the effects of an RDD would likely be localized to an area from blocks to, at most, miles – in contrast with the fallout from a nuclear detonation, which could theoretically spread for hundreds of miles. Levels of exposure would generally be low, but people may require decontamination from radioactive material – an unfamiliar and threatening experience that is likely to cause confusion and distress. Therefore, the impact of an RDD would be largely psychological, sowing fear in those who believe they have been exposed and disrupting the lives of those in the immediate area.

Radiological Exposure Devices

A Radiological Exposure Device (RED) directly exposes people to ionizing radiation, most likely gamma radiation, emitted by the radioactive material. REDs involve the placement of radioactive materials in locations where passersby may be exposed without realizing it. For example, materials could be concealed under a train seat or in a park or shopping mall. The radioactive material in an RED could be in any form, including sealed sources used for medical and industrial applications, and little preparation is required other than removal of the shielding. Depending on proximity to the source, the length of the exposure, and the portion of the body exposed, it is possible that people could receive a life-threatening dose of radiation from an RED, but since the material remains in one place and is not dispersed, decontamination would not be necessary. Like RDDs, this method is likely to cause anxiety in far more people than the number who are actually physically impacted.



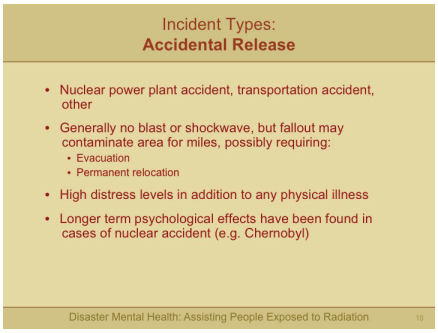
Nuclear Blast

The damage that would be caused by a nuclear blast would be exponentially more severe and widespread than any possible impact an RDD could have. As Harvard University nuclear terrorism expert Graham Allison puts it, "the difference between a dirty bomb and a nuclear bomb is like the difference between a lightning bug and lightning." (That is not to minimize the possible psychological and physical results an RDD could produce, simply to emphasize how much more devastating a nuclear blast would be.)

A nuclear blast is not merely a powerful explosion, but the result of an uncontrolled chain reaction of splitting atoms. According to the US Department of Homeland Security, the damage would consist of multiple phases occurring in quick succession. The energy generated by the initial blast would produce a fireball that could reach tens of millions of degrees. This intense wave of light and heat would be followed by a shockwave of air pressure that would destroy structures and kill or severely injure people. In the process, radioactive materials would be produced and pulled aloft along with dust and other debris into a mushroom cloud, which then would cool and condense. The resulting solid particles would then return to the ground in a plume of radioactive fallout, which could spread radioactive materials for hundreds of miles, sickening people and contaminating food and water supplies.

Thus, beyond the certain deaths near the epicenter, potential immediate physical injuries from a nuclear blast would include not only radiation exposure, but also severe thermal burns to skin and eyes from the initial fireball, and crush and internal injuries from the shockwave pressure and/or from collapsing buildings. Unlike a dirty bomb where any radiation released would likely remain in a localized area, a nuclear fallout plume can expand the range of exposure for many hundreds of miles depending on the height and strength of the blast, and on wind strength and direction and other uncontrollable meteorological conditions. As a result, responders must be prepared to help unpredictable numbers of exposed people, as well as the significantly greater number of people who fear they have been exposed. Additionally, the initial release of radiation from the blast may produce a powerful electromagnetic pulse that would not harm people but could destroy the region's power and communications systems, leaving responders and healthcare professionals working without usual technologies.

To date, the only offensive military use of nuclear weapons was the United States' bombings of Hiroshima and Nagasaki in 1945, though at least eight countries with nuclear arsenals have detonated smaller weapons under controlled circumstances for testing and demonstration purposes. Non-state or terrorist use would most likely involve an Improvised Nuclear Device (IND). An IND may be fabricated in a completely improvised manner, may be an improvised modification to a nuclear weapon, or may be acquired in some other way. The use of an IND by terrorists is generally thought to have a very low probability of occurrence because of the difficulty of obtaining the material and constructing such a device. However, such use would result in major adverse consequences to public health and safety, since it would have the impact of a low-yield nuclear bomb. The effects in the immediate area of the nuclear explosion would be catastrophic and would essentially destroy the existing infrastructure for response in that area, so any emergency response would come from capabilities outside the immediate area.



Nuclear Accident

Widespread radiation dispersal can also be caused by accidents at nuclear power plants. In this situation, the number of people exposed to radioactive fallout could be extensive, though without the thermal and pressure injuries associated with a nuclear blast. Still, a major accidental release like the one that occurred in Chernobyl, Soviet Union, in 1986 can require the evacuation and possibly permanent relocation

of residents for miles around the site. Even when the plume dissipates without exposing people to unsafe levels of radiation, as in the Three Mile Island accident in 1979, levels of distress may be intense and long-lasting. These events are described further at a later point in the training.

- Suggest that participants read the sidebar on WMDs on their own to save time.

WMDs and CBRNE

While exposure to radiation and nuclear fallout can occur as the result of accidents, they are also two of the major categories of weapons of mass destruction (WMDs). As the name implies, WMDs are weapons that can cause far more widespread damage than conventional arms. Use of WMDs is specifically intended to cause death or serious bodily injury to large groups of people, as well as causing the associated disruption to impacted communities, infrastructure, and economic systems. These weapons may be yielded by states (such as national governments or militaries), by terrorist groups, or by individuals.

Fortunately most forms of WMDs are technically difficult to produce, distribute, and implement in large-scale attacks, so their actual use is rare. However, given their vast destructive potential, it is essential that organizations prepare to respond to their physical and psychological effects.

The five main categories of WMDs are often referred to by the acronym CBRNE:

Chemical: Chemical attacks could involve compounds developed for military use including blistering agents (chlorine gas, mustard gas, lewisite) and nerve agents (sarin), or the intentional misuse of industrial or commercial chemicals. Chemical attacks could target the food or water supply, but more typically involve the release of toxins in gas or vapor form. While this can be highly damaging in enclosed spaces (as the attack using sarin in the Japanese subway system in 1995 demonstrated), toxic concentrations tend to dissipate in open areas, so producing extensive casualties would require large quantities of chemicals to be released.

Biological: Biological attacks involve the intentional use of bacteria (anthrax, plague), viruses (Ebola, smallpox), or

biotoxins (botulism, ricin) to cause illness or death. Some but not all biological agents are contagious (transmissible from person to person), increasing their potential health impact. Most of these agents occur naturally but they may be "weaponized," meaning manipulated to increase ease of dissemination or to boost treatment resistance. Because it typically takes some time for symptoms to develop in those exposed, biological attacks may be very difficult to identify and contain in their early stages.

Radiological: Radiological attacks involve the dispersal of radioactive materials that release alpha, beta, or gamma radiation. The most likely terrorist approach would involve a "dirty bomb" that would use conventional explosives to disseminate radioactive materials. High doses of exposure can cause Acute Radiation Syndrome, which may be fatal, but it is more likely that exposure levels would be low and contained to the immediate area of attack. Still, contamination is likely even if exposure levels are not dangerous, resulting in more psychological damage than physical injury.

Nuclear: A nuclear attack would produce exponentially more harm than a dirty bomb since the release of radioactive particles would follow an uncontrolled chain reaction that would actually split atomic nuclei. Damage results primarily from an intense shockwave and release of heat, followed by exposure to fallout radiation, which could be spread widely depending on wind patterns.

Explosive: Explosive attacks can include suicide bombings, truck bombs, improvised explosive devices, and attacks on high-impact targets such as government buildings or shopping malls. Terrorist groups may plan multiple simultaneous or sequential explosions to increase both physical and psychological damage. Explosive devices can also be used to distribute other WMD materials such as radioactive substances.

PHYSICAL EFFECTS OF EXPOSURE

The health impact of radiation will depend on characteristics of the exposure, and of the individual. The dose received is assessed in terms of:

- The **time** a person was in the presence of the radioactive material (twice as long = double the dose)
- Their **distance** from the source (waves dissipate rapidly, so the dose received two feet from the source is approximately one-quarter that received one foot away)
- The amount of **shielding** between the source and the person (with more and denser layers of material blocking much of the dose)

Individual differences such as age, sex, and general health also influence individual reactions, so two people exposed to the same dose of radiation may experience very different physical effects. Potential effects include the following.

Physical Effects of Exposure

Dose of radiation received is assessed in terms of:

- **Time** a person was in presence of radioactive material: Twice as long = double the dose
- **Distance** from source: Waves dissipate rapidly so dose received two feet from the source is approximately one-quarter that received one foot away
- Amount of **shielding** between source and person: More and denser layers of material block much of dose

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Acute Radiation Syndrome

The most serious physical reaction to radiological exposure is Acute Radiation Syndrome (ARS), or radiation sickness. According to the Centers for Disease Control, this is only likely to occur if an individual's exposure was extensive and involved most of the body; it penetrated to internal organs; and the intensity was so high that the entire dose was received within a few minutes. Thus, ARS would be expected among those within miles of a nuclear event who survived the initial blast and shockwave, **but it is unlikely to occur as a result of a dirty bomb**. Following an RDD detonation people may become contaminated with radioactive dust, but the level of exposure received would likely be far below what is required to cause ARS.

The course of ARS is somewhat unusual. Within minutes to days after the exposure, affected people typically develop nausea, vomiting, and fatigue. The speed at which these prodromal symptoms develop is an indicator of the seriousness of the exposure: Patients who experience them within 30 minutes, or who develop immediate diarrhea, have probably received a lethal dose, while those receiving lower doses may not experience symptoms for several days. However, it is important for healthcare providers to consider the possibility that patients demonstrating immediate nausea, vomiting, or diarrhea may be doing so in response to fear, pain, or another injury or illness.

Physical Effects of Exposure:
ARS

Acute Radiation Syndrome (ARS) is only likely if exposure:

- was extensive and involved most of the body
- penetrated to internal organs
- was so intense that the entire dose was received within a few minutes

ARS is unlikely to occur as a result of a dirty bomb.

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- Emphasize that ARS is unlikely to occur from the detonation of a dirty bomb; however, it may be quite common for people to misinterpret their psychological symptoms as physical signs of exposure or contamination.

Physical Effects of Exposure:
ARS

ARS symptoms:

- Nausea, vomiting, and fatigue
- Drop in blood cell count
- Hair loss
- Broken capillaries
- Mouth sores
- Malaise
- Weight loss
- Chills

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Physical Effects of Exposure:
ARS

ARS treatment:

- If nausea, vomiting, and diarrhea develop within 30 minutes of exposure, a lethal dose was probably received and treatment should focus on comfort care. However, stress reactions and other illness must be considered as cause of early symptoms
- Reduced blood cell count leaves patients vulnerable to infection, so treatment should include antibiotics, isolation to avoid infection, and blood transfusion to replace lost cells until marrow regenerates

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For those whose exposure was high but not necessarily lethal, the initial symptoms may dissipate for some time, but the internal effects are still developing. In particular, blood-forming organs are highly sensitive to radiation, so formation of new blood cells is impaired and older cells die without replacements. While the resulting drop in blood cell counts leaves patients vulnerable to infection, survival may be supported by medical care including antibiotic treatment and isolation to avoid infection, and blood transfusion to replace lost cells, until the bone marrow regenerates sufficiently to restore immune system functioning. Other common symptoms during this stage include hair loss, petechia (small purple spots on the skin resulting from broken capillaries), mouth sores, chills, malaise, weight loss, and fatigue.

Physical Effects of Exposure:
Radiation Injury

- Radiation burns remain localized to the exposed areas, but may be serious enough to warrant amputation
- Patients may have suffered other injuries from blast or shockwave and may require treatment for internal injuries, crush injuries, lacerations, broken bones, and thermal burns
- Acute injuries should generally take precedence over the radiation burns, which will take some time to develop

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Radiation Injury

If the exposure did not involve the entire body, it is unlikely to be life-threatening, though it can cause serious damage to the exposed areas. But just as a sunburn (which actually is a mild form of radiation damage) only affects the body parts that were directly exposed to the sun, acute radiation injuries do not travel beyond the originally impacted areas. Still, the damage to those areas can include severe burns and in some cases may result in amputation of digits or limbs. Additionally, patients may have suffered other injuries from the detonation used to distribute the radioactive materials in RDDs or from the blast or shockwave of a nuclear blast, so they may require treatment for internal injuries, crush injuries, lacerations, broken bones, and thermal burns as well as for localized radiation burns. These more acute injuries should generally take precedence over the radiation burns, which will take some time to develop.

Physical Effects of Exposure:
Long-Term Effects

- Very high levels of exposure may increase risk of cancer (esp. leukemia and thyroid cancer) so long-term monitoring is advised
- However, there's little evidence that lower levels of exposure (as from a dirty bomb) are associated with significantly increased risk of cancer or other long-term health effects
- Patients should be informed about actual risk levels to reduce anxiety

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- Emphasize that public health officials must also recognize that acute radiation poses differential risks compared to chronic radiation. The same total dose of radiation received in a short span of time (acute exposure) is about twice as likely to cause cancers as opposed to chronic exposure, because DNA has more time to repair across the time span of chronic exposure.

