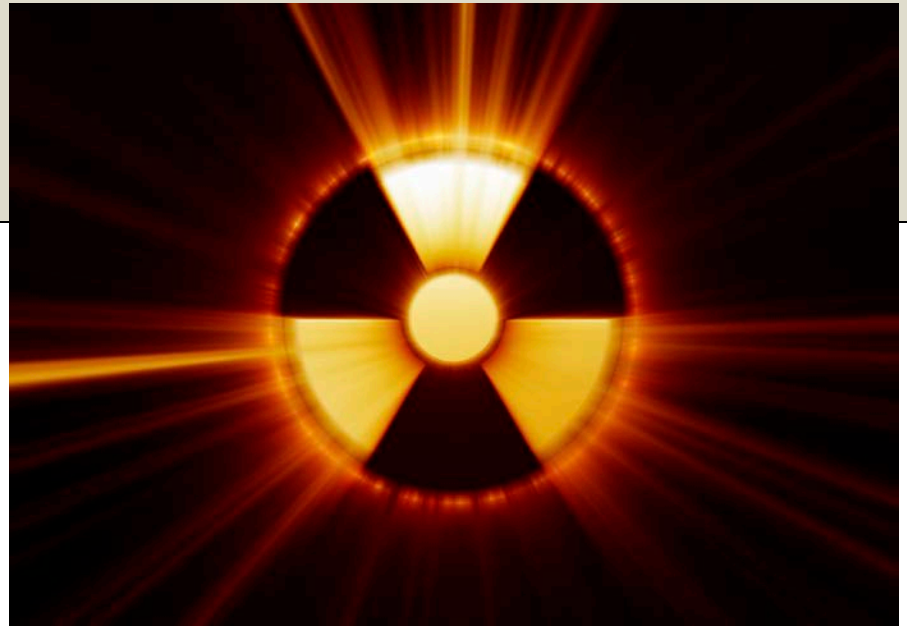
Disaster Mental Health:



Assisting People Exposed to Radiation

Steve Moskowitz, LMSW

Acknowledgments

•This material was developed by the Institute for Disaster Mental Health at SUNY New Paltz for the New York State Department of Health. The following individuals have contributed to the development of this course:

•Lead Author: Monica Indart, Psy.D., Visiting Faculty and Assistant Professor, Department of Clinical Psychology, Rutgers University Graduate School of Applied and Professional Psychology

•Second Author & Project Coordinator: Karla Vermeulen, Ph.D., Institute for Disaster Mental Health Coordinator, Visiting Assistant Professor in Psychology at SUNY New Paltz

•Project Director: James Halpern, Ph.D., Institute for Disaster Mental Health Director, Professor of Psychology at SUNY New Paltz

•Subject Matter Experts:

- Gloria Leon, Ph.D.
- Adela Salame-Alfie, Ph.D.
- Cynthia A. Costello, MS, MPH, CHP

•Design and Production: SUNY New Paltz Design & Print Services

Goals and Objectives

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

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

Radiological Incident Overview

- **Exposure vs. contamination**
- **Radiological event types**

Exposure vs. Contamination

- **Exposure** = individual has been in contact with radioactive material and may have been harmed, but material has been absorbed or removed and poses no threat to others
- **Contamination** = radioactive material is still present and releasing radiation
  - Individual should be decontaminated ASAP to prevent further harm to self or others
  - Decontamination involves removing all clothing and gently but thoroughly washing the skin and hair with soap and water
  - Once free of all contaminated materials, individual poses no risk of contaminating others
  - Helpers should exercise typical universal precautions

Radiological Event Types

- **Radiological Dispersal Devices (RDD)**
- **Radiation Exposure Devices (RED)**
- **Improvised Nuclear Devices (IND) (nuclear weapons)**
- **Accidental release**

Incident Types:
Radiological Dispersal Devices

A.K.A. “Dirty Bombs”

- Intentional use of conventional explosives to disperse radioactive material such as stolen medical or laboratory waste
- Range and intensity of radiological exposure are likely to be fairly limited, but those in close proximity may be injured by explosion as well as by radiation
- Many people may need decontamination though few are likely to become ill from radiation
- Strong psychological impact

