

# Psychological Responses in Immediate Impact Area

- Confusion
- Intense concern/urgency to reunite with loved ones
- “Shock” / Disbelief
- Fear
- Horror
  - Dead/injured
  - Widespread destruction

# Injuries in Immediate Impact Area

- Blast Injury
  - Ruptured tympanic membrane
  - Pulmonary damage
  - Rupture of hollow viscera
  - Penetrating trauma
  - Crush injuries/blunt trauma
  - Fractures/traumatic amputations
  - Open/closed brain injuries
- Thermal/Burn Injury
  - Flash blindness/retinal burns
  - Burns (direct absorption, fires)
- Prompt radiation injuries
  - Acute radiation syndrome (ARS)