Long-Term Effects

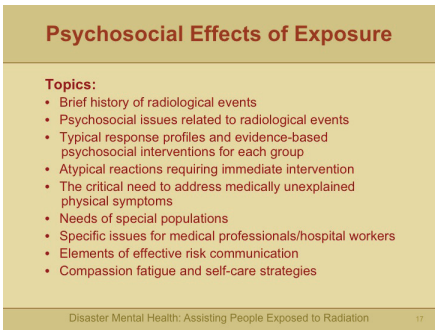
Many members of the public may believe that acute exposure to radiation drastically increases the odds of developing cancer later, but this fear is typically inflated. It is true that any radiation exposure increases the risk of developing cancer, and the same dose of radiation received acutely is about twice as likely to cause cancer as a chronic exposure since there is more time for DNA repair during chronic exposures.

However, there is little evidence that the low dose of radiation that would be expected after a dirty bomb would have any long-term health consequences. Because radiation is naturally occurring in the environment, our bodies appear to have evolved ways of recovering from lower level exposure,

so assuming that any initial radiation sickness or injury is survived, long-term carcinogenic effects appear to be minimal.

Still, if the initial damage was severe enough that those recovery processes are impaired or overwhelmed, cancer (in particular, thyroid cancer following exposure to radioactive iodine, or leukemia) may develop, so long-term monitoring of survivors is recommended, as is psychoeducation about actual risk levels in order to calm anxiety about future health effects.

PSYCHOSOCIAL EFFECTS OF EXPOSURE



The threat of exposure to radioactive substances posed by terrorist acts looms large in the minds of the public and has been a high priority for federal and state Homeland Security Departments (Becker, 2004). The remainder of this training is intended to increase awareness and deepen knowledge of the psychosocial issues related to radiological events in public health professionals. Specifically, we will address the following areas:

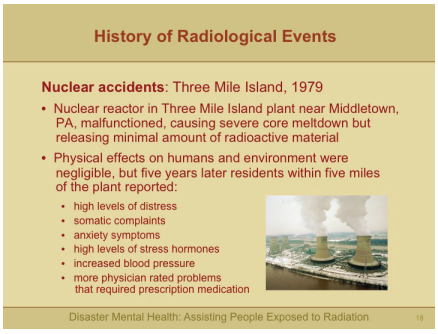
- Brief history of community responses to radiation accidents and exposure
- Psychosocial issues related to radiological events
- Typical response profiles and evidence-based psychosocial interventions for each group
- Atypical reactions requiring immediate intervention
- The critical need to address medically unexplained physical symptoms (MUPS)
- Needs of special populations
- Specific issues for medical professionals/hospital workers
- Elements of effective risk communication
- Compassion fatigue in first responders and health care workers, and self-care strategies to mitigate the potential negative effects

Brief History of Community Responses to Potential Radiological Exposure

In order to understand the depth of anxiety that such events pose, a brief review of seminal events is helpful to provide

historical context. Much of our understanding of the issues relevant for public health professionals comes from the consequences of two historic nuclear accidents: Three Mile Island and Chernobyl. These events will be summarized for the lessons learned regarding psychosocial issues. Additionally, threats related to acts of terrorism involving radiological exposure will be briefly reviewed in order to set the context for public reactivity to the issue.

Nuclear Accidents



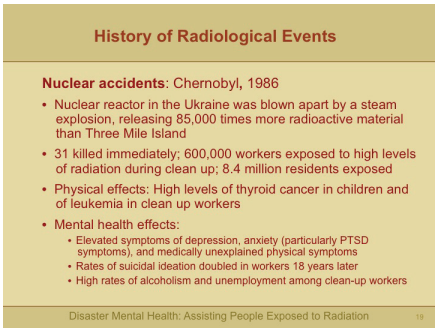
- Familiarize yourself sufficiently with these events to provide a brief summary. The descriptions are intended to provide enough background detail for you to respond to questions that may arise, but they do not need to be discussed at length.

Three Mile Island: On March 28, 1979, the nuclear reactor in the plant at Three Mile Island (TMI) near Middletown, Pennsylvania malfunctioned, causing a severe core meltdown. Such a malfunction is identified as the most dangerous kind of nuclear power accident (U.S. Nuclear Regulatory Commission, 2009). Despite the gravity of the accident, there was minimal discharge of radioactive material. However, no one was allowed to enter the plant for two years, and the reactor was eventually entombed in concrete. Several independent studies estimated that the average dose of radiation to approximately two million people in the area was about 1 millirem. To put this into context, the average exposure from a chest x-ray is about 6 millirem, and every year we are exposed to about 600 millirem due to background radiation. Thousands of environmental samples of air, water, milk, soil, vegetation, and food products collected by various monitoring groups over the course of years concluded that the radiation was well contained. Continued monitoring of adverse effects to humans and the environment indicated negligible negative consequences. In a 20-year follow-up study of morbidity and mortality data on residents living within a five-mile radius of TMI, researchers at the University of Pittsburgh found no significant increase in deaths from cancer. After adjusting for background radiation, educational level and smoking, a slight increase in the risk of lymphatic and hematopoietic cancers among males was found and related to radiation exposure from the accident, and an increased risk of mortality from lymphatic and hematopoietic cancers in women was found to be related to background radiation in the area (Talbot, Youk, McHugh-Pemu, & Zborowski, 2003).

Despite this finding of negligible effects, a five-year follow-up after the accident found that residents who lived within five miles of the plant had higher levels of distress, somatic complaints, and anxiety symptoms, higher levels of stress hormones, increased blood pressure, and more physician

rated problems that required prescription medication (Baum, Gatchel, & Schaeffer, 1983). The public horror and outrage related to the event resulted in sweeping changes related to nuclear energy policies, and renewed debates regarding international nuclear missile capabilities.

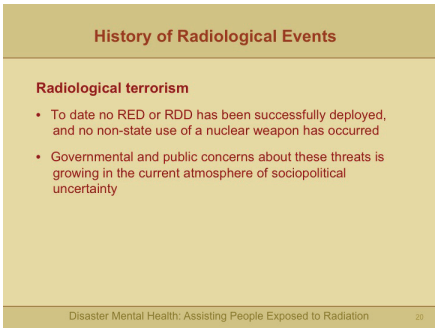
Chernobyl: On April 26, 1986, a nuclear reactor within a plant in the small Ukrainian town of Chernobyl was blown apart by a steam explosion. The radiation release was 85,000 times greater than the TMI release. According to the UN's official reports (United Nations Office in Belarus briefing, March 28, 2006), 31 people died immediately and 600,000 first responders and other workers were exposed to high doses of radiation in the clean-up operations. Nearly 8,400,000 people in Belarus, Ukraine and Russia were exposed to radiation, with approximately 25% of Belarus declared as contaminated. The clearest finding to emerge from all of the studies examining health effects of the accident converge around the dramatic increase in thyroid cancer in children, followed by increased incidence of leukemia in Russian clean-up workers in the first few years after the accident (Sumner, 2007). A feared consequence of damage to fetuses in utero has not been supported to date; studies of the children of women who were pregnant at the time of the accident examining the neurotoxic effects have found no subsequent cognitive deficits that appeared to be the result of radiation (Joseph, Reisfeld, Tirosh, Silman, & Rennert, 2004).



The mental health impact of Chernobyl, however, is regarded by many experts as the largest public health problem related to an accident to date. Bromet and Havenaar (2007) reviewed findings from 20 years of reports regarding stress-related symptoms, effects on the developing brain, and cognitive and psychological impairments among highly exposed cleanup workers. Symptoms of depression, anxiety (particularly PTSD symptoms), and medically unexplained physical symptoms (MUPS) have been found to be two to four times higher in exposed populations as compared to controls, although rates of diagnosable disorders do not seem to significantly differ. Severity of symptoms has been significantly related to risk perceptions, and to being diagnosed with a Chernobyl-related health problem. A particularly relevant finding is reflected in a study of 295 male clean-up workers examined 18 years after the accident: Rates of suicidal ideation among this group were twice the rate found in controls, reflecting the psychological toll of extreme exposure to such events. Other studies indicate high levels of alcoholism and unemployment, the latter due to fears by employers and others that the clean up workers

are contaminated and contagious. Tremendous uncertainly about their own long-term health consequences and disbelief of the information provided by the government were also reported (Koscheyev, Leon, & Greaves, 1997; Koscheyev, Leon, Gourine, & Gourine, 1997). Mothers of young children with high radiation exposure were found to be another particularly vulnerable group; even after evacuation, they reported higher scores on the SCL-90 Global Severity Index, lower perceived physical health, and more days absent from work (Adams, Bromet, Panina, Golovakha, Goldgaber, & Gluzman, 2002). Further, Bromet et al. (2000) found that both the mothers and teachers viewed these children as in poorer health than the control group children even though objective health data did not support this perception. The findings from these studies and supporting research are consistent with the findings from Three Mile Island, as well as the psychosocial sequelae from nuclear bombings such as those that occurred in Hiroshima and Nagasaki.

A literature review of TMI and Chernobyl from professional journals, popular, and "mixed" media sources reflects widely divergent views and descriptions of the events, their aftermath, and the risks posed to affected communities as well as to the general public. Given the current 24-hour information environment, it is inevitable that people will access media sources that may highlight the risks, minimize the safeguards, and serve to foment the fear. Respected experts in medical and scientific fields that have studied these events generally agree regarding the long-term effects examined to date, but also acknowledge that future generations will need to be studied in order to better understand the effects, if any, on genetic mutations following radiation exposure. These issues are at the very heart of the public's fears and anxieties; they represent "the great unknown." And there is an abundance of information that serves to fuel these fears.



Radiological Terrorism

Intentional radiological events span decades and continents, representing a range from smaller and more localized incidents to global, sophisticated plans involving multinational groups. One of the first documented examples of radiological terrorism occurred in 1995, when Chechen rebels attempted to disrupt the Soviet government by planting an RED containing a small quantity of cesium-137 in a Moscow park. An event involving US national security interests occurred in 2002, when the FBI arrested Jose Padilla, a US citizen, at a Chicago airport. Padilla was widely suspected of planning to detonate an RDD, having undergone training

in the mechanics of such devices in Pakistan. More recently, in 2008 FARC rebels in Colombia were allegedly seeking to sell uranium for $1 million a pound (a huge sum for a substance that usually commands $30 to $200 per pound in its more common form), raising suspicion that they had acquired weapons-grade uranium suitable for building nuclear weapons. Colombian officials seized approximately 50 kilograms of depleted uranium, and the severity of the threat appeared to have been exaggerated. Nonetheless, this incident demonstrated how wide-ranging rebel groups and militias are gaining sophistication in their methods as well as access to radioactive materials (Nuclear Threat Initiative, Introduction to Radiological Terrorism, retrieved 5/1/10)

Radiological terrorism, exemplified most clearly through the risk of an individual or group detonating an RDD in a major metropolitan area, heightens public anxiety even further by introducing the elements of evil and of human intention. These aspects complicate psychosocial reactions and adjustment over time, as elements of rage, suspicion, and unpredictability are introduced into the psychological landscape. As public cynicism and distrust in once revered civic institutions grows, the citizenry's faith in government to provide adequate protection falters, and the solidarity and sense of community relied upon to withstand such threats begins to fray. These are the sociopolitical conditions that give rise to panic and chaos.

Reality Basis for Public Concerns

In the past decade, public concern about nuclear/radiological terrorism has increased substantially, and public health preparedness for such events has moved to an equal place of prominence in the national security agenda. This growing apprehension stems from a constellation of related factors. Because radioactive materials have numerous beneficial functions (e.g., medical treatments, industrial uses), they are now ubiquitous. Although international security has been substantially enhanced as a result of threats to the public welfare across nations, safeguarding the sources of radioactive material remains a high-risk proposition, and serious vulnerabilities remain (Becker, 2004). As noted by the International Atomic Energy Agency (IAEA, 2002), radioactive materials are lost or stolen every year; specifically, between 1993 and 2001 there were 175 cases of trafficking in nuclear material and 201 cases of trafficking in other radioactive sources (IAEA, 2001). While many material sources are small

Exercise 1

- On a blank sheet of paper, write down all the words, images and reactions that come to mind when you think of a radiological event, such as a nuclear accident or "dirty bomb" incident as we have just reviewed
- Include all reactions – physical, emotional, mental, as well as any images that come to mind

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- Introduce this exercise to participants by emphasizing the importance of understanding our underlying anxieties and attitudes re: radiological events. The more we can understand our own reactions, the better prepared we will be to address the reactions of others.
- Refer to Appendix D for tips on facilitating this exercise.
- Encourage participants to write the class's responses down so they can refer to them when leading the training themselves.

and pose little risk to public safety, and some materials are recovered, there remain a significant number of potent radioactive sources that have been lost from regulatory control (Becker, 2004). Given the active trafficking of weapons, including materials for weapons of mass destruction such as radiological substances, these sources are likely to be "high value targets" for such global markets. When asked to rate the risk associated with 90 various activities and threats, various groups consistently rate nuclear weapons as the most risky (Slovic, 2001). In an information-saturated media environment, the public is all too aware of the uncertainty of safeguarding these potentially lethal materials. Thus, concerns that may have once been dismissed as implausible or even reflective of a degree of paranoia are now accepted with a certain degree of wary (and weary) resignation.

