Anticipated Psychological Impact of Radiological Terrorism

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Importance of Psychological Responses to a Traumatic Event

- Can disrupt rational problem-solving
- Influence appraisal of danger
- Affect physiological responses
- Promote adaptive or maladaptive individual and group behaviors
### Basic Assumptions About Life

- Belief in a “just” world
- Healthy denial of hazards/risk
- Order
- Predictability
- Control
- Meaning

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**Terrorism** is an action undertaken to achieve a political, ideological, or theological goal through a threat or action that creates terror or horror.
Initial Psychological & Cognitive Responses to IND/RDD

- Intense fear for loved ones and self
- Shock
- Horror
- Anxiety
- Strong urge to be with loved ones
- Intense hunger for information
  - Status of loved ones
  - To appraise the level of danger ("risk perception")
  - To guide protective behaviors
- Diminished ability to retain and process information due to crisis
- Uncertainty

"Let me assert my firm belief that the only thing we have to fear is fear itself -

nameless, unreasoning, unjustified terror which paralyzes needed efforts to convert retreat into advance."

Franklin Delano Roosevelt, 1933
**Manifestations of Fear**

<table>
<thead>
<tr>
<th>Too little</th>
<th>“Appropriate”</th>
<th>Too much</th>
</tr>
</thead>
<tbody>
<tr>
<td>“denial”</td>
<td>fear</td>
<td>“panic”</td>
</tr>
<tr>
<td>apathy</td>
<td>concern</td>
<td></td>
</tr>
<tr>
<td>Inaction</td>
<td>self-protective measures</td>
<td>disorganization</td>
</tr>
<tr>
<td></td>
<td>compliance</td>
<td></td>
</tr>
<tr>
<td></td>
<td>pro-social behaviors</td>
<td></td>
</tr>
</tbody>
</table>

**Mass Panic**

- Intense, contagious fear
- Individuals behave with reference to self only
- Flight (escape) or freeze
- Loss of social organization
- Loss of social roles
- Community chaos
Risk Factors for Mass Panic

- Belief that there is a small chance of escape from the agent
- Perceived high risk
- Available, but limited, treatment resources
- No perceived effective response
- Loss of credibility by authorities

Fear of Radiation

- Cannot detect by senses
- Must rely on experts with special equipment
- Produces common symptoms
- Uncertainty
Fear of Radiation

- Delay in health effects
  - Cancer
  - Genetic damage affecting offspring

- Contamination

- Limited availability of treatments

Fear & Risk Perception

“Whereas technologically sophisticated analysts employ risk assessment to evaluate hazards, the majority of citizens rely on intuitive risk judgments, typically called “risk perceptions.””

Slovic, 1987
Risk Perception Research

- Perception and acceptance of risk are rooted in psychological, social and cultural factors.

- Responses are influenced by family, friends, co-workers, and respected public officials.

- The mental strategies, or heuristics, that people use to make sense of hazards and risks have been studied.

(Adapted from Slovic, 1987)

Factors Affecting Risk Perception

<table>
<thead>
<tr>
<th>Less Risk</th>
<th>More Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voluntary</td>
<td>Involuntary</td>
</tr>
<tr>
<td>Personally controlled</td>
<td>Controlled by others</td>
</tr>
<tr>
<td>Familiar</td>
<td>Exotic</td>
</tr>
<tr>
<td>Natural</td>
<td>Manmade</td>
</tr>
<tr>
<td>Reversible</td>
<td>Permanent</td>
</tr>
<tr>
<td>Statistical</td>
<td>Anecdotal</td>
</tr>
<tr>
<td>Endemic</td>
<td>Epidemic</td>
</tr>
<tr>
<td>Fairly distributed</td>
<td>Unfairly distributed</td>
</tr>
<tr>
<td>Affect adults</td>
<td>Affect children</td>
</tr>
</tbody>
</table>

