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Radiological Dispersal Device Incident Response Planning: Psychological Management

PURPOSE

Describes pre-planning initiatives for the psychological management of victims, the public, and emergency response personnel following a radiological dispersal device (RDD) incident.

SUMMARY

Experts believe that an RDD event may have a significant psychological impact on victims, emergency responders, and the public, even if the overall number of killed and injured individuals is small. An RDD incident could trigger mass anxiety and strain or could overwhelm a jurisdiction's critical services. However, many jurisdictions may not be prepared to address the individual and collective psychological and behavioral responses to acts of unconventional terrorism, especially those involving RDDs.

Public officials and emergency response personnel must be cognizant of the unique psychological and social factors likely to influence the public's response to an RDD incident. This understanding is essential to help jurisdictions effectively manage acts of terrorism involving the release of radioactive materials. This document describes the fundamental issues and procedures that jurisdictions should consider when pre-planning for the psychological management of RDD victims, emergency responders, and the public:

- Anticipated psychological impact of an RDD event;
- High-risk groups;
- Expected psychological and behavioral responses;
- Behavioral countermeasures and strategies for behavioral consequence management;
- Onsite psychological triage planning; and
- Psychological management at monitoring sites.

DESCRIPTION

Anticipated Psychological Impact of an RDD Event

Experts believe that the psychological impact of an RDD event could be the most difficult aspect of consequence management. Real or perceived exposure to radiation after an RDD incident could cause mass fear and panic because radiation is invisible, odorless, and largely unknown or misunderstood. The invisibility of radiation may be the most terrifying aspect of the RDD. Many people do not understand the physical consequences of radiation exposure and may become concerned with the limited availability of and uncertainty about the

The American Psychological Association's Managing Traumatic Stress: Tips for Recovering From Disasters and Other Traumatic Events includes information on psychological stress following a traumatic event.

effectiveness of prophylactic measures and treatments.

Planners must consider that the behavioral responses of individuals and groups immediately after an RDD incident can complicate or impede emergency response operations. In addition, an RDD attack could generate a large number of psychological stress casualties as well as individuals with long-term psychological effects such as phobias, depression, or post-traumatic stress disorder.

Emergency response personnel need to understand individual and group psychological and behavioral responses unique to radiation exposure or perceived exposure in order to effectively manage an RDD event.

> The Emergency Operations Training Academy's *RAP171DW: Crime Scene Issues, Hazards, and Law Enforcement Interface* states that "the psychological impact of the dispersion of radiological material into the community will far outweigh the impact of the [dirty bomb] explosion. The public has very little understanding of what effect radiological material may have in their community. This fact alone may cause unwarranted panic."

Factors Affecting the Number of Psychological Casualties

Several factors can affect the number of psychological casualties after an RDD event. These can include factors associated with specific incident conditions as well as factors related to individuals or communities involved in the incident.

Incident-Specific Factors

- **Incident magnitude:** The number of psychological casualties from an RDD event will likely rise in proportion to the number of physical casualties and/or the extent of the victims' injuries.
- **Lack of knowledge about or misunderstanding of radiation and radioactivity safety principles:** People who are unfamiliar with radiation safety principles might be more prone to become psychological casualties.
- **Physical proximity to the incident site:** People near the incident site at the time of the event might believe that they have been exposed to radioactive material and be more prone to become psychological casualties.
- **Type of radiological dispersal device employed:** A dirty bomb explosion could produce more psychological casualties than other RDDs. A dirty bomb could cause exposure and/or contamination as well as blast injuries. Other RDDs can simply disperse radioactive materials, and thus only contaminate people.
- **Additional factors:** Some victims and the public may be particularly distressed by emergency responders wearing personal protective equipment as well as by the procedures for monitoring, decontamination, isolation, and observation.

> Following the 1987 Cesium-137 release in Goiânia, Brazil, the lack of knowledge and misunderstanding about radiation generated mass fear and panic. A total of 125,000 people (12.5% of the city's population) requested screening. For additional information on mass panic and psychological issues after a radiological release event, also refer to the *Lessons Learned Information Sharing* Lesson Learned document Radiological Incident Response: Post-Release Psychological Management.

Individual-Specific Factors

These factors can include prior mental health problems, multiple exposure to traumatic or violent events, and pre-existing medical problems.

Community-Specific Factors

These factors include socioeconomic status, prior community traumas or disasters, preexisting social tensions of cultural, racial, or economic origins, and relations with law enforcement and public officials.

Any of the aforementioned factors may increase the risk of acute behavioral problems during and after an RDD incident or other life-threatening event.