In short, our deeply ingrained human response to radiological and nuclear threats is based both in historical events as well as in the fear of the unknown and ultimate health consequences, and lack of control such events evoke in us.

- Introduce this section by noting that these reactions are the most common psychosocial consequences of such events, and will be addressed throughout the remainder of the training. Additionally, it may be helpful to summarize the information presented at right on "dread risks" and "unknown risks" as a way of giving participants a framework for understanding the unique psychological "fingerprint" of reactions to radiological events.

Psychosocial Issues Related to Radiological Events

As previously mentioned, the invisible nature of potential exposure to some radiological events creates a psychological climate of prolonged fear and uncertainty. An individual may not know that he or she has been exposed until after hearing a news report or seeing a first responder emergency unit, including a decontamination unit, arrive at the site – or people may fear exposure has occurred when it hasn't. As a result, situations involving radioactive materials have a unique capacity to evoke "widespread fear, a profound sense of vulnerability, and a continuing sense of alarm and dread" (Becker, 2004, p. 197). It is this peculiar combination of alarm and dread that results in the unique fingerprint of emotional reactions related to radiological events.

Slovic (2001) has suggested that people assess the risks of technologies and activities based upon two broad dimensions or sets of factors: "dread risks" and "unknown risks." Dread risks are characterized by their catastrophic potential, fatal consequences, uncontrollability, inequitable distribution of risks and benefits, involuntariness, and a high risk to future generations. Unknown risks are perceived as new, unobservable, unknown to those exposed, and with delayed effects. RDDs, nuclear power, and weapons fallout all score high on both of these dimensions, resulting in the attendant

emotional reactions of alarm and dread. Thus, individuals are left to struggle with two equally compelling, yet competing human impulses. The psychological end result may be a greater degree of internal confusion than is seen with other types of disasters with more proximal and knowable effects, such as floods or earthquakes, or even terrorist attacks using more conventional weapons, leading to a greater degree of chaos and social disruption on a broader scale.

Predominant Psychosocial Issues

Fear: As captured by the quote at the beginning of this manual, fear has powerful public health implications (Gray & Ropeik, 2002). When researchers have surveyed the public regarding the images they connect with radiological and/or nuclear events, the predominant images are negative and fear-based, provoking strong aversive reactions of dread and revulsion. Current research in the field of affective neuroscience suggests that fear is one of the most powerful of our basic, core emotions, and prolonged states of fear almost always result in various types of psychopathology (LeDoux, 1996). Additionally, prolonged fear states tend to promote excessive release of cortisol (stress-based neurohormones) into the bloodstream, resulting in multisystemic physiological consequences such as impaired immune functioning over longer periods of time. Because of the nature of radiological events, fear of unknown consequences will be a prominent factor that may remain for substantial periods of time – perhaps even years depending upon the event and degree of exposure.

Radiological and nuclear events possess another unique facet in the realm of fear-based reactions: The fear extends to concerns about the danger to unborn generations, as there is widespread public concern regarding the genetic mutations that may occur as a result of significant radiological exposure. Although such effects have not been found in cases of radiological or even nuclear accidents because of relatively low doses of radiation exposure (though after Chernobyl the Soviet government did encourage all exposed pregnant women to have abortions) the public images of nuclear attacks (e.g., Hiroshima and Nagasaki) loom large when considerations of future generations are presented. Fear of such magnitude is not readily countered by reason.

Anxiety and Uncertainty: Although sometimes confused with fear, anxiety has a substantively different neurophysiological pathway, can be more responsive to

interventions, and leaves less psychic disruption. However, anxiety does not often possess the strong immediate adaptive aspects of fear (e.g., survival functions), and in chronic forms can be quite debilitating. In more moderate forms, anxiety serves an adaptive function by motivating performance, and can be mobilized to ensure treatment adherence or compliance with public health directives. At the more extreme ranges, and particularly if chronic, anxiety limits motivation and performance, and disrupts adaptive coping skills. Studies of individuals exposed to radiological events suggest that high levels of sustained anxiety are quite common and require active intervention on the part of public health professionals in order to avoid negative health outcomes and chronic psychosocial disruption.

Anxiety reactions related to radiological events have a particular quality, as they represent anxiety related to uncertainty as to whether the individual was exposed to radiation, and about ultimate health outcomes. Unlike anxiety related to other common disaster-related issues, such as loss of one's home or job (which are difficult factors with which to contend and should not be minimized), much of the anxiety related to radiological events does not have a specific target so it remains a vague, nameless feeling of dread about the future. Such persistent feelings are destabilizing for individuals and families, and can be difficult to dispel with many of the usual cognitive strategies that are often employed with negative affective states. Lastly, information and knowledge are tools that are frequently used to effectively cope with feelings of anxiety about the future. In the case of radiological events, information may be limited or anxiety-provoking, and because of heightened levels of fear, seeking information from the media may not only be unhelpful, but may actually serve to further raise anxiety about the future.

Lack of Control: This psychosocial issue relates to fear and anxiety. Occupational health experts identify lack of control as the most damaging aspect of chronic stress responses (Canadian Ministry of Health, 2000). In radiological events, the sense of being out of control is particularly profound. Individuals may not even be aware of their exposure, and the "invisible" nature of these events heightens the sense of personal vulnerability, as the individual feels that he or she is being attacked by forces that are unseen and whose effects may be unknown for long periods of time. For these reasons, technological, radiological, chemical, and nuclear types of events are referred to as "silent disasters" (Kilpatrick, 2002).

Contamination and Stigmatization: These issues are interrelated in radiological and nuclear events, and again are the result of public misperception, fear, and panic. As described earlier, most RDDs, REDs, and nuclear accidents would probably not lead to large-scale deaths from the contaminant (though a nuclear blast clearly would cause extensive casualties). A more likely scenario is that there would be a substantial number of people within a specific geographic area who would be exposed to the radiological material, with a smaller number of people contaminated. People who were exposed but not contaminated cannot expose or contaminate others. Even for those individuals who are contaminated, it is unlikely (though not impossible, depending on their proximity to the source) that the amount of material on their clothing or body would be sufficient to expose others, though it is recommended that people who don't have a life threatening injury or serious medical issues get decontaminated as soon as possible to avoid transferring material to others.

However, as mental health and public health officials are well aware, public reaction is not always based upon factual data. For the general public, the equation is often "contamination=contagion." Because of these anticipated public misperceptions, it is presumed that individuals who are in high exposure areas may be stigmatized as "contaminated and contagious," and may be shunned by neighbors and others in their communities at the very time that they need additional social support. Additionally, these individuals may experience themselves as contaminated or "dirty" in some sense (the term "dirty bomb" has powerful negative psychological connotations), and may self-stigmatize, unnecessarily isolating themselves from family and friends. The experience of having to be decontaminated has powerful psychological effects, and individuals may worry that they are exposing their loved ones to dangerous substances. Internally, they may retain the experience of being "dirtied" or even "damaged" in some way, and may come to perceive themselves as presenting a risk despite reassurances to the contrary. (Please see subsequent section on medically unexplained physical symptoms for further discussion of this issue.)

Disruption of Social Networks: Such anticipated disruptions will come from a variety of sources:

- In the case of terrorist attacks, the particular geographic areas that may require evacuation are likely to be densely populated and may be economic/financial centers of a metropolitan area, as such areas will be viewed as "high value targets."

- Individuals may be asked to evacuate their homes, temporarily or even permanently, depending upon the magnitude of the event.
- Medical facilities may be overwhelmed with individuals who are concerned about exposure and their health and safety, causing a general feeling of panic.
- Certain areas and communities may be ordered to shelter in place for an unspecified period of time.
- Media reports may only serve to heighten fear and anxiety.

On the other hand, social networking websites and services will likely be flooded with people contacting one another, particularly if shelter-in-place precautions are ordered. Such technology-based communications can serve to ameliorate the sense of isolation and provide much needed human connections at a time of uncertainty. However, as helpful as social networking sites can be in such situations, there is no substitute for human contact, and it is this disruption that can have such a destabilizing effect on communities.

Psychosocial Interventions for Specific Target Groups

As is true for disasters of all types, the majority of affected individuals will recover with time and support, and will require minimal or no professional treatment. After a disaster or terrorist event, three groups of affected individuals typically emerge which reflect different psychological responses to the event:

- Those who are distressed
- Those who manifest behavioral changes
- Those who are at high risk to develop psychological disorders

The characteristics of each group will be briefly presented, followed by the appropriate evidence-based psychosocial intervention for each response profile. Matching interventions to specific target groups is an area receiving increased research interest as the field moves towards refining its response to different types of disasters (e,g., Litz, Gray, Bryant & Adler, 2002; Ritchie, Watson & Friedman, 2006; Ursano, Fullerton & Norwood, 2003).

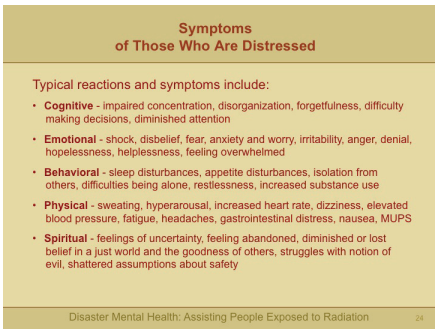
Those Who Are Distressed

Aspects of Response: Distress following a radiation release will be common, and will be manifested in a wide range of typical reactions and symptoms including:

Cognitive - impaired concentrating, disorganization, forgetfulness, difficulty making decisions, diminished attention
Emotional - shock, disbelief, fear, anxiety and worry, irritability, anger, denial, hopelessness, helplessness, feeling overwhelmed
Behavioral - sleep disturbances, appetite disturbances, isolation from others, difficulties being alone, restlessness, increased substance use (alcohol, tobacco, prescription medications and illicit substances)
Physical - sweating, hyperarousal, increased heart rate, dizziness, elevated blood pressure, fatigue, headaches, gastrointestinal distress, nausea, MUPS
Spiritual - feelings of uncertainty, feeling abandoned, diminished or loss of belief in a just world and the goodness of others, struggles with notion of evil, shattered assumptions about safety

Because of the powerful impact of such events on our psyches, it is anticipated that a large-scale radiation release will elicit a broader range of reactions as well as more severe reactions. Thus, mental health and public health professionals will need to be prepared to manage more severe reactions that continue for longer periods of time than are often seen in natural disasters. However, for this group, the same pattern of decrease in distress and increase in functioning over a period of several weeks post-event should still be seen.

Psychosocial Interventions: The predominant evidence-based model of intervention for this group and response profile is Psychological First Aid (PFA). A modular intervention that can be easily adapted to various groups and settings, and which incorporates principles of cultural responsiveness, PFA seeks to reduce hyper-arousal and distress, teach basic emotional regulation skills, and encourage use of positive social supports as essential elements of achieving stabilization (Halpern & Tramontin, 2007).

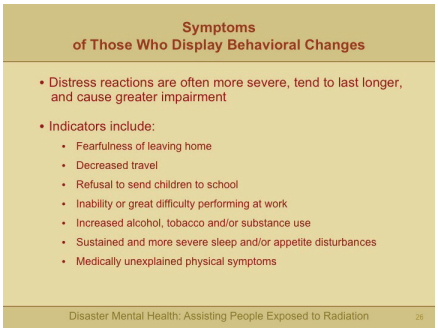


- Emphasize that these psychosocial reactions are the common reactions we often see to disaster events. In response to radiological events, these reactions may be more pronounced, or an individual may experience a broader range of distress reactions.

- Goals: Reduce distress and encourage adaptive functioning
- Core Intervention Elements:

Attitudes	Actions
• Being calm • Providing warmth • Providing acknowledgement and recognition • Expressing empathy • Showing genuineness • Empowering the survivor	• Obtaining information • Attending to safety needs • Attending to physiological needs • Providing information • Helping clients to access social support • Avoiding negative social support • Assisting with traumatic grief

- Settings: PFA can be delivered anywhere: onsite, such as through mobile decon units; in emergency departments and acute care units of hospitals; through mobile PODS (points of dispensary, if established); and community settings.
- Delivered by: PFA can be provided by trained public health nurses and first responders, school personnel, paraprofessionals as well as crisis counselors and mental health professionals.