Incident Types:
Radiological Exposure Devices

- Placement of radioactive materials in locations where passersby may be exposed without realizing it
- Those in close proximity to RED may receive high level of exposure sufficient to cause death
- Contamination does not occur with REDs
- Likely to cause more fear and anxiety than actual harm in those who fear they have been exposed

Incident Types:
Improvised Nuclear Device (Nuclear Weapons)

- Uncontrolled chain reaction of splitting atoms leads to:
  - Enormous fireball
  - Shockwave of air pressure
  - Mushroom cloud of debris and radioactive material, which then returns to ground in plume of radioactive fallout
  - Electromagnetic pulse which may destroy power and communications systems
- Effects in immediate area of a nuclear explosion would be catastrophic and would essentially destroy existing infrastructure for response in that area
- Geographic range of radioactive fallout depends on explosion strength, wind power, and weather, potentially spreading contamination for thousands of miles

Incident Types: Accidental Release

Nuclear power plant accident, transportation accident, other

- Generally no blast or shockwave, but fallout may contaminate area for miles, possibly requiring:
  - Evacuation
  - Permanent relocation
- High distress levels in addition to any physical illness
- Longer term psychological effects have been found in cases of nuclear accident (e.g. Chernobyl)

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

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.**

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

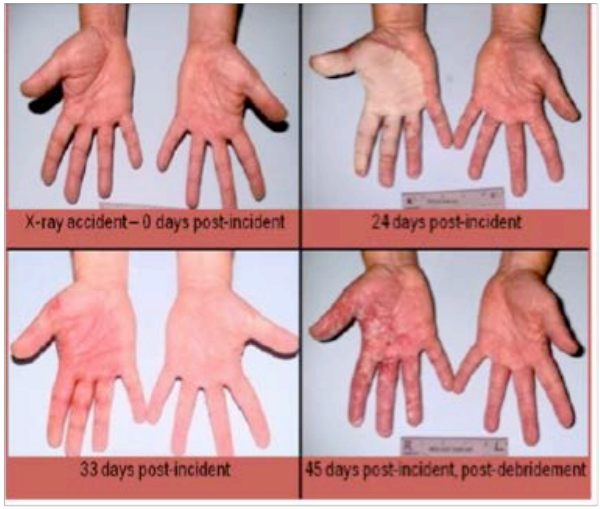
Physical Effects of Exposure: ARS

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

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

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

Psychosocial Effects of Exposure

Topics:

- Brief history of radiological events
- 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
- Needs of special populations
- Specific issues for medical professionals/hospital workers
- Elements of effective risk communication
- Compassion fatigue and self-care strategies

History of Radiological Events

Nuclear accidents: Three Mile Island, 1979

- Nuclear reactor in Three Mile Island plant near Middletown, PA, malfunctioned, causing severe core meltdown *but releasing minimal amount of radioactive material*
- Physical effects on humans and environment were negligible, but five years later residents within five miles of the plant reported:
  - high levels of distress
  - somatic complaints
  - anxiety symptoms
  - high levels of stress hormones
  - increased blood pressure
  - more physician rated problems that required prescription medication

History of Radiological Events

Nuclear accidents: Chernobyl**,** 1986

- Nuclear reactor in the Ukraine was blown apart by a steam explosion, releasing 85,000 times more radioactive material than Three Mile Island
- 31 killed immediately; 600,000 workers exposed to high levels of radiation during clean up; 8.4 million residents exposed
- Physical effects: High levels of thyroid cancer in children and of leukemia in clean up workers
- Mental health effects:
  - Elevated symptoms of depression, anxiety (particularly PTSD symptoms), and medically unexplained physical symptoms
  - Rates of suicidal ideation doubled in workers 18 years later
  - High rates of alcoholism and unemployment among clean-up workers

History of Radiological Events

Nuclear accidents: Goiania, Brazil 1987

- In a city of approx. 1 million residents, two individuals searching for scrap metal found a radioactive source (cesium-137) enclosed n abandoned medical equipment
- It was sold at a scrap yard
- For 16 days, the source was moved around the city before it was recognized as radioactive
- 4 people died from excessive exposure
- 249 were contaminated
- 112,000 sought medical evaluations (11% of the population)