(Adapted from CDC: Crisis and Emergency Risk Communication, 2002)
Risk Perception – “Most Risky”

<table>
<thead>
<tr>
<th>Activity/Technology</th>
<th>League Of Women Voters</th>
<th>Experts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nuclear power</td>
<td>1</td>
<td>20</td>
</tr>
<tr>
<td>Motor vehicles</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Police Work</td>
<td>8</td>
<td>17</td>
</tr>
<tr>
<td>Hunting</td>
<td>13</td>
<td>23</td>
</tr>
<tr>
<td>Mountain climbing</td>
<td>15</td>
<td>29</td>
</tr>
<tr>
<td>Electric power</td>
<td>18</td>
<td>9</td>
</tr>
<tr>
<td>X-rays</td>
<td>22</td>
<td>7</td>
</tr>
<tr>
<td>Swimming</td>
<td>19</td>
<td>10</td>
</tr>
</tbody>
</table>

Additional Issues

- Poorly understood outside of limited professional groups
- Subject of controversy in professional community
- Public (and scientific) uncertainty likely to characterize RT
Physiological Responses of Anxiety
(Autonomic Arousal)

- Anorexia
- Chest pain/tightness
- Diaphoresis
- Diarrhea
- Dizziness
- Dry mouth
- Dyspnea
- Faintness
- Flushing
- Hyperventilation
- Light-headedness
- Muscle tension
- Nausea
- Pallor
- Palpitations
- Paresthesias
- Shortness of breath
- Tachycardia
- Urinary frequency
- Vomiting

Misattribution of Autonomic Arousal

- Interpretation of normal responses as symptoms of serious illness
- Increased by rumors and false information
- Increased by hyper-suggestibility in initial victim transitional states secondary to environmental disruption

Interventions:
- Risk communication
- Rumor control
### Goiania, Brazil

**September, 1987**

- 125,800 screened (city of 1.2 million)
- 249 contaminated (0.2%)
- 50 required medical surveillance
- 20 hospitalized
- 4 died


### Goiania: Screening for Contamination

- Between September and late April, 12.5% of the population had been checked for contamination
- Evaluation required taking time off from work or use of weekend hours, traveling across the city, and waiting in line to be scanned
- >8,000 asked for an official certificate that they were not contaminated
Goiania: Physiological Responses to Anxiety/Fear

“Approximately 11% of the 113,000 Goiania residents, who were waiting their turns to be assessed for contamination, exhibited the classic symptoms of radiation (nausea, reddened skin, etc.). After they received a clean bill of health, their symptoms disappeared in a few hours.”


Goiania: Physiological Responses to Anxiety/Fear

“Perhaps the most important finding in examining the Goiania event, however, was the fact that of the first 60,000 individuals to be monitored, approximately 5000 individuals (8.3%) presented acute stress or allergic symptoms (i.e., rash around neck and upper body, vomiting, diarrhea, etc.). Curiously, the majority of these individuals claimed that these symptoms had begun after the capsule was broken but before the announcement in the news media. Not a single one of these individuals was contaminated! This has profound implications for the study of perceived risk in general and “special” nuclear-related impacts in particular.”

Individual and Community Responses to RT

- Altruism
- Resilience
- Anger
- Scapegoating
- Stigma and discrimination
- Paranoia
- Loss of faith in social institutions and government
- Breakdown of social networks / social Isolation
- Demoralization

Goiania: Stigma

“The hearse carrying the first fatality, a six-year-old girl (who was to be “…buried along with her radioactive dolls”) to the Goiania cemetery was blockaded and then stoned - forcing the driver to flee.”

Goiania: Stigma (cont.)

- Economic consequences:
  - Prices of agricultural and manufactured goods ↓ 40-50%
  - All conventions were canceled or rescheduled

- Social consequences:
  - Could not stay in neighboring hotels
  - Airplanes and buses refused to carry them
  - Autos with Goiania tags were stoned

Goiania: Stigma and Fear

“It must be emphasized that this situation was not simply a case of ‘ignorant peasants’ flopping around in confusion…For example, doctors and dentists, trained in the U.S., routinely refused to treat patients without certificates; unlike other emergencies, nurses refused to return from strike to treat contaminated individuals.”