Those Who Display Behavioral Changes

Aspects of Response: For individuals in this group, distress reactions are often more severe, and tend to last longer. Unlike the distressed group, there is often greater dysfunction in this group (e.g., the level of distress is sufficiently severe to disrupt normal occupational and social functioning to some extent). Such behavioral indicators of more severe distress include:

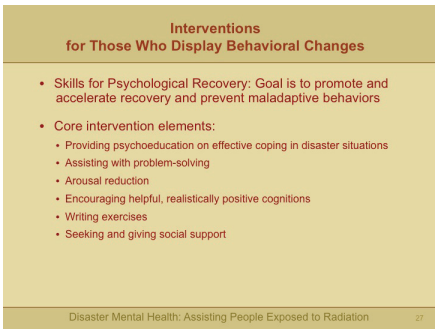
- Fearfulness of leaving home
- Decreased travel
- Refusal to send children to school
- Inability or great difficulty performing at work
- Increased alcohol, tobacco and/or substance use
- Sustained and more severe sleep and/or appetite disturbances
- Medically unexplained physical symptoms

The reactions of this group are not substantively different than the distress group, but rather reflect differences in quantity as well as reports of greater subjective distress. For this group, level of distress remains high and level of

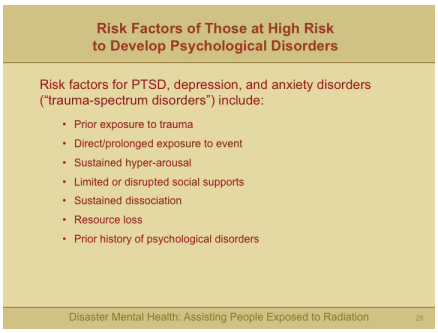
functioning remains lower for longer periods of time than the typical three to six week pattern of diminishing acute stress reactions seen in the distress-only group. Because of this pattern, these individuals are likely to seek medical attention.

Psychosocial Interventions: As with the distress group, PFA is an indicated initial intervention. However, individuals in this group may require interventions beyond PFA, and require assistance for longer periods of time. For individuals presenting to hospital emergency departments, PFA should be provided, followed by a referral to crisis counselors and/or mental health professionals trained in disaster response as indicated. Crisis counseling and short-term cognitive-behavioral-based interventions are recommended for this group. These interventions are included in a modular-based model referred to as Skills for Psychological Recovery (SPR) (National Center for PTSD and National Child Traumatic Stress Network, 2007). Typically, SPR is appropriate after the initial crisis has subsided. Because the period of crisis may be sustained for a period of time with a radiological event, SPR may be used while people still experience themselves as "in crisis," and require more assistance in regaining some measure of psychosocial stabilization.

- Goals: Promote and accelerate recovery and prevent maladaptive behaviors
- Core Intervention Elements:
  - Provide psychoeducation on effective coping in disaster situations
  - Assist with problem-solving
  - Arousal reduction
  - Encouraging helpful, realistically positive cognitions
  - Writing exercises
  - Seeking and giving social support
- Settings: SPR can be delivered in a variety of settings; however, because it requires several sessions, it may best be delivered in a consistent setting that provides low stimulation (e.g., a hospital ER may not be the most appropriate setting.) Through utilizing mobile, crisis-based mental health services, SPR can be delivered in the home, at the workplace (as long as privacy and confidentiality are guaranteed) as well as over the phone.
- Delivered by: Crisis counselors and mental health professionals specifically trained in the model and in disaster interventions



- Although most participants will be familiar with PFA, some participants may have less familiarity with SPR. Emphasize how SPR utilizes evidence-based strategies from cognitive-behavioral therapy that have been demonstrated to be effective in reducing hyperarousal and establishing emotional regulation.

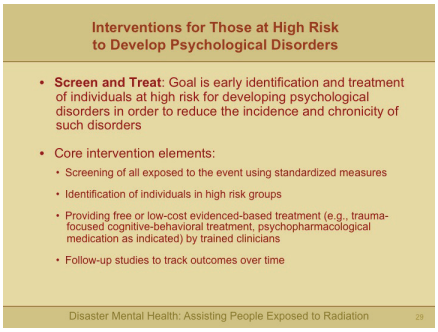


Those Who Are at High Risk for Psychological Disorders

Aspects of Response: Prospective studies have demonstrated that most people will adapt effectively within approximately three months after the event. For those who fail to recover within this general time frame, the risk for chronic PTSD and related disorders is substantial. Therefore, helpers should be on the lookout for individuals who manifest one or more of the following risk factors for PTSD, depression, and anxiety disorders (generally described as trauma-spectrum disorders) in order to provide treatment to mitigate their risk:

- Prior exposure to trauma
- Direct/prolonged exposure to event
- Sustained hyper-arousal
- Limited or disrupted social supports
- Sustained dissociation
- Resource loss
- Prior history of psychological disorders (However, it is important to remember that people with no prior history of psychiatric illness can be vulnerable to developing a disorder after a terroristic exposure. For example, in the aftermath of the 1995 Oklahoma City bombing, nearly 40% of those who developed PTSD and depression had no previous psychiatric disorder (CSTS, retrieved 5/1/10).)

In general, members of this group will require careful assessment to identify those in need of professional mental health intervention.



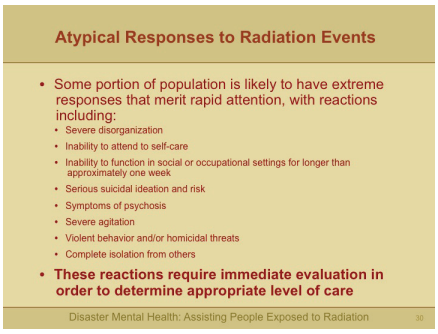
- Emphasize that there is a solid evidence base supporting the effectiveness of a "screen and treat" model. However, the model requires considerable resources in terms of highly trained clinicians.

Psychosocial Interventions: This group of individuals may benefit from mental health treatment for specific disorders, as opposed to broad-based interventions that are designed to address sub-acute distress. A particular model that has received recent research support was developed by Brewin (2007) and described as "screen and treat." This model provides an evidence-based approach to meeting the needs of individuals who are at risk of developing psychological disorders following exposure to terrorist incidents. It assumes a well-developed mental health infrastructure, with an adequate number of available clinicians trained in evidence-based interventions for trauma-spectrum disorders. The model essentially establishes a public health structure for identifying individuals exposed to a large scale terrorist event (the model can be easily applied to those exposed to radiation-related accidents), screening these individuals for common

posttraumatic reactions with empirically based measures, and triaging those individuals whose score on these measures surpasses a pre-established cutoff into different treatment programs.

- Goals: Early identification and treatment of individuals at high risk for developing psychological disorders in order to reduce the incidence and chronicity of such disorders
- Core Intervention Elements:
  - Screening of all those exposed to the event using standardized measures
  - Identification of individuals whose cutoff scores and history place them in a high risk group
  - Providing free or low-cost evidence-based treatment (e.g., trauma-focused cognitive-behavioral treatment, psychopharmacological medication as indicated) by trained clinicians
  - Follow-up studies to track outcomes over time
- Settings: Office-based treatment
- Delivered by: Clinicians specifically trained in and experienced with evidence-based trauma-focused treatments

Atypical Responses to Radiation Events



While the majority of event survivors will fall into one of the three response categories just described, some portion of the population is likely to have an extreme response that merits rapid attention. Atypical responses to radiation events are similar to this category of response to disasters in general, including:

- Severe disorganization
- Inability to attend to self-care
- Inability to function in social or occupational settings for longer than approximately one week
- Serious suicidal ideation and risk
- Symptoms of psychosis
- Severe agitation
- Violent behavior and/or homicidal threats
- Complete isolation from others

These reactions may reflect an impending psychiatric crisis, and require immediate psychiatric evaluation in order to determine the appropriate level of care.

Medically Unexplained Physical Symptoms

- MUPS = multi-systemic and/or nonspecific somatic complaints for which no physical/organic cause can be found upon examination
- May mimic ARS symptoms
- Symptoms are **not imagined or unreal** - they are bona fide physical reactions, precipitated by psychological distress (i.e., psychosomatic)
- MUPS are common after disasters and likely to be extremely widespread after a radiological event given uncertainty about exposure
- Response plans should address expected surge to medical facilities

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- The essential feature of MUPS in this situation is the misattribution of physical symptoms of autonomic arousal to radiation. Emphasize that a lack of physical findings does not mean that the physical symptoms and reactions are not "real" – they are bona fide physical reactions, precipitated by psychological distress.

Medically Unexplained Physical Symptoms (MUPS)

This category of distress response is also referred to as Multiple Idiopathic Physical Symptoms (MIPS). Even under usual, non-disaster/crisis circumstances, it is estimated that one-third of primary care patients present for assistance with MUPS (CSTS, retrieved 5/1/10). Essentially, MUPS refers to the presentation of multi-systemic and/or nonspecific somatic complaints for which no physical/organic cause can be found upon examination. These symptoms can mimic those of acute radiation syndrome (ARS), such as nausea, vomiting and skin rash.

It is estimated that following exposure to a nuclear-related event, approximately 75% of individuals would express psychosomatic symptoms (Mettler & Voelz, 2002). These patients should always be initially evaluated and managed by medical professionals. However, once it has been determined that no underlying medical etiology is related to the symptom presentation, these individuals can best be managed through psychosocial interventions (in particular, case management services) that are integrated in public health settings (e.g., a mental health clinician working in a hospital emergency department or acute care setting). It should be emphasized for public health professionals that a lack of physical findings does not mean that the physical symptoms and reactions are not "real" – they are bona fide physical reactions, precipitated by psychological distress. (This is the essential definition of the term psychosomatic, a term which is often misunderstood by the general public and some health professionals.) MUPS is an obviously distressing phenomenon for the individual, causing impairment in socioemotional, physical, and occupational functioning.

Both exposed and non-exposed individuals may present with MUPS. The essential feature of MUPS in this situation is the misattribution of physical symptoms of autonomic arousal to radiation. Confusion regarding degree of exposure is anticipated in the immediate aftermath of radiation events. Evidence from previous events suggests that people will overestimate their risk of exposure to unknown threats (e.g., the odorless, invisible nature of radiation attacks or accidents) or not believe the information provided by the government. It follows, therefore, that the most prominent symptoms people will present with are somatic complaints, causing significant demands upon the capacity of medical facilities (addressed in a subsequent section). Additionally, people from non-Western cultures frequently express psychological distress in physical

symptoms, and these individuals may also be driven to seek medical attention (Yevelson, Abdelgani, Cwikel, & Yevelson, 1997). As the prevalence rates of MUPS tend to increase after disasters in general, it may be helpful for mental health professionals charged with service and surge capacity planning to estimate expected prevalence rates of MUPS following a radiation event.

Van der Berg, Grievink, Yzermans, and Lebret (2005) have summarized current approaches to addressing MUPS following disasters. According to their research risk factors for MUPS include:

- Female gender
- High physical damage resulting from event (includes injury to self and/or loved ones, serious threat to self/loved ones, loss of loved one, damage to house/property)
- Posttraumatic stress symptoms

Additional factors under study (these factors have not been validated with disaster survivors, but have been found in Gulf War veterans):

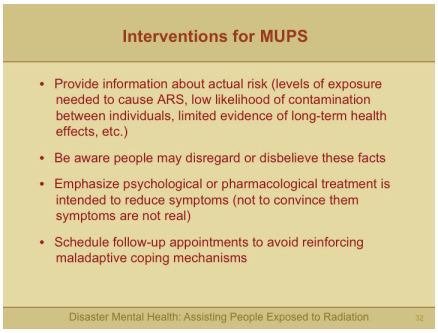
- History of psychiatric disorders
- Stressful life events

Van der Berg et al. recommend identifying risk factors for MUPS in three categories (the "3-P model"):

- **Predisposing factors:** factors that existed prior to the disaster, such as demographics and personality characteristics
- **Precipitating factors**: factors directly related to the disaster, such as injury, relocation, fear, loss of resources
- **Perpetuating factors**: coping style, lack of social support, resource loss, other stressful events that may maintain or exacerbate symptoms

Suggested Interventions

As MUPS is an anxiety symptom, psychological strategies for reducing the physiological arousal associated with anxiety states can be helpful. However, these strategies may have only short-lived benefits, as the underlying belief (misattribution) that one is ill from radiation exposure remains. Factual information for those who have clearly not been exposed, or for those whose exposure is minimal, can be gently and consistently presented; however, some of the risk factors for MUPS suggest that simply repeating factual data may be of



limited benefit. Nonetheless, it is important to repeatedly reassure individuals that contamination between individuals is unlikely and presents minimal risk.

For individuals whose anxiety and somatic complaints persist, more intensive psychological and even pharmacological treatment may be necessary. Paradoxically, individuals most likely to suffer from sustained MUPS-related reactions are particularly reluctant to seek mental health treatment, as they see a referral to a mental health professional as evidence of the professional's disbelief in their symptoms and suffering. It is imperative for mental health helpers to clearly explain that the treatment is for their symptoms, and not to "dissuade" them of their symptoms. Psychoeducation can be helpful, as well as couching the intervention strategies as ways that the individual can lessen their distress over their physical state. Finally, rather than scheduling appointments on an as needed basis, it is recommended to schedule appointments at regular intervals in order to avoid reinforcement of maladaptive coping mechanisms that may become associated with MUPS (CSTS, retrieved 5/1/10).

Needs of Special Populations

Certain groups are identified as particularly vulnerable in times of disaster and in need of specific interventions to:

- address increased harm likely to be experienced during the event as members of a special population
- mitigate or treat mental health reactions that may be more intense or urgent than general population

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- Emphasize that these two goals are the foundation of providing culturally responsive services designed to meet the needs of vulnerable groups.

Needs of Special Populations

Young children and their parents, pregnant women, older adults, and individuals from different cultures and/or with limited English proficiency are identified as special populations in need of specific psychoeducation outreach efforts following radiological events. Specific issues for each group, as well as suggested strategies, will be briefly reviewed.