High-Risk Groups

Certain groups of people may have a high risk of becoming psychological casualties after an RDD event. High-risk groups might include:

- **Emergency Response Personnel and Cleanup Workers:** Emergency personnel and cleanup workers responding to an RDD incident may not understand radiation principles. These responders can have a false perception of the onsite radiological threat, especially if they lack proper training.
- **Healthcare Personnel Working with Contaminated Patients or Psychological Casualties:** Healthcare personnel managing a large number of potentially contaminated or exposed patients are also at risk of becoming psychological casualties.

Psychosomatic Symptoms in Cleanup Workers

Studies have shown a large increase in psychological distress among the disaster workers that participated in the cleanup after the 1987 Chernobyl nuclear power plant accident:

- Almost half of the Latvian cleanup workers developed psychosomatic disorders.
- Suicide was the leading cause of death among Estonian cleanup workers. Their suicide rate was almost three times higher than the rate of the Estonian population.

- **Parents of Young Children and Children:** Parental concern for children will be high after an RDD event. Thus, emergency response personnel might be faced with high levels of anxiety and concern. Some parents could develop psychosomatic symptoms mimicking their children's symptoms.

  Children are especially vulnerable to post-traumatic stress disorder and other trauma-related psychological consequences. Depending on age, stage, and other factors, children typically do not possess the same psychological constructs and coping mechanisms to make sense or meaning from traumatic loss.
- **People Living Near the Incident Site:** People who reside near the incident site may be particularly worried about the immediate and long-term effects of radiological contamination. For instance, the *Report of the President's Commission on the Accident at Three Mile Island* concluded that the highest levels of mental distress were found among people living within 5 miles of the incident site and in families with preschool children. The most serious health effect of this accident was severe mental stress.
- **Pregnant Women:** Pregnant women will likely experience a high level of anxiety following an RDD event. They may fear that exposure could have health and genetic effects on their babies. Emergency planners might find it helpful to provide pre-natal and genetic counseling resources to pregnant women after the event.
- **Other High-Risk Groups:** Other high-risk groups could include people with prior mental health problems, older people with a limited support network, and evacuees.

Psychological Support for High-Risk Groups

Jurisdictions should plan to implement psychological support mechanisms for members of the general public and for high-risk groups. Experts advise planners to pre-identify a range of mental health and behavioral resources within their communities and in nearby jurisdictions that could be deployed during an RDD emergency response. These resources could include professionals such as psychologists, psychiatrists, and social workers as well as para-professionals such as counselors from schools or faith-based organizations. These mental health and behavioral personnel should be able to quickly adapt their counseling or mental health skills to the requirements of an RDD response.

Emergency planners should position pre-identified psychological support providers at points of high-emotional consequence such as hospitals, decontamination facilities, and other receiving sites from the onset of RDD emergency response. These mental health experts should be trained to understand radiation and radiation safety principles, and should be integrated into the overall response. They should not be held apart as a stand-alone function.

Emergency Response Personnel

Concern about emergency responders' personal safety or their families' well-being may compromise some responders' ability to function during rescue operations. The *DHS Working Group on RDD Preparedness' Medical Preparedness and Response Sub-Group's Report* includes guidance for managing stress in first responders and healthcare personnel. The guidance incorporates management suggestions for supervisors and medical care providers for first responders.

Deployment of Psychological Support Teams following the Madrid Bombings

On March 11, 2004, 10 bombs exploded between 7:39 a.m. and 7:42 a.m. on 4 commuter trains in Madrid, Spain, killing 191 people and injuring approximately 1,755. Madrid Mental Health Services was notified of the attacks at 8:30 a.m. They responded by deploying psychological support teams to offer onsite assistance to victims, their families, and emergency responders. On March 11 and 12, the Spanish Psychological Association's Psychological Emergency and Disaster Teams also provided psychological support to professionals and volunteers working at the temporary mortuary set up at the Institucion Ferial de Madrid convention center. This initial function was extended to include assistance to victims' relatives and friends.

Expected Psychological and Behavioral Responses

Experts anticipate that many members of the public could exhibit specific behavioral responses to real or perceived radiation exposure. This will likely include a dramatic surge in healthcare-seeking behavior by the public, which could overwhelm the healthcare system in a jurisdiction. Other generalized behavioral responses could consist of:

- Greater anger and mistrust of emergency responders and public officials;
- Mass Sociogenic Illness (epidemic hysteria), in which clusters of unexposed individuals present physical ailments and symptoms consistent with exposure to a specific hazardous material;
- Misattribution of normal arousal symptoms, as people misinterpret typical stress reactions (e.g. elevated heart rates and blood pressure, faster respiratory rates) as proof that they have been contaminated by the hazardous agent; and
- Multiple unexplained physical symptoms (MUPS) arising from psychosomatic stress reactions. People experiencing such reactions truly believe that they are injured or ill due to exposure to the hazardous material used in the attack. Thus, these people will demand medical assistance for themselves and their loved ones.