Three Mile Island, 1979

- Partial meltdown of reactor core in Nuclear Power Plant
- Very small releases of radioactivity
- Maximum dose to a person at the site < 100 mrem
- Average dose to 2 million people in the area @1 mrem
- Deaths: 0
- Injuries: 0

Three Mile Island Mental Health Effects

- Houts et al. (1981)
  - @4-10 people living closer to plant more distressed than those farther away months
- Mileti et al. (1984)
  - Increased alcohol sales in areas close to TMI post accident
  - 10 year longitudinal study
  - TMI residents:
    - Higher distress levels up to 5 yrs post event
    - Elevated BP and catecholamine levels for more than 10 years
- Bromet et al. (1982, 2000)
  - 10 yr. study of mothers with small children
  - Small group of mothers: sig’t levels of distress
  - Children from TMI (& Chernobyl): no sig’t health problems vs. controls
Chernobyl, 1986

- Explosion in reactor core in Nuclear Power Plant
- Extremely large release of radioactivity
- Radiation-related health effects:
  - Acute:
    - 299 cases of Acute Radiation Sickness in responders
    - 28 Deaths
  - Longer-term:
    - Increased rate of thyroid cancer in youth (esp. in utero – 2 yo)
- Mental Health effects
  - Multiple confounds
  - Compared with controls, exposed adults (esp. women) had increased somatization, depressive, anxiety and posttraumatic stress symptoms in decade after disaster
    (see Bromet et al., 2000)

Post-RT Interventions

1. Communication
2. Communication
3. Communication….
**Definition of Crisis & Emergency Risk Communication**

“Is the effort by experts to provide information to allow an individual, stakeholder, or an entire community to make the best possible decisions about their well-being within nearly impossible time constraints, and to help people ultimately accept the imperfect nature of choices during the crisis.”

CDC Crisis & Emergency Risk Communication, September, 2002

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**Crisis & Emergency Risk Communication**

Differs from traditional risk communication:

- Decisions must be made within a narrow time constraint
- The decision may be irreversible
- The outcome may be uncertain
- The decisions usually need to be made with incomplete or imperfect information
Principles of Emergency Risk Communication

- Two-way process
- Stop trying to allay panic
- Emphasize that there is a response process in place
- Avoid over-reassurance
- Acknowledge uncertainty
- Give people things to do
- Express wishes

(Adapted from: “How to Communicate Effectively in a Crisis”, Peter Sandman, Ph.D. Crisis + Emergency Risk Communication. CDC, September 2002)

Principles of Emergency Risk Communication

- Acknowledge the shared misery
- Provide anticipatory guidance
- Address “what if” questions
- Ask more of people
- Be a role model

“How to Communicate Effectively in a Crisis” P. Sandman, Ph.D. Crisis + Emergency Risk Communication. CDC, September 2002
Communications Challenges

- Translating science to 6th grade reading level
- Assisting people in making decisions on issues in which there is scientific disagreement
- Dealing with uncertainty
- Explaining stochastic health effects
- Forecasting and explaining changes in scientific understanding and expectations

Post-Event Interventions

- Effectively communicate protective action guidelines (PAGs) and risk
- Provide anticipatory guidance
- Provide guidance on channeling anger & fear
- Provide rapid, effective triage & treatment
- Control hyperarousal symptoms
  - Realistic reassurance
  - Meds for sleep prn
### Post-Event Interventions

- Manage misattribution of somatic symptoms
- Establish surveillance/monitoring system
- Contact high concern / vulnerable individuals on regular basis
  - e.g. distressed mothers of younger children
- Integrate behavioral health into medical treatment teams