Children and Parents

Children who have been exposed to the radiation event may display more severe and acute signs of illness (e.g., ARS) because of their relatively smaller body surface-to-radiological substance ratio, causing potentially greater exposure (NCTSN, retrieved June 7, 2010). For those children who are not clearly impacted physically, psychosocial reactions to radiation events will be similar to other disasters, affected by developmental stage and mitigated by parental/caretaker response. Even more than in most disasters, it is imperative for parents/caretakers to monitor their own reactions in talking with their children. Because one of the most prominent fears of parents is that their children may be irreparably damaged by the potential for radiation exposure (e.g., the increased risk of thyroid cancer and leukemia that has been well-publicized in media reports),

Special Populations:
Children and Parents

- Children are more vulnerable to radiation exposure and may become sicker than adults in response to the same dose because of their smaller size
- Parents are likely to become extremely anxious about short- and long-term health effects upon their children

- Advise parents to monitor their reactions as children will pick up on parental anxiety
- Helpers should provide parents with psychoeducation on how to help their children (see manual for specific suggestions helpers can offer)

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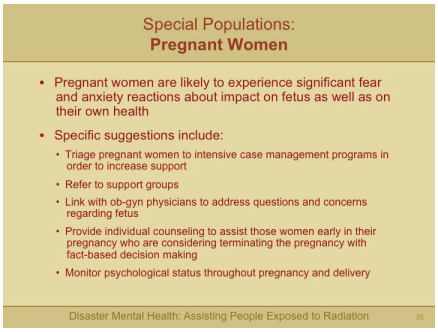
parents will need to contain their own anxieties and make special efforts to present factual information to allay fears and anxieties.

Specific suggestions that helpers can provide to parents include:

- Be a role model for your child/children. Remain calm so that your child can learn how to manage stressful situations
- Monitor adult conversations regarding the radiation event that your child might overhear
- Limit media exposure
- Reassure children they are safe and you will do everything to keep them safe
- Take care of your child's health - make sure they get sufficient rest, exercise, good nutrition, etc.
- Maintain regular daily life and a routine, including expectations (e.g., attending school, unless instructed otherwise by public health officials)
- Encourage children to help others
- Give extra support and attention at bedtime
- Maintain a hopeful and realistically positive attitude
- Listen to your child's concerns and respond to them as they arise

Pregnant Women

Pregnant women who are potentially exposed to radiation events will feel particularly vulnerable, and are likely to experience significant fear-based reactions, as well as anxiety symptoms. It is essential to address these psychological reactions as early as possible, and to provide enhanced psychosocial support. Pregnant women will also likely require more frequent contact with ob-gyn physicians, and such increased demands should be anticipated by the public health system.



Specific suggestions include:

- Triage pregnant women to intensive case management programs in order to increase support
- Refer to support groups
- Link with ob-gyn physicians to address questions and concerns regarding the fetus/unborn child

- Provide individual counseling to assist those women early in their pregnancy who are considering terminating the pregnancy with fact-based decision making
- Monitor psychological status throughout pregnancy and delivery

Special Populations:
Older Adults

- Older adults may have mobility difficulties or other pre-existing health issues that increase feelings of vulnerability and/or sensitivity to exposure or treatment; they may be more prone to MUPS
- Specific suggestions include:
  - Involve older adults in assisting others as much as possible, as a means of reducing isolation and helping them feel valuable
  - Develop outreach programs specifically for older adults
  - Develop family-oriented activities that take into account generations and extended families
  - Include screenings for depression and anxiety
  - Encourage physical activity as much as possible as an effective means of reducing arousal and anxiety
  - Provide links to social support groups

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Older Adults

Older adults may feel particularly vulnerable because of physical impairments and/or shrinking social supports that can influence outcomes to potentially traumatic events. Older adults who are less mobile may feel especially vulnerable if social conditions of panic occur, as they will feel trapped and unable to escape without assistance. Older adults may also be more prone to experience MUPS; they may experience a greater degree of physical symptoms to begin with as part of the aging process, and these symptoms may be exaggerated under distress. If they are in need of medical care due to exposure, some of the treatments provided may be difficult for the older adult to tolerate. Finally, older adults who have less developed social support networks are particularly vulnerable to psychological distress, which can further compromise their overall well-being and health status.

Specific suggestions include:

- Involve older adults in assisting others as much as possible, as a means of reducing isolation and helping them feel valuable
- Develop outreach programs specifically for older adults
- Develop family-oriented activities that take into account generations and extended families
- Include screenings for depression and anxiety
- Encourage physical activity as much as possible as an effective means of reducing arousal and anxiety
- Provide links to social support groups

Special Populations:
Culturally Diverse Groups

- For members of the non-dominant culture, particularly recent immigrants, refugees, and undocumented citizens, fear and anxiety about the event may compound existing feelings of marginalization and isolation
- Language barriers to receiving or understanding warnings may increase risk of exposure
- Undocumented immigrants may resist seeking healthcare or other contact with authorities, fearing deportation

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Culturally Diverse Groups

Primary issues for individuals who are from the non-dominant culture, particularly recent immigrants, refugees, and undocumented citizens, are the compounded reactions created by a growing climate of fear and anxiety in the context of experiencing varying degrees of marginalization and isolation (referred to as cumulative adversity, Remennick, 2002). Undocumented residents may hesitate to consult with health officials because of fears of deportation. Additionally, the rapidly changing scenario that is likely to characterize the

radiation-related disaster may make it difficult for individuals and families from certain less prominent linguistic groups to get timely and accurate information, particularly about necessary precautions to take and/or sheltering in place.

Specific suggestions include:

- Plan ahead and have educational materials prepared in advance
- Utilize local radio and television stations to communicate with different cultural and linguistic groups
- Utilize houses of worship and religious/spiritual leaders to gain access to communities and provide accurate information
- Utilize natural community leaders to gain access and disseminate information
- Provide assurances that identity documents and proof of citizenship/immigration status will not be required in order to obtain treatment and social service assistance
- Develop outreach plans to monitor and track the needs of these often neglected communities

- Emphasize the need for sufficient preparation and planning, including effective outreach strategies, to disseminate timely information to different linguistic and cultural groups.

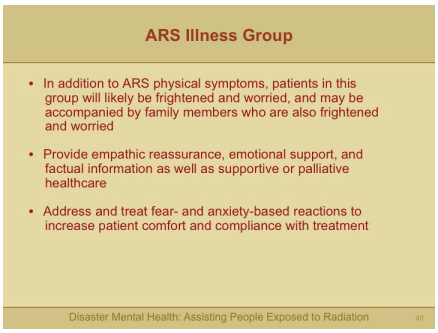
SPECIFIC ISSUES FOR HOSPITAL-BASED MEDICAL PROFESSIONALS

The anticipated surge in demand for medical evaluation and consultation following a radiation event may overwhelm the capacities of some facilities. The September 1987 accident in Goiania, Brazil is a lesson in the profound public health consequences of widespread fear and panic arising from radiation events. An abandoned metal container of cesium 137 from a radiotherapy clinic was found in a junkyard by scavengers. It was broken open, and children later came by and began playing with the glowing substance. Unaware of the danger of the substance, workers in the junkyard also took some of it home, and contamination spread throughout the small community. Ultimately, the accident resulted in four deaths, about 260 people showing signs of contamination, and 49 needing medical treatment, as well as 800 acres of land contaminated. In short, it was not a particularly lethal or dangerous event in terms of overall consequences. However, as word spread of the incident, people panicked. Within days, 112,000 people concerned about exposure overwhelmed the medical system; some individuals fainted in line, and although

- Data from the sarin gas incident in Japan suggests significant surge in psychologically mediated reactions. In this 1995 incident where 12 people died of direct effects of exposure to the gas, approximately 88% of all visits to emergency medical visits were made by persons who were not exposed but experiencing symptoms of psychological distress. (Okumura, T. Suzuki, K. & Fukuda, A., et al., 1998).

most were found not to be exposed, they had pronounced signs of ARS. Notably, 8.3% of the first 60,000 people seeking medical screening presented with signs and symptoms consistent with ARS, even though they had no exposure. The consequences of the event continued for months; citizens of Goiania were banned from hotels when they tried to travel, airline pilots refused to fly if citizens were on the plane, and discrimination against these citizens was rampant in many other ways (Becker, 2004). Although this example is extreme, it highlights the power of fear to create utter chaos.

In anticipating a demand for medical consultations, a conservative estimate of unexposed to exposed patients appearing in medical settings is 4 to 1 (CSTS, retrieved 5/1/10). Therefore, it is essential that emergency management and public health officials carefully plan and coordinate services for management of such events. Healthcare providers will play a critical role in determining how the general public will react to the event in the days and weeks following the first exposures. For example, following the 2001 anthrax attacks, 77% of the surveyed public reported that they would seek the advice of their doctor and perceive the information provided as a trusted and reliable source of guidance (CSTS, retrieved 5/1/10). For hospital-based medical professionals, this section will focus upon the psychosocial issues of three groups that are likely to be assessed through a triage center: those ill with acute radiation syndrome (ARS), those who have been exposed, and those who have no exposure but present with physical and/or psychological symptoms (CDC, 2003, 2005; IAEA, 2005; Becker and Middleton, 2008).



ARS Illness Group

These individuals will likely present with symptoms common to ARS (nausea, vomiting, fatigue, diarrhea, skin rash), which may be delayed depending upon the intensity of the exposure. Some individuals may not exhibit prominent psychological symptoms of distress, but unless they are severely ill, most individuals will likely be frightened and worried, and they may be accompanied by family members who are also frightened and worried. Providing empathic reassurance, emotional support, and factual information will assist most ill individuals and their families. It may also be helpful to utilize the services of the hospital social worker to provide additional support. Medical professionals will likely be focused on treating the symptoms of ARS and providing palliative care; it is recommended that they also make efforts to attend to psychosocial needs, as reducing hyperarousal and other fear- and anxiety-based reactions will assist the patient in complying with treatment, feeling more comfortable and recovering more quickly.

Exposure Group

These individuals may or may not present with physical and/or psychological concerns. Once exposure level and physical status have been assessed, it is recommended that their psychological status be assessed through a brief screening tool if possible. Identifying risk factors for more complicated reactions (e.g., trauma-spectrum disorders) may be helpful in preventing future health-related problems. Referring individuals for additional psychosocial support may be particularly helpful at this stage, and it can be emphasized to the patient that it is important they maintain their overall health and well-being, including monitoring their emotional health and stress levels. This support can be offered through trained clinicians in the Emergency Services Extended Care Center (ESECC; see the box for specific suggestions).

Although infrequent in occurrence, some individuals who have been exposed to radiation events will present with no signs of psychosocial distress. This situation should not necessarily be seen as a "positive indicator" of adaptation. It may represent a more extreme form of denial and dissociation that may complicate the patient's health status and well-being at a later point in time. It is recommended that these individuals be referred and gently encouraged to go to the ESECC for a "check-in" before final discharge. Nursing staff can inform the patient that such referrals are made as a matter of course in order to safeguard patient well-being in the face of such potentially traumatic events.

Exposure Group

- If possible, assess psychological status as well as exposure level and physical status, referring for psychosocial support as indicated
- Encourage exposed patients to maintain overall health and well-being, including monitoring emotional health and stress levels
- Evaluate those with complete lack of distress carefully, as this reaction may indicate potentially harmful denial or dissociation rather than positive coping

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No Exposure Group

These individuals will likely present to the hospital emergency department with varying degrees of pronounced physical symptoms. Once it has been determined that there has been no exposure, and therefore, no risk of illness, this information should be factually presented to the patient and his or her family members. The patient's reaction at this juncture will determine the next steps. If the patient and his or her family members gratefully receive this reassurance and it significantly reduces their arousal and symptoms, they can either be referred to the social worker/crisis clinician for psychoeducational information on staying healthy during stressful times, or discharged home with a referral for this consultation in the future should they desire it. If the patient continues to feel ill, continues to be distressed, and perhaps insists that they may have been exposed and are concerned about their health, he or she (and accompanying family members) should be referred to ESECC.