Planners should be aware that some emergency response activities after an RDD incident can further exacerbate both individual and group behavior. These activities can include disrobing for decontamination, being separated from loved ones, enduring possible periods of isolation and observation, seeing responders in protective suits, and generally feeling confused or uninformed. Other factors contributing to the behavioral response to RDD incidents can include the magnitude of the incident (i.e. number of physical casualties and/or extent of their injuries), physical proximity to the incident site, and lack of knowledge or information about the substance dispersed in the attack. Exposures to hazards that may burn or blister the skin can be visually disturbing. Likewise, images of the injured and dead are horrific and can elevate fear to panic levels in any sort of attack.

> The 1987 release of Cesium-137 in Goiânia, Brazil, resulted in mass fear and panic with more than 125,000 people requesting medical screening. More than 4,500 people also sought medical attention after the 1995 sarin gas attack in the Tokyo subway system. Only around 1,000 of these people had been exposed to the sarin gas. These influxes of people following the release of hazardous materials quickly exhausted scarce resources and overwhelmed the local healthcare systems.

Crowd Management in RDD Events

Experts believe that emergency personnel responding to an RDD event must be cognizant of several psychological and behavioral "flashpoints" or "tipping points." This recognition is essential to help responders work safely and effectively with emotionally charged individuals and groups. These flashpoints or tipping points can precipitate hostile, aggressive, and potentially violent behavior from an anxious and fearful congregation of people.

Flashpoints following an RDD event may be time-specific and/or location-specific. Indeed, emergency planners should consider that public fear, anger, and frustration may translate into aggression at certain times and locations following an RDD incident. Location-specific flashpoints can include Points of Dispensing (POD), decontamination sites, hospital emergency rooms, isolation and observation areas, and even morgues. All these are sites at which individuals and groups are emotionally overwhelmed and may act out physically in an attempt to be reunited with loved ones, dead or alive. Pharmacies and facilities storing medicines, medical supplies, and other necessities also may be targeted by those who believe that critical goods are in short supply.

Experts have identified several flashpoint factors associated with governmental, law enforcement, and security activities. These flashpoints can include the denial of access to critical goods, services, or facilities; a perceived breech of rules and inequities in distribution of medications and supplies; a perceived abridgement of rights; the disorganization of responders and caregivers; an excessive or inappropriate use of force by authorities and law enforcement personnel; unfair or zealous arrests; and the unwillingness of others to obey rules. Finally, rumors, misinformation, and poorly crafted risk communications can precipitate flashpoints.

Responders must consider that these specific reactions are not the actions of common criminals exploiting the chaos of a crisis by looting and robbing, but rather of people driven to extreme actions by their perception of an extreme event.

Behavioral Countermeasures and Strategies for Behavioral Consequence Management

Emergency planners can help mitigate the psychological consequences of an RDD incident by developing consequence management strategies and techniques for all phases of the response. In particular, experts advise emergency planners to develop "crowd

management" strategy in place of "crowd control" tactics. Crowd management strategies could be based upon knowledge of likely individual and group dynamics and behaviors.

Jurisdictions should train emergency responders who are likely to respond to an RDD event to understand and manage the psychological and sociological consequences of such an event. This training is essential to help emergency response personnel prepare for and respond to the psychological and behavioral challenges of an RDD incident. Training should incorporate, among other things, verbal de-escalation elements and Psychological First Aid (PFA).

The Uniformed Services University School of Medicine, Center for the Study of Traumatic Stress's Psychological and Behavioral Issues Healthcare Providers Need to Know When Treating Patients Following a Radiation Event describes psychological first aid principles and techniques.

Psychological First Aid for Victims, Emergency Response Personnel, and the Public

PFA is an evidence-informed modular approach for assisting people by reducing initial distress and fostering short- and long-term adaptive functioning in the immediate aftermath of a disaster. The National Center for Posttraumatic Stress Disorder (National Center for PTSD) states that PFA is not a tool only for mental health professionals. Instead, mental health specialists, response personnel, primary and emergency healthcare providers, school crisis response teams, faith-based organizations, disaster relief organizations, Community Emergency Response Teams, Medical Reserve Corps members, and Citizen Corps volunteers can all use PFA in a variety of settings. These settings include the front line of the emergency, decontamination sites, hospital emergency rooms, and a number of other locations.