History of Radiological Events

Nuclear accidents: Fukushima, Japan

- The Fukushima Daiichi nuclear accident was initiated by the 2011, Great East Japan Earthquake and tsunami. The earthquake knocked out offsite AC power to the plant and the tsunami inundated portions of the plant site. Flooding of critical plant equipment resulted in the extended loss of reactor monitoring, control, and cooling functions in multiple units.
- Three reactors sustained severe core damage (Units 1, 2, and 3); three reactor buildings were damaged by hydrogen explosions (Units 1, 3, and 4); and offsite releases of radioactive materials contaminated land in Fukushima and several neighboring prefectures.
- The accident prompted widespread evacuations of local populations and distress of the Japanese citizenry; large economic losses; and the eventual shutdown of all nuclear power plants in Japan.

Nuclear accidents: Fukushima, Japan

- *When Radiation Isn't the Real Risk* (George Johnson, NYT, SEPT. 21, 2015)
  - No one has been killed or sickened by the radiation - a point confirmed by the International Atomic Energy Agency.
  - Even among Fukushima workers, the number of additional cancer cases in coming years is expected to be so low as to be undetectable, a blip impossible to discern against the statistical background noise.
  - But about 1,600 people died from the stress of the evacuation - one that some scientists believe was not justified by the relatively moderate radiation levels at the Japanese nuclear plant.

History of Radiological Events

Radiological terrorism

- To date no RED or RDD has been successfully deployed, and no non-state use of a nuclear weapon has occurred
- Governmental and public concerns about these threats is growing in the current atmosphere of sociopolitical uncertainty