No Exposure Group

- For those individuals presenting to ED with physical symptoms, yet no exposure has occurred, provide fact-based information to person and family explaining that there is no risk of illness
  - If this reassurance reduces arousal and symptoms, refer for psychoeducational information or discharge
  - If the individual continues to feel ill, acts distressed, or insists they have been exposed, refer to the Emergency Services Extended Care Center for assistance

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Emergency Services Extended Care Center

- To address expected surge following a radiological event, hospitals should establish an area for a combined medical/psychosocial unit/team that can provide:
  - Crisis counseling for acutely distressed patients and family members
  - Psychoeducational consultation regarding psychological responses to radiation events
  - Brochures and materials providing accurate information regarding radiation exposure
  - Stress management strategy brochures and consultation
  - Individual and family counseling to address particular concerns (e.g., pregnant women, etc.)
  - Child-based services
  - Psychiatric consultation
  - Capacity to refer back for re-evaluation if warranted

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Emergency Services Extended Care Center

- Avoid stigmatization; do not refer to patients as "the worried well"
- Take all concerns and complaints seriously
- Reinforce competency and self-efficacy
- Schedule follow-up appointment rather than prn (call when needed) arrangement, particularly for patients with MUPS
- Educate patients that distress is universal and normal
- Be prepared to answer questions regarding safety of food and water supplies
- Counsel patients regarding conflicting media reports
- Prepare patients to expect reactions may continue
- Consider identifying different areas of hospital as low risk, moderate risk, and high risk
- Refer to support groups and link to social services and trained mental health professionals as needed

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Specific Suggestions for Hospital-Based Psychosocial Response

- Establish an area of the hospital for a combined medical/psychosocial unit/team that can provide the following services
  - Crisis counseling to deal with acutely distressed patients and family members
  - Psychoeducational consultation regarding psychological responses to radiation events
  - Brochures and materials that provide accurate information regarding radiation exposure, including what is known about the long-term effects of exposure (essential as people often have difficulty remembering critical information that is told to them when under conditions of fear and/or high anxiety). These materials should reinforce the basic principles of protection from radiological risk so people can assess their actual exposure:
    - Shielding - minimize exposure by sheltering in place as directed
    - Time - limit time spent near radiation source
    - Distance - maximize distance from radiation source
  - Stress management strategy brochures and consultation
  - Individual and family counseling to address particular concerns (e.g., pregnant women, etc.)
  - Child-based services
  - Psychiatric consultation
  - Capacity to refer back for re-evaluation if warranted
- Consider calling this area "Emergency Services Extended Care Center (ESECC) to avoid stigmatization and encourage comfort and adherence (CSTS, retrieved 5/1/10). Do not refer to the patients referred to this area as "the worried well"
- Take all concerns and complaints seriously
- Reinforce competency and self-efficacy
- Schedule a follow-up appointment rather than a prn (call when needed) arrangement, particularly for the patient with MUPS
- Educate patients that distress is universal and normal
- Anticipate questions about the safety of food and water supplies and be prepared with factual answers
- Counsel patients that they may hear conflicting media reports about the radiation event, and encourage them to use reliable sources of media information
- Prepare patients to expect that their reactions may continue for a period of time
- Consider identifying different areas of the hospital as low risk, moderate risk, and high risk to designate the status of patients referred to these areas. These designations will reassure patients that their concerns are taken seriously
- Provide linkage to social services as needed
- Provide referrals to support groups as indicated (e.g., for pregnant women)
- Provide linkage to trained mental health professionals in the community as needed

RISK COMMUNICATION FOR RADIATION EVENTS

The information provided thus far emphasizes the critical necessity of expert risk communication with and for the public. Because of the heightened fear triggered by disasters involving radiation or nuclear events, communicating with individuals and with the public serves an essential stabilization function if done well – and can serve to foment panic if done poorly. The public often does not believe the information presented, feeling that the risk has been down-played, so using credible sources for information dissemination is crucial. One of the strongest findings of the Three Mile Island accident relates to the issue of communication, and how risk communication failures greatly exacerbated the human impact of that emergency (Becker, 2004).

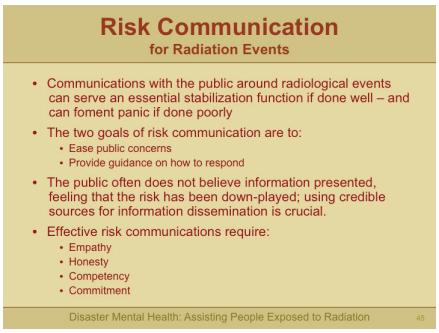
The term consequence management is used by emergency management and public health officials alike to refer to strategic planning, a central aspect of which is effective risk communication. Consequence management by definition includes management of misinformation and rumors, human processes that can have devastating effects on public health and emergency response efforts and that inevitably arise in times of crisis. To optimize communication effectiveness, good risk communication skills should not be relegated to high-level government and public health officials, but should also be taught to public health and mental health clinicians (Hrudey et al., 2003; Gray & Ropeik, 2002; Lasker, 2004).

The two goals of risk communication are:

- Ease public concerns
- Provide guidance on how to respond

To achieve these goals, researchers in the field suggest that the qualities demonstrated by the communicator may be more critical than the message delivered.

Four Qualities of Effective Risk Communicators
■ Empathy ■ Honesty ■ Competency ■ Commitment



- Consequence management by definition includes management of misinformation and rumors. Public health and mental health clinicians need to learn the essential elements of risk communication in order to effectively deliver services.
- Public health officials should anticipate that communication may be met with varying degrees of mistrust and disbelief; individuals may believe that the risk to them and their loved ones has been minimized. Encourage participants to consider how they will effectively counter these reactions of fear and mistrust.

These four qualities are perceived as building trust and credibility. Building trust and credibility of not only the officials in charge, but also the clinicians delivering the services, will provide the strongest safeguards against rumors and misinformation. To further support these critical attributes of trust and credibility, Covello and Allen (1988) suggest five "rules":

Five Rules for Building Trust and Credibility

1. Accept and involve the public as a partner.
Work with and for the public to inform, dispel misinformation and, to every degree possible, allay fears and concerns.

2. Appreciate the public's specific concerns.
Statistics and probabilities do not necessarily answer all the questions. Be sensitive to people's fears and worries on a human level. Acknowledge the sadness of illness, injury, and death. Do not overstate or dwell on tragedy, but do empathize with the public's pain and provide answers that respect their humanity.

3. Be honest and open.
Once lost, trust and credibility are almost impossible to regain. Never mislead the public by lying or failing to provide information that is important to their understanding of issues.

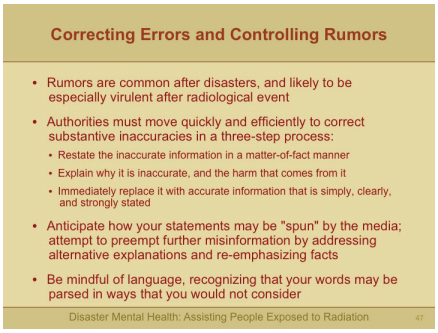
4. Work with other credible sources.
Conflicts and disagreements among organizations and spokespersons create confusion and breed distrust. Coordinate your information and communications efforts with those of other legitimate partners.

5. Meet the needs of the media.
Never refuse to work with the media. The media's role is to inform the public, which will be done with or without your assistance. Work with the media to ensure that the information they are providing the public is as accurate and enlightening as possible.

In short, remember the equation that crisis + heightened public emotions + limited access to facts + rumor, gossip, speculation, assumption, and inference = an unstable information environment.

That instability opens the door to mistrust and misinformation, increasing anxiety for those affected. A concerned individual's question such as, "If you're not certain, how can we know we're being protected?" is not a question about data, it's about personal and family safety. That is the issue to be addressed.

Correcting Errors and Controlling Rumors

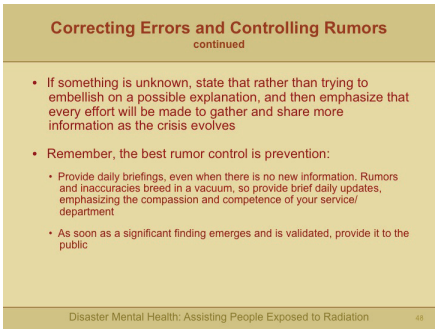


Substantive inaccuracies (e.g., those that have the potential to further a crisis or problem) require rapid corrective action, as the longer misinformation remains in the information environment the more difficult it may become to correct it. This quick corrective action must be balanced with a certain degree of tolerance for human processes - i.e., people will talk, and rumors will occur. Government and public health officials who sharply react to all rumors run the risk of inadvertently adding to their legitimacy (Becker, 2004; Rahu, 2003).

Guidelines for Responding to Inaccuracies and Rumors:

- Distinguish between substantive inaccuracies that may damage public health efforts and/or jeopardize public welfare from minor rumors that will dissipate without action and do not provide a risk to the public good
- Move quickly and efficiently to correct substantive inaccuracies in a three-step process:
  - Restate the inaccurate information in a matter-of-fact manner
  - Explain why it is inaccurate, and the harm that comes from it
  - Immediately replace it with accurate information that is simply, clearly, and strongly stated
- Keep the level of your response appropriate to the level of the inaccuracy:
  - Over-reacting to an isolated mistake or piece of misinformation will only attract attention to it, and perhaps call into question other related messages
  - Under-reacting to widely reported misinformation will only compound the damage

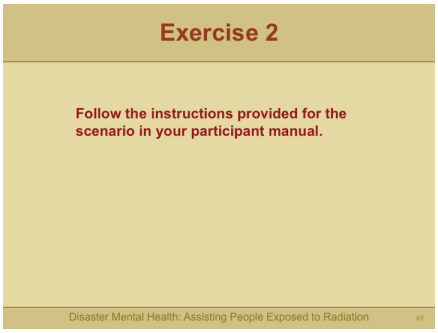
- If a damaging rumor is confined within a small group, address only this group and do not make a public announcement
- When addressing inaccuracies and misinformation, anticipate how your statements may be "spun" by the media, and attempt to preemptively close off these avenues of further misinformation by simply addressing alternative explanations and then re-emphasizing the facts
- Be mindful of language, recognizing that your words may be parsed in ways that you would not consider. Have a trusted colleague review your public statements for such potential misinterpretations
- If the truth is that something is unknown, state that rather than trying to embellish on a possible explanation, and then emphasize that every effort will be made to gather and share more information as the crisis evolves
- Finally, the best rumor control is prevention:
  - Provide daily briefings, even when there is no new information. Rumors and inaccuracies breed in a vacuum, so provide brief daily updates, emphasizing the compassion and competence of your service/department
  - As soon as a significant finding emerges and is validated, provide it to the public (but be sure it is validated rather than making the mistake of trying to "beat the media" to public dissemination)



Lastly, the ethical implications of providing health-related services in the context of such a potentially damaging event require careful consideration. Although the specific issues differ from those of a pandemic, aspects of the ethical principles that were applied for that type of public health emergency are highly relevant for radiological and nuclear disasters. The University of Toronto's Joint Centre for Bioethics issued ethical guidelines after Toronto experienced a significant public health emergency as a result of the SARS (severe acute respiratory syndrome) outbreak in early 2003. Key ethical principles from this task force are summarized here (University of Toronto Joint Centre for Bioethics, 2005):

- **Individual Liberty:** Restrictions to liberty necessary in a public health crisis should be proportional to the seriousness of the risk of harm, least restrictive, and applied equitably.
- **Protection of the public from harm:** Imperatives for compliance will be thoroughly reviewed, with established mechanisms to review decisions made.

- **Proportionality:** Requires that restrictions to individual liberty and measures to protect the public from harm should not exceed what is necessary to address the actual level of risk.
- **Privacy:** Individuals have a right to privacy in health care. Decisions to override such rights will only be made in the case of the necessity of protecting the public from harm in the event of a crisis.
- **Duty to provide care:** Health care providers will have to weigh the demands of their professional roles and codes of ethics against other competing obligations to their own health and to family and friends.
- **Reciprocity:** Requires that society support those who face a disproportionate burden in protecting the public good.
- **Equity:** Decisions regarding individual health care needs must be balanced against the resources needed to meet the demands of the public in emergency situations. In a health care crisis, some services will be maintained while other, less urgent services, may be deferred.
- **Trust:** Decision makers must uphold the public trust through upholding such values as transparency.
- **Solidarity:** Global collaboration will be necessary in order to meet the needs of disadvantaged people and nations, requiring countries to set aside traditional values of self-interest or territoriality.
- **Stewardship:** Requires strong leadership driven by integrity and principles.



- It will be helpful to review the two options for an exercise ahead of the course in order to be well-acquainted with the scenario and prepare various roles. You may choose to conduct either Exercise 2 or 3, depending on the composition of the group and the time allotted. Be sure to leave adequate time to debrief the exercise.
- Refer to Appendix D for tips on facilitating this exercise.
- Encourage participants to write the class's responses down so they can refer to them when leading the training themselves.

COMPASSION FATIGUE AND SELF-CARE

Mental health and public health helpers and first responders can experience a range of reactions to those they assist – from feeling good about the help they have provided to feeling distressed about witnessing another human being's suffering. These reactions span the "compassion satisfaction to compassion fatigue continuum," and it is helpful to acknowledge that the work we do provides us with both opportunities. Compassion fatigue (CF) has been defined as "the cost of caring for those in emotional pain." It is the emotional duress experienced by those in close contact with trauma survivors. Figley (1995) captures the human aspect of CF with this simple description: "Sometimes . . . we become emotionally drained by [caring so much]; we are adversely

affected by our efforts" (p. 5). Compassion fatigue is an aspect of being human, therefore, and reflects our ability to care for others, empathize with their suffering, and genuinely seek to help them. When we find ourselves caring for others in highly stressful situations, such as in crises and disasters, and we feel obligated to help as many people as possible, we can become vulnerable to compassion fatigue. Helpers also may experience vicarious traumatization, which can have a similar disruptive effect on the healthcare professional or first responder as a traumatic event has on a patient, with symptoms and reactions that often mimic the symptoms of PTSD.