Emergency response organizations are advised to include psychological first aid as part of their standard operating procedures (SOP). This may be fundamental, especially for responders who arrive first onsite to an RDD event. PFA techniques can be valuable to help these emergency responders manage victims, other emergency response personnel, and the public.

PFA Training and Resources

Emergency response planners could establish pre-incident PFA training for emergency response personnel who will likely arrive first on the scene of an RDD event. Several organizations offer PFA training and resources for emergency response personnel. For instance:

- The Center for the Study of Traumatic Stress provides "Psychological First Aid: How You Can Support Well-Being in Disaster Victims."
- The Johns Hopkins Bloomberg School of Public Health, Johns Hopkins Center for Public Health Preparedness offers "Psychological First Aid" training to first responders and first receivers who are not mental health professionals.
- The New Jersey Department of Human Services, Division of Mental Health Services Disaster and Terrorism Branch offers the "Psychological Consequences of Chemical, Biological, Nuclear, and Radiological Terrorism" training course. This guide includes handouts for victims and survivors of disasters and terrorism.
- The National Child Traumatic Stress Network and National Center for PTSD's Psychological First Aid: Field Operations Guide provides guidelines for early

The National Center for Posttraumatic Stress Disorder and the National Child Traumatic Stress Network (NCTSN) have collaborated in the development of the *Psychological First Aid: Field Operations Guide*. This guide includes handouts for victims and survivors of disasters and terrorism.

assistance of children, adolescents, adults, and families in the immediate aftermath of disasters.

The Disaster Research Education and Mentoring Center offers a list of organizations that can provide information on exposure and reactions to disasters and terrorism events. A wide range of resources is available via these links.

The University of Medicine and Dentistry of New Jersey, New Jersey Preparedness Training Consortium offers an online version of this course. Module 1-2 of Part 3 focuses on The Psychosocial Consequences of CBNR Terrorism and Public Health Emergencies. The consortium also offers "Hostility and Rage Management (HARM) in Public Health Emergencies." The 1987 radiological release event in Goiânia, Brazil, is employed as a central case study for this course.

Onsite Psychological Triage Planning

Experts advise emergency responders to plan to triage people who fear they have been exposed to radiation or manifest symptoms consistent with acute radiation syndrome (ARS) as soon as possible. Real or psychosomatic symptoms of ARS in a small number of victims could trigger an outbreak of similar symptoms in other victims, the population, and emergency response personnel.

Jurisdictions should identify mental health professionals within the community or in nearby communities familiar with emotional and behavioral responses to an RDD incident. These professionals can play a critical role during triage and other phases of emergency response after an RDD incident.

The *DHS Medical Preparedness and Response Sub-Group's Report* describes some of the aspects that emergency managers should include in their triage plans following an RDD event:

- **Adding mental health professionals to the triage teams:** Emergency planners should include mental health professionals in their triage teams. Psychiatrists could be particularly helpful due to their medical backgrounds. Mental health professionals could initiate psychological management as soon as the need is identified.
- **Adopting a reassuring language:** The Sub-Group advises emergency planners to adopt a triage labeling system such as "high," "moderate," and "minimal" risk. This triage system can help reassure patients that their health is taken seriously and is constantly monitored.

Three Mile Island Registry

The Pennsylvania Department of Health established a registry of the local population shortly after the March 28, 1979, accident at the Three Mile Island nuclear plant outside Harrisburg, PA. In all, 150 enumerators collected demographic and health-related information from 35,930 people (over 93% of the population) residing within 5 miles of the plant. The data were used afterward as a baseline for several epidemiologic studies. These studies concluded that the only detectable effect was psychological stress during and shortly after the accident. The registry was discontinued in June 1997.

Emergency response personnel should also avoid using terms such as "worried well" or "radiophobia" when dealing with victims. This may lead victims to feel that their health concerns are not taken seriously. Use of these labels could also undermine the patients' trust in emergency responders' competency.

Some experts also advise emergency managers to include the following suggestions in their triage plans:

- **Establishing a clinical registry of high-risk people or victims with psychological or psychosomatic symptoms:** Emergency responders should plan

to establish a registry of victims who might be at risk of manifesting or who already manifest psychological or psychosomatic symptoms. A registry can facilitate follow-up and can reassure these patients that their symptoms are taken seriously.