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

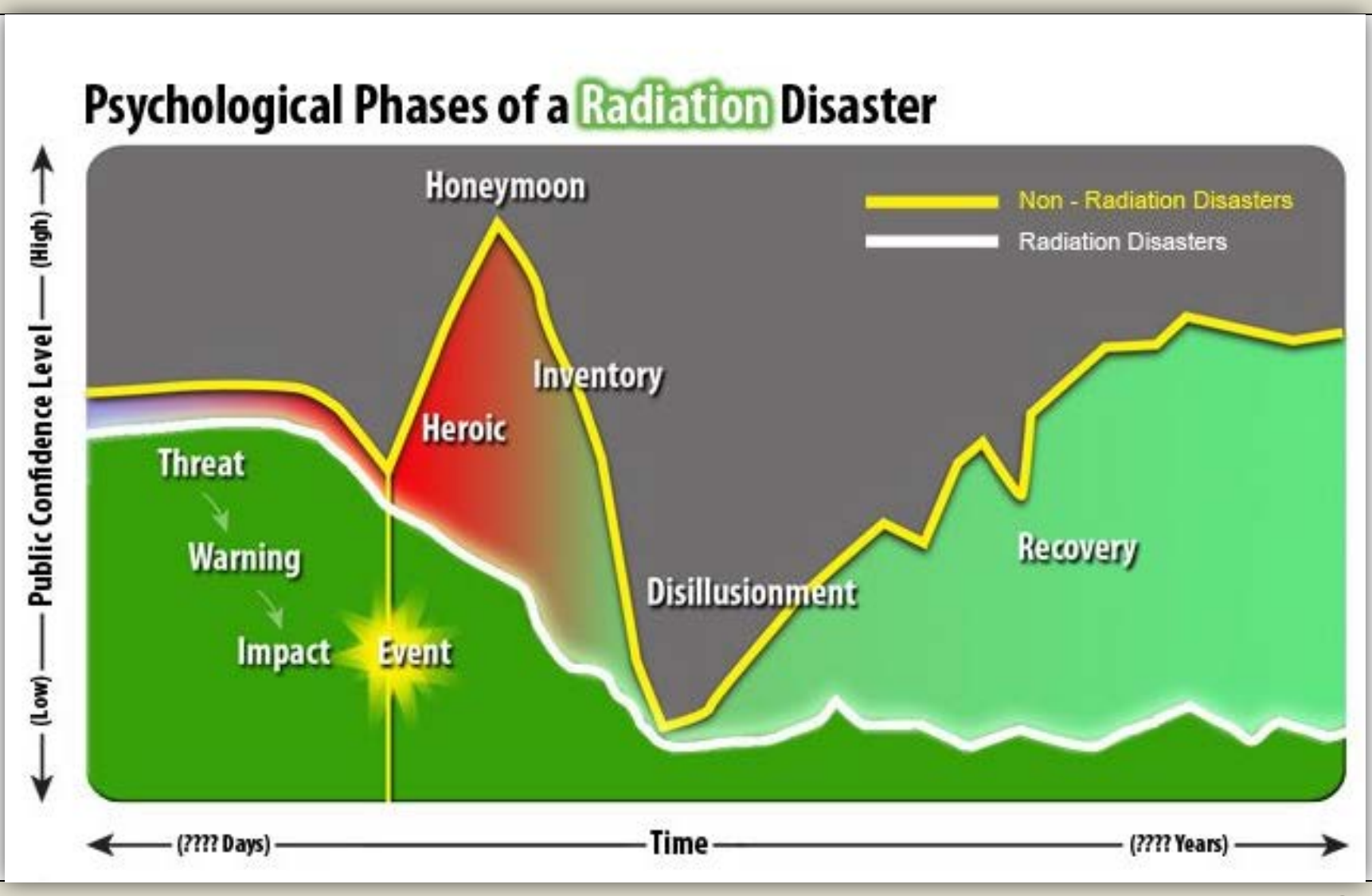

BREAK TIME
memegenerator.net

Psychosocial Issues Related to Radiological Events

Because radiation is undetectable without tools, people may be exposed without knowing it - or they may fear exposure has occurred when it hasn't. As a result, events may evoke:

- Fear (short- and long-term, and for subsequent generations)
- Anxiety and uncertainty
- Lack of control
- Contamination and stigmatization fears
- Disruption of social networks

Psychosocial Issues
Related to Radiological Events



Psychosocial Interventions for Specific Target Groups

- As in other types of disasters, survivors' psychological responses to a radiological event typically will cluster into three groups:
  - Those who are distressed
  - Those who manifest behavioral changes
  - Those who are at high risk to develop psychological disorders
- Interventions should be matched to each group.

Symptoms
of Those Who Are Distressed

Typical reactions and symptoms include:

- **Cognitive** - impaired concentration, 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
- **Physical** - sweating, hyperarousal, increased heart rate, dizziness, elevated blood pressure, fatigue, headaches, gastrointestinal distress, nausea, MUPS
- **Spiritual** - feelings of uncertainty, feeling abandoned, diminished or lost belief in a just world and the goodness of others, struggles with notion of evil, shattered assumptions about safety

Interventions for Those Who Are Distressed

- **Psychological First Aid**:
  Goal is to reduce distress and encourage adaptive functioning

- **Core intervention elements:**

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

Symptoms of Those Who Display Behavioral Changes

- **Distress reactions are often more severe, tend to last longer, and cause greater impairment**
- **Indicators 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

Interventions for Those Who Display Behavioral Changes

Skills for Psychological Recovery: Goal is to promote and accelerate recovery and prevent maladaptive behaviors

- **Core intervention elements:**
  - Providing psychoeducation on effective coping in disaster situations
  - Assisting with problem-solving
  - Arousal reduction
  - Encouraging helpful, realistically positive cognitions
  - Writing exercises
  - Seeking and giving social support

Risk Factors of Those at High Risk to Develop Psychological Disorders

Risk factors for PTSD, depression, and anxiety disorders ("trauma-spectrum disorders") include:

- 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

Interventions for Those at High Risk to Develop Psychological Disorders

Screen and Treat:

Goal is 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 exposed to the event using standardized measures
  - Identification of individuals in high risk groups
  - Providing free or low-cost evidenced-based treatment (e.g., trauma-focused cognitive-behavioral treatment, psychopharmacological medication as indicated) by trained clinicians
  - Follow-up studies to track outcomes over time

Atypical Responses to Radiation Events

- Some portion of population is likely to have extreme responses that merit rapid attention, with reactions 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 require immediate evaluation in order to determine 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