Figley identifies four reasons why professional helpers (including public health and mental health workers, first responders, clergy) are vulnerable to CF:

1) empathy is a major resource for helpers to help the traumatized and suffering
2) most helpers have experienced some traumatic event in their lives
3) unresolved trauma of the helper can be activated by reports of similar trauma or suffering in those they seek to help.
4) children's trauma is particularly provocative for helpers, and helpers in disaster situations cannot escape seeing the suffering of children.

Unlike other forms of job "burnout," CF is precipitated not by workload and institutional stress but by exposure to patients' trauma. CF can have profound effects on the professional helper; if left unaddressed, it can disrupt the professional's feelings, personal relationships, physical well-being, work performance, and overall view of the world.

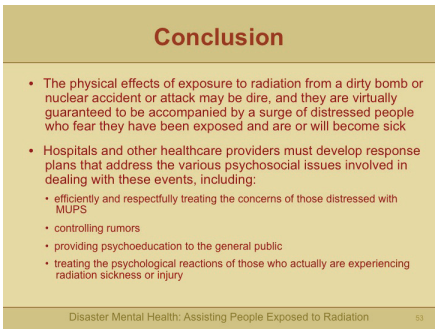
Contributing Factors to CF in Healthcare Staff:

- Exposure to multiple traumatic and grief experiences of patients and colleagues
- Concern for distress of colleagues
- Chronic stressors
- Individual past/present traumatic and unresolved grief experiences
- Feelings of helplessness to help patients, or in some instances, to save lives
- The need to maintain patient confidentiality prohibits discussion of cases with family and/or friends, precluding valuable sources of social support

- Helpers must tolerate a great deal of ambiguity and uncertainty; in many cases they will not know the outcome of contact with patients
- Concerns for legal ramifications of the services provided (e.g., being involved in litigation on patient care cases, perhaps without cause)
- Increased risk of being involved in verbal and physical assaults from patients who are frightened, agitated and out of control

Self-Care Suggestions:

- Build balance into your life – balance work and play, socializing with family and friends and solitude, physical and mental activity
- Focus on the basics of good health care, practiced regularly:
  - Adequate sleep on a regular basis (7-8 hours per night)
  - Balanced diet, with plenty of fresh fruit and vegetables, making sure to drink lots of water to stay well-hydrated
  - Physical exercise
  - Active relaxation, such as meditation or a similar calming activity
  - Limit alcohol and tobacco intake, particularly during stressful periods
  - Socializing with family, friends, colleagues
- Know and respect your limits
- Let your faith comfort you
- Recognize signs of compassion fatigue and vicarious traumatization, and take preventative action
  - Where possible, vary your patient/work load
  - Limit contact to the extent possible with highly distressed patients that may be unable to benefit from your help at the time
  - Seek support of colleagues, friends and family
  - Support others - sometimes helping others allows us to help ourselves in profound ways
  - Plan time off before you feel overwhelmed
- Support efforts to develop and sustain staff well-being programs in the workplace
- **If you find that you are suffering from the signs of compassion fatigue and you are not improving, get professional help. It can make a difference!**



- Review the points included in the Conclusion slide.
- Solicit questions and feedback about the course.

CONCLUSION

As this module has made clear, the physical effects of exposure to radiation from a dirty bomb or nuclear accident or attack may be dire, and they are virtually guaranteed to be accompanied by a surge of distressed people who fear they have been exposed and are or will become sick. As a result, it's essential that hospitals and other healthcare providers develop response plans that address the various psychosocial issues involved in dealing with these events, including efficiently and respectfully treating the concerns of those distressed with MUPS, controlling rumors, and providing psychoeducation to the general public, as well as treating the psychological reactions of those who actually are experiencing radiation sickness or injury. Now that you have completed this module, you are encouraged to continue to educate yourself about the topic using the resources listed in Appendix B – and to share the lessons from this training with others in your healthcare facility so you can become as well prepared as possible for this worst-case scenario.

EXERCISES AND ACTIVITIES

Three options for exercises are provided; the facilitator will choose which exercise to use depending upon time and participant needs.

Exercise 1: (10 minutes)

Instructions to participants:
On a sheet of paper, write down all the words and images that come to mind when you think of a radiation event, nuclear accident or "dirty bomb" incident.

- Participants will have an opportunity to share with the group the images and words that came to mind when they were imagining these events.
- Facilitator will write down the responses of participants and note common themes.
- Facilitator will emphasize how these responses reflect essential human processes and reactions.

Exercise 2: (35-40 minutes)

Divide participants into two groups playing the following roles:

1) Community members who are coming to the local hospital's emergency department
2) The emergency department's integrated medical/psychosocial team that has been mobilized for this disaster

Review the following scenario:
There have been a series of RDDs ("dirty bombs") detonated throughout your city during the past 24 hours. Some community members were directly affected as they were in the immediate vicinity of the bomb detonation, some were not in the immediate area but fear they may have been close enough to have been exposed, and some are fearful that the radiation is spreading everywhere and even though they were fairly far away, they are convinced they are "contaminated." The integrated medical team within the emergency department includes physicians and nurses trained in dealing with radiation events, as well as a mental health team that is also trained in dealing with the psychosocial consequences of radiation events. People from the community are overwhelming the emergency department, desperately wanting to know if they will become ill or even die from the radiation levels they feel certain they have been exposed to. Families with children, individuals, older adults, and people from various ethnic/cultural communities within the city are flooding the

hospital begging to be seen. In reality, there will likely be three groups of people in the ER: 1) some who have been exposed and have ARS or other radiation illness or injury; 2) some who have been exposed but do not have ARS or another injury or illness, but are very distressed and agitated about what will happen to them and if they will get sick; and 3) some who have had no exposure but are either terrified they have been exposed and will become ill, or are absolutely convinced they have been exposed and will get ill regardless of what they are told.

The facilitator will hand each participant a card with his/her specific role, such as:

- 24-year-old married father of two young children who are severely ill with ARS
- 44-year-old single female, with no risk of exposure, presenting with severe MUPS
- 78-year-old widowed female with early dementia, unsure of what has happened and frightened she will die
- etc.

The medical team will have the following assigned roles:

- Nursing supervisor for ER
- Nurses
- ER physicians
- Mental health clinicians

The facilitator will ask participants to simulate an ER in a developing state of chaos.

Participants playing the role of the medical team are asked to develop a plan of action and implement it. The medical team will meet to determine how to set up their triage center and will then proceed with evaluating and treating all the patients who are crammed into their waiting area and in the halls.

Participants playing community members are asked to play their role as realistically as possible.

Role-play simulation continues for 20 minutes. The facilitator then will stop the simulation and ask participants to take a few slow, deep breaths in order to decompress.

The facilitator will guide a structured review of the exercise, utilizing the following questions as a guide:

- What did you experience in your particular role?
- What did you notice about the ER environment overall?
- What were some of the primary challenges, from the perspective of your role?
- What was helpful?
- What was not helpful?
- For medical staff: What did the various people you were seeing seem to need the most?
- For the community members: What did you need most from the ER staff?
- What could have been done differently to ease the panic and chaos?

Exercise 3: (30 minutes)

Divide participants into small groups of 4 to 5 people each. Distribute the scenario described in Exercise 2. Explain that each group will be acting as an integrated medical team and will be developing a plan for how to triage, evaluate and manage all the patients that are overwhelming their emergency department. Instruct participants to use the information and principles they have been introduced to in the training and develop a preliminary plan for how they would set up the ER, and how they would assess and manage the three different groups of patients who are presenting for evaluation and treatment.

At the end of 20 minutes, bring small groups back to larger plenary group and process the exercise, using the following questions as a guideline:

- What were some of the primary challenges you faced in trying to manage this crisis?
- What were your priorities?
- How did you manage each of the three different patient groups?
- What were the primary interventions you used?
- What reactions did this elicit in you as you went through the exercise?
- What suggestions would you have for your colleagues if faced with a similar situation?

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APPENDIX B:
INTERNET RESOURCES

In addition to the readings listed in the References section, a number of governmental agencies offer materials that may provide useful information on planning for and responding to radiological and nuclear events. (All URLs were correct at the time of publication.)

Department of Health and Human Services

The Department of Health and Human Services operates an extensive website, **Radiation Emergency Medical Management: Guidance on Diagnosis & Treatment for Health Care Providers**:
www.remm.nlm.gov

The site includes background information on radiological events and tools for healthcare providers, such as algorithms for managing treatment for patients who have been exposed and/or contaminated.

Centers for Disease Control and Prevention

The Centers for Disease Control and Prevention provides online resources for health professionals on a range of WMD-related topics:

Radiation Emergencies:
www.bt.cdc.gov/radiation

Bioterrorism:
www.bt.cdc.gov/bioterrorism

Chemical Emergencies:
www.bt.cdc.gov/chemical

Mass Casualty Events:
www.bt.cdc.gov/masscasualties

CDC also offers in-depth downloadable reports on two relevant topics:

Roundtable on the Psychosocial Challenges Posed by a Radiological Terrorism Incident:
www.bt.cdc.gov/radiation/pdf/rt-psychosocial.pdf

Roundtable on Hospital Communications in a Mass Casualty Radiological Event:
www.bt.cdc.gov/radiation/pdf/hospitalroundtablereport.pdf

Department of Homeland Security

The Department of Homeland Security offers concise Fact Sheets summarizing key aspects of nuclear and radiological events:

Nuclear Attack:
www.dhs.gov/files/publications/gc_1230052660333.shtm

Radiological Attack: Dirty Bombs and Other Devices:
www.dhs.gov/files/publications/gc_1216746097047.shtm

Federal Emergency Management Agency

For those seeking more intensive training in operational aspects of responding to radiological events, the Federal Emergency Management Agency's Emergency Management Institute offers a free 10-hour-long independent study course, "Radiological Emergency Management," that addresses fundamental principles of radiation, nuclear threat and protective measures, and incidents involving nuclear and radiological hazards:
training.fema.gov/EMIWeb/IS/is3.asp

National Council on Radiation Protection and Measurements

The National Council on Radiation Protection and Measurements offers a series of commentary briefings and reports on key issues related to radiological and nuclear events:

Commentary 19: Key elements of preparing emergency responders for nuclear and radiological terrorism: December 31, 2005:
www.ncrponline.org

APPENDIX C: INSTRUCTOR GUIDELINES FOR PRACTICE EXERCISES

Exercise Instructor Notes

Your objective is to assist participants in placing the information they are receiving in a "real world" context in order to encourage preparedness. Exercises will also provide an opportunity for participants to face, albeit in a simulated scenario, some of the fear, anxiety, panic, and chaos that may ensue in response to a real radiological or nuclear event. By having an opportunity to prepare for their own reactions, participants will be able to focus more readily on how they can be most helpful to the communities they will potentially serve.

In setting up the exercises, you should ask participants to be aware of their own reactions at each step of the process, and consider how they will manage these very human and expectable stress reactions. Additionally, it would be helpful to ask participants to consider how they can function most effectively in their respective professional roles. Finally, it may be beneficial to ask participants to view the exercises with a broader operational perspective: Ask them to look for gaps in service delivery, identify limitations of preparedness plans, and generally be thinking of the unexpected and considering the consequences of unanticipated events that will inevitably arise in real-world situations.

Two exercises are planned for this training: Exercise 1 and a choice of Exercise 2 or 3. In choosing between Exercise 2 or 3, you should consider the following factors:

- Time: Exercise 2 will likely require at least 15 minutes more to complete than Exercise 3
- Participant mix: As we are aware as instructors, some groups/training classes are more participatory than others. Gauge your group and determine if they would get more benefit from a more "active" exercise (Exercise 2), or a more "abstract" exercise (Exercise 3). Both exercises will provide similar experiences of planning for an event, but reach this objective through different participatory methodologies. In general, Exercise 2 may be most effective for a mixed audience of responders (first responders, public health, mental health), as the different professional roles and interactions among responders will be more evident.
- Classroom environment: Exercise 2 requires more physical space, and will also likely result in more noise! It may also require more monitoring on your part. Plan accordingly given the setting.

Exercise Guidelines

Exercise 1

- Objective: Participants will begin to identify their personal reactions (physical, emotional, cognitive, etc.) to radiological events in order to facilitate personal preparedness
- Methodology: Individual written exercise and large group discussion
- Estimated time: 10-15 minutes

Instructions to participants:
On a sheet of paper, write down all the words and images that come to mind when you think of a radiation event, nuclear accident or "dirty bomb" incident.

As the instructor, you will then ask participants to share their words and images, writing all responses on a flip chart or whiteboard.

- Recognize that there are a broad range of reactions across various domains of functioning (physical, emotional, cognitive/mental, perhaps spiritual)
- Emphasize the common themes, images, and reactions that participants express
- Emphasize how these responses reflect essential human processes and reactions
- Ask participants to keep these responses and reactions in mind as you continue through the training and begin focusing on psychosocial responses
- Emphasize to participants that planning for the management of psychosocial responses to radiological and nuclear events may be more critical than in many other types of disasters.