- **Establishing separate areas for victims with psychological or psychosomatic symptoms that could compromise the delivery of critical medical care:** Emergency planners could establish separate areas for the management of victims with psychological or psychosomatic symptoms. Some of these victims could compromise the delivery of critical medical care to other patients by becoming overly anxious or belligerent. The *DHS Medical Preparedness and Response Sub-Group's Report* suggests strategies for managing some of these patients. Categories of victims that emergency managers are likely to consider when planning for separate areas can include:
  - **Asymptomatic exposed or unexposed victims manifesting high levels of concern:** These patients could amplify concerns and resist clinicians' reassurance. Unexposed victims may not accept a diagnosis of non-exposure, become angry and disruptive, and insist on treatment.
  - **Exposed or unexposed victims with unexplained symptoms and high levels of concern:** These patients could show symptoms such as chest pain and breathing difficulties that might increase the level of anxiety of other patients. The *Report* advises planners to triage these patients in a designated area distinct from the area used to care for acutely ill patients.
  - **Possibly exposed but unconcerned victims with no symptoms:** These patients could deny or neglect personal medical needs. The *Report* advises planners to record the contact information of these victims. Registering these victims' can facilitate follow-up to ensure that these patients have attended to injuries and exposure appropriately.

Psychosomatic Symptoms Manifesting in the Public

Approximately 8% of the first 60,000 people screened after the 1987 Cesium-137 release in Goiânia, Brazil, presented symptoms consistent with ARS. These symptoms included skin reddening and rashes, vomiting, and diarrhea. The fear was so intense that several people fainted in line when the time to be monitored approached. However, these people had not been exposed to radiation.

- **Identifying "advocates" with specific radiological training to help patients with psychosomatic symptoms:** The Medical Preparedness and Response Sub-Group's *Report* advises emergency response organizations to identify volunteers that understand the challenges of a radiological event and can provide psychological support to patients with psychological or psychosomatic symptoms.

The 1987 Cesium-137 release accident in Goiânia, Brazil, suggests that 4 out of 5 people seeking medical attention after a radiological release event may be unexposed.

Psychological Management at Monitoring Sites

Fear of radiation exposure can generate mass panic and overwhelm a jurisdiction's medical response capability. The National Council on Radiation Protection and Measurement's report, *Management of Terrorist Events Involving Radioactive Material,* states that "in the immediate aftermath of an incident, thousands of people who fear possible exposure to radiation may stream into area medical centers to seek assistance."

Emergency response organizations are strongly advised to include psychological support mechanisms in their emergency plans to manage a large number of people self-reporting for monitoring and screening at healthcare facilities and monitoring sites. Plans might include:

- **Establishment of specific areas for monitoring of patients who remain fearful and are not reassured by negative findings:** The Medical Preparedness and Response Sub-Group's *Report* encourages emergency planners to create an "Emergency Services Extended Care Center" (ESECC) when feasible. An ESECC was first developed by the Rush Chicago Medical Center as a temporary extension of the emergency room during a large disaster. The ESECC is designed to provide psychosocial support to disaster victims who no longer need acute medical attention in the emergency room. The center offers psychosocial support, education about normal human responses to trauma, and help with re-connecting victims to family members and friends.
- **Mechanisms for psychological support of family members of exposed victims who arrive at the monitoring site:** Experts agree that family members of victims could arrive at monitoring sites asking for information and reassurance.

July 7, 2005, London Bombing
The London Assembly's *Report of the 7 July Review Committee* on the London terrorist attack concluded that "the failure to plan for the care of hundreds of people who are likely to have suffered psychological trauma having survived the 7 July explosions is completely unacceptable… Plans for responding to major incidents should include plans that extend into the months following an incident, setting out how survivors will be informed of any health risks, including post-traumatic stress disorder."

Selected Resources

Several resources can help jurisdictions plan for the psychological management of RDD victims, emergency responders, and the public. These resources include:

- The Department of Health and Human Services' Radiation Event Medical Management (REMM) Web site. REMM includes a Psychological Issues section that lists resources to address the psychological consequences of an RDD incident and the management of victims and the public.
- *DHS Medical Preparedness and Response Sub-Group's Report*. This report includes a section on psychological and behavioral consequences of RDD and IND events.
- The International Atomic Energy Agency's *Generic Procedures for Medical Response during a Nuclear or Radiological Emergency*. "Section E: Psychological Support" of this manual includes guidelines for emergency responders, victims, and the public. Readers are cautioned that these procedures should be adapted to reflect local conditions and capabilities.

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