Interventions for MUPS

- Provide information about actual risk (levels of exposure needed to cause ARS, low likelihood of contamination between individuals, limited evidence of long-term health effects, etc.)
- Be aware people may disregard or disbelieve these facts
- Emphasize psychological or pharmacological treatment is intended to reduce symptoms (not to convince them symptoms are not real)
- Schedule follow-up appointments to avoid reinforcing maladaptive coping mechanisms

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

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)

Special Populations: Pregnant Women

Pregnant women are likely to experience significant fear and anxiety reactions about impact on fetus as well as on their own health

- **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 fetus
  - 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

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

Special Populations: Culturally Diverse Groups

- **Specific suggestions include:**
  - Prepare educational materials 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 provide accurate information to diverse communities
  - Utilize natural community leaders to disseminate information
  - Provide assurance 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 needs of these often neglected communities

Specific Issues for Hospital-based Medical Professionals

- **Surge: People with MUPS and/or who fear they have been exposed are likely to far outnumber those who actually require medical treatment**
- **Healthcare facilities should be prepared to triage and respond to needs of three groups:**
  - Those ill with Acute Radiation Syndrome
  - Those who have been exposed
  - Those who have no exposure but present with physical and/or psychological symptoms

ARS Illness Group

- In addition to ARS physical symptoms, patients in this group will likely be frightened and worried, and may be accompanied by family members who are also frightened and worried
- Provide empathic reassurance, emotional support, and factual information as well as supportive or palliative healthcare
- Address and treat fear- and anxiety-based reactions to increase patient comfort and compliance with treatment

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

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

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

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

Risk Communication

for Radiation Events

- Communications with the public around radiological events can serve an essential stabilization function if done well – and can foment panic if done poorly
- The two goals of risk communication are to:
  - Ease public concerns
  - Provide guidance on how to respond
- The public often does not believe information presented, feeling that the risk has been down-played; using credible sources for information dissemination is crucial.
- Effective risk communications require:
  - Empathy
  - Honesty
  - Competency
  - Commitment

Risk Communication
for Radiation Events

- **Five Rules for Building Trust and Credibility:**

1. Accept and involve the public as a partner
2. Appreciate the public's specific concerns
3. Be honest and open
4. Work with other credible sources
5. Meet the needs of the media

(Covello & Allen, 1988)

Correcting Errors and Controlling Rumors

- Rumors are common after disasters, and likely to be especially virulent after radiological event
- Authorities must 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
- Anticipate how your statements may be "spun" by the media; attempt to preempt further misinformation by addressing alternative explanations and re-emphasizing facts
- Be mindful of language, recognizing that your words may be parsed in ways that you would not consider

Correcting Errors and Controlling Rumors
continued

- If 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
- Remember, 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

Exercise 2

- Divide into 2 groups at each table
- Read the exercise scenario
- 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.
- Using the information and principles you have been introduced to in the training, develop a preliminary plan to:
  - how you will set up the ER, and
  - how you will assess and manage the three different groups of patients who are presenting for evaluation and treatment.

Exercise 2

- 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?

Compassion Fatigue and Self-care

- Reactions of mental health and public health helpers can span continuum from compassion satisfaction to compassion fatigue
- Compassion fatigue: emotional duress experienced by those in close contact with trauma survivors
- Vicarious traumatization: symptoms and reactions similar to PTSD symptoms

Compassion Fatigue and Self-care

Contributing factors to compassion fatigue in disaster response settings:

- Exposure to multiple traumatic and grief experiences
- Concern for distress of colleagues
- Chronic stressors
- Past/present traumatic and unresolved grief experiences
- Feelings of helplessness
- Need to maintain patient confidentiality prohibits talking with family and/or friends, sometimes limiting valuable social support
- Ambiguity and uncertainty prevalent in disaster situations
- Concerns for legal ramifications of services provided
- Increased risk of being involved in verbal and physical assaults from patients

Compassion Fatigue and Self-care

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
- Know and respect your limits
- Let your faith comfort you
- Recognize early warning signs of compassion fatigue and vicarious traumatization, and take preventative action
- 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

Conclusion

- 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
- Hospitals and other healthcare providers must 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
  - providing psychoeducation to the general public
  - treating the psychological reactions of those who actually are experiencing radiation sickness or injury