Exercise 2

- Objective: Through a simulated exercise, participants will experience the critical need for adequate preparation and teamwork during the acute phase of a radiological event, and they will identify potential challenges to effective functioning in their respective roles within a hospital emergency department
- Methodology: Simulation, with assigned roles, followed by large group debriefing of exercise and "lessons learned"
- Estimated time: 35-45 minutes

Scenario:

Divide participants into two groups playing the following roles:

1) Community members who are coming to the local hospital's emergency department following a radiological event
2) The emergency department's integrated medical/psychosocial team that has been mobilized for this disaster

Ask participants to review the following scenario, (which you may also wish to read aloud) which is included in the participant's manual, and can be provided as a separate handout if desired:

There have been a series of RDDs ("dirty bombs") detonated throughout your city during the past 24 hours. Some community members were directly affected as they were in the immediate vicinity of the bomb detonation and required decontamination, some were not in the immediate area but fear they may have been close enough to have been exposed, and some are fearful that the radiation is spreading everywhere and even though they were fairly far away, they are convinced they are "contaminated." The integrated medical team within the emergency department includes physicians and nurses trained in dealing with radiation events, as well as a mental health team that is also trained in dealing with the psychosocial consequences of radiation events. People from the community are overwhelming the emergency department, desperately wanting to know if they will become ill or even die from the radiation levels they feel certain they have been exposed to. Families with children, individuals, older adults, and people from various ethnic/cultural communities within the city are flooding the hospital begging to be seen. In reality, there will likely be three groups of people in the ER: 1) some who have been exposed and have ARS or other radiation illness or injury; 2) some who have been exposed but do not currently have ARS or another injury or illness, but are very distressed and agitated about what will happen to them and if they will get sick; and 3) some who have had no exposure but are either terrified they have been exposed and will become ill, or are absolutely convinced they have been exposed and will get ill regardless of what they are told.

Roles:

You will hand each participant a card with his/her specific role, such as:

- 24-year-old married father of two young children who are severely ill with ARS
- 44-year-old single female, with no risk of exposure, presenting with severe MUPS
- 78-year-old widowed female with early dementia, unsure of what has happened and frightened she will die
- Additional cards should be available with brief roles to accommodate 6-12 participants (half the training class) that would be playing the role of affected community member

The medical team will have the following assigned roles:

- Nursing supervisor for ER
- Nurses
- ER physicians
- Mental health clinicians
- First responders (police, fire, paramedics, etc.)

You will ask participants to simulate an ER in a developing state of chaos.

Participants playing the role of the medical team are asked to develop a plan of action and implement it. The medical team will meet to determine how to set up their triage center and will then proceed with evaluating and treating all the patients who are crammed into their waiting area and in the halls.

Participants playing community members are asked to play their role as realistically as possible.

Response Guidelines:

Encourage both groups of participants (community members and medical/professional team) to act as realistically as possible, yet to include a range of reactions. For example, not all of the community members should be in a state of panic - ask participants to be aware of others and vary their "acting" accordingly to simulate a realistic range of responses. Similarly with the medical team, ask participants to provide a range of professional responses that would be expected, from the nursing supervisor who "takes charge" to the ER physician who may only be concerned about those who are acutely ill, to the crisis counselor who is attempting to juggle many roles and respond to a variety of needs on the part of patients and staff.

It may be most helpful if each group (community members and professional response team) spends a few minutes with each other to familiarize themselves with their roles and "coordinates" how each will play/act out their role.

Role-play simulation continues for 15-20 minutes. Monitor the roleplay and encourage participants to make it as realistic as possible. Then stop the simulation and ask participants to take a few slow, deep breaths in order to decompress.

Structured Review:

You will facilitate a structured review of the exercise, utilizing the following questions as a guide:

- What did you experience in your particular role?
- What did you notice about the ER environment overall?
- What were some of the primary challenges, from the perspective of your role?
- What was helpful?
- What was not helpful?
- For medical staff: What did the various people you were seeing seem to need the most?
- For the community members: What did you need most from the ER staff?
- What could have been done differently to ease the panic and chaos?

Using a flip chart or whiteboard, summarize responses to the following queries as they come up:

- What were some of the primary challenges?
- What responses were helpful?
- What responses were not helpful?
- What could have been done differently to ease the panic and chaos? (lessons learned)

Key Points:

At the close of the exercise, emphasize the following key points:

- Large scale fear and panic can potentially derail the best of plans
- There is no substitute for intensive preparation
- Expect the unexpected
- Rational people can behave very irrationally under the right circumstances; focus on restoring order and stability, containing potentially disruptive behavior while compassionately empathizing with the fears driving that behavior
- Know yourself! As a responder, learn the skill of continuously monitoring your reactions "in the background" so that you can focus on effective functioning

Exercise 3

- Objective: Through an abbreviated "tabletop" exercise, participants will develop a preliminary plan for managing a hospital emergency department during an acute surge following a radiological event in the community.
- Methodology: Abbreviated tabletop/planning exercise conducted in small groups, followed by a large group debriefing of exercise and "lessons learned"
- Estimated time: 30-35 minutes

Scenario:

Divide participants into small groups of 4-5 members in each group. Ask participants to review the same scenario described in Exercise 2 (which you may also wish to read aloud).

Response Guidelines:

Instruct each group that they will be acting as an integrated medical team and will be developing a plan for how to triage, evaluate, and manage all the patients that are overwhelming their emergency department. Instruct participants to use the information and principles they have been introduced to in the training and develop a preliminary plan for how they would set up the ER, and how they would assess and manage the three different groups of patients who are presenting for evaluation and treatment. Included as part of the integrated medical team are: ER physicians, nursing supervisor, ER nurses, and trained mental health clinicians.

Additionally, there will be first responders in the ER that should be included in the planning process. Specific areas to address in the plans should include:

- How will you physically set up the ED to accommodate the influx of patients?
- How will you make triage decisions?
- How will you most effectively manage the fear, chaos and panic that is expected? How will you restore order and stability?
- What are the major medical and psychosocial needs of each of the three groups of patients presenting to the ED?
- How can you best meet these needs?
- What strengths will you bring to this situation as a professional? What are issues that may be particularly challenging for you, and how will you manage these issues?

Structured Review:

At the end of 20 minutes, bring small groups back to larger plenary group and process the exercise, using the following questions as a guideline (you do not need to elicit responses to each question, as time will likely not allow for this, so select questions that you feel are most relevant to your group):

- What were some of the primary challenges you faced in trying to manage this crisis?
- What were your priorities?
- How did you manage each of the three different patient groups?
- What were the primary interventions you used?
- What reactions did this elicit in you as you went through the exercise?
- What suggestions would you have for your colleagues if faced with a similar situation?

You will summarize the groups' responses to these questions on a flipchart or whiteboard.

Key Points:

At the close of the exercise, emphasize the following key points:

- Large scale fear and panic can potentially derail the best of plans
- There is no substitute for intensive preparation
- Expect the unexpected
- Rational people can behave very irrationally under the right circumstances; focus on restoring order and stability, containing potentially disruptive behavior while compassionately empathizing with the fears driving that behavior
- Know yourself! As a responder, learn the skill of continuously monitoring your reactions "in the background" so that you can focus on effective functioning

APPENDIX D:
INSTRUCTOR TRAINING GUIDELINES

The following information is provided to help you lead the direct delivery version of this training within your facility or community. This course was designed to take 2 ½ hours, including at least one exercise. Breaking for 10 to 15 minutes roughly halfway through the session is highly recommended as most people find it difficult to concentrate for extended periods.

About participants

This course will provide participants with tools to help people cope with the psychosocial effects of actual or feared exposure to radiation. It's designed for individuals called to provide assistance in the aftermath of disaster.

- Participants may work in human services, healthcare, or another area, like law enforcement, firefighting, or emergency medical services.
- Participants' jobs during the disaster may be part of their regular responsibilities, or they may be called upon to perform duties outside their job descriptions.
- Participants may be called upon to work in disaster settings, such as a hospital emergency department, a decontamination site, or another disaster relief site.

Be sure to collect contact information for all participants so the Department of Health can keep track of who has received this training. A sign-in sheet that can be photocopied is located at the end of this appendix, and a PDF version is on the Instructor CD. You will be notified about where to send the sign-in sheet after you deliver the course.

Class size

Training effectiveness can by assured by adhering to a few basic instructional principles. One of these principles is to limit the class size. The optimal number of trainees in each training class is between 12 and 25 individuals. The effectiveness of training may be compromised with a smaller or larger class size, so that should be avoided if possible.

Technology

The course is designed to be delivered using a PowerPoint presentation, which ideally will be projected to a large screen so it can be read easily by the entire class. If you don't have a projector available, smaller groups may be able to view the presentation on a central monitor, but this is not recommended. Alternatively, slides could be printed out and participants could follow along on paper. (The slides are included in the margins of the Participant Manual, but because of the small text size, you might want to provide handouts of the slides as well. These can be printed directly from the PowerPoint presentation on the CD.)

Classroom environment

The classroom should be comfortable to ensure a pleasant learning experience. It's essential that the room be configured to support an effective training environment.

A seminar-style room configuration, with participants seated around a U-shaped table facing the instructor and screen, will provide individuals with an opportunity to interact with each other and for the instructor to create a more intimate training experience. Fixed seating in rows is less conducive to discussion and interaction. Other environmental factors such as a room that is uncomfortably warm or cold, or in a noisy area, can impair participants' concentration.

Your skills

Ideally this course will be taught by instructors who have experience in disaster behavioral health. However, this is not always possible, and given this specific topic, it's unlikely that most instructors will have direct experience dealing with radiation exposure. If you're teaching it without having any personal experience, you're encouraged to call on examples you heard while taking the Train the Trainer course. Reading the materials listed in Appendix B is also recommended to increase confidence in your understanding of the topic.

As an instructor, you should possess good:

- communication skills, such as reading non-verbal cues from the audience and listening to what is said, what is not said, and what may be meant by each interaction
- analytical, language, and presentation skills, such that you can process information in a logical consistent manner, articulate that information in a clear and precise manner, and present the information in a dynamic and interesting way to gain and maintain your audience's attention
- organizational and time management skills, such that you can provide an organizational structure that supports the transfer of knowledge, manage the informational structure, and create and maintain a workable training flow

Preparation

The success of this course depends on your ability to coordinate delivery of content and to facilitate the exercise(s). Strategies for preparing include:

- Read all the materials well in advance of delivering your each class. Make notes about the content and about what you plan to say about each slide. The goal is not to read the accompanying text verbatim, but to summarize it and emphasize certain points.
- Practice the delivery of the entire course.
- Learn how to navigate the PowerPoint slides, including exactly when to advance

to the next slide.

- Become comfortable with the technology that is required to deliver this course.
- Review each exercise and suggested responses. You're unlikely to have sufficient time to use all of the exercises provided, so have a strategy in mind for which you will select depending on time available and the size of the group.

Instructor effectiveness

It's critical to manage the classroom experience effectively to achieve curriculum goals and to make the training experience valuable for the participants. Although many people contribute to the quality of the classroom experience, the instructor is primarily responsible for providing a comfortable learning environment. Therefore, you must:

- Provide structure, direction, guidance, and feedback throughout the training.
- Transfer knowledge and information with respect to the subject matter.
- Encourage trainees to ask questions and to participate.
- Check for understanding by directing questions to the participants.
- Provide summaries regularly, and ask if the material is understood.
- Answer questions using clear descriptions or an experience to illustrate a point.
- Use open-ended questioning to facilitate self-discovery.
- Set clear expectations about what to read, do, and practice.
- Share actual field experiences that illustrate the concepts that are being discussed.
- Facilitate successful completion of the activities as outlined in the instructor manual.

Classroom management

Instructors also must manage the classroom experience as effectively as possible. Elements of effective classroom management include clear expectations of participant behavior in the classroom. Whenever these expectations are not met, the instructor must make the participants aware of the problem immediately. Let participants know that you expect them to:

- Observe start times for training at the beginning of the day and after the break.
- Ask questions and share information; participation should be encouraged.
- Show respectful behavior towards the instructor and others.
- Share your thoughts with respect; opposing opinions are healthy.
- Set all cell phones and PDAs to vibrate.
- Stay focused on the topic. Interruptions and side conversations are distracting to the instructor and other training participants.
- Speak clearly so that everyone can hear what you are saying or asking.

- Respect the training agenda. If participants need extra time to discuss a topic with the instructor, pursue it after class.
- Be flexible with respect to last minute changes.
- Maintain professional confidentiality when discussing real-life examples.

Instructor and participant manuals

The instructor and participant manuals may each be printed from a single file on the CD. The page layout is designed to provide content and slide references. You will be able to keep yourself and participants focused on the content that is being delivered by using the following features.

- Use the table of contents to communicate context, content organization, and specific topic locations.
- Use the slide numbers on slides, headings, and page numbers to direct participants where to look on a page within the manual.
- Use the instructor notes to help you facilitate the activities.

Your instructor manual will look identical to the participant manual with one exception: Your manual has brief directives and suggestions about how to deliver the content. These directives appear in the outer margins and are not present in the participant manual, which is otherwise the same as the instructor version.

Assisting People Exposed to Radiation
Sign-in Sheet

Training Host (Agency/Organization):		**Training Day and Date:**	
Training Location:			
Instructor's Name:			

Please Print Legibly

Participant's Name	Mailing Address	Primary E-mail Address	Primary Contact Number
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			

Please Print Legibly

Please Print Legibly

Participant's Name	Mailing Address	Primary E-mail Address	Primary Contact Number
12.			
13.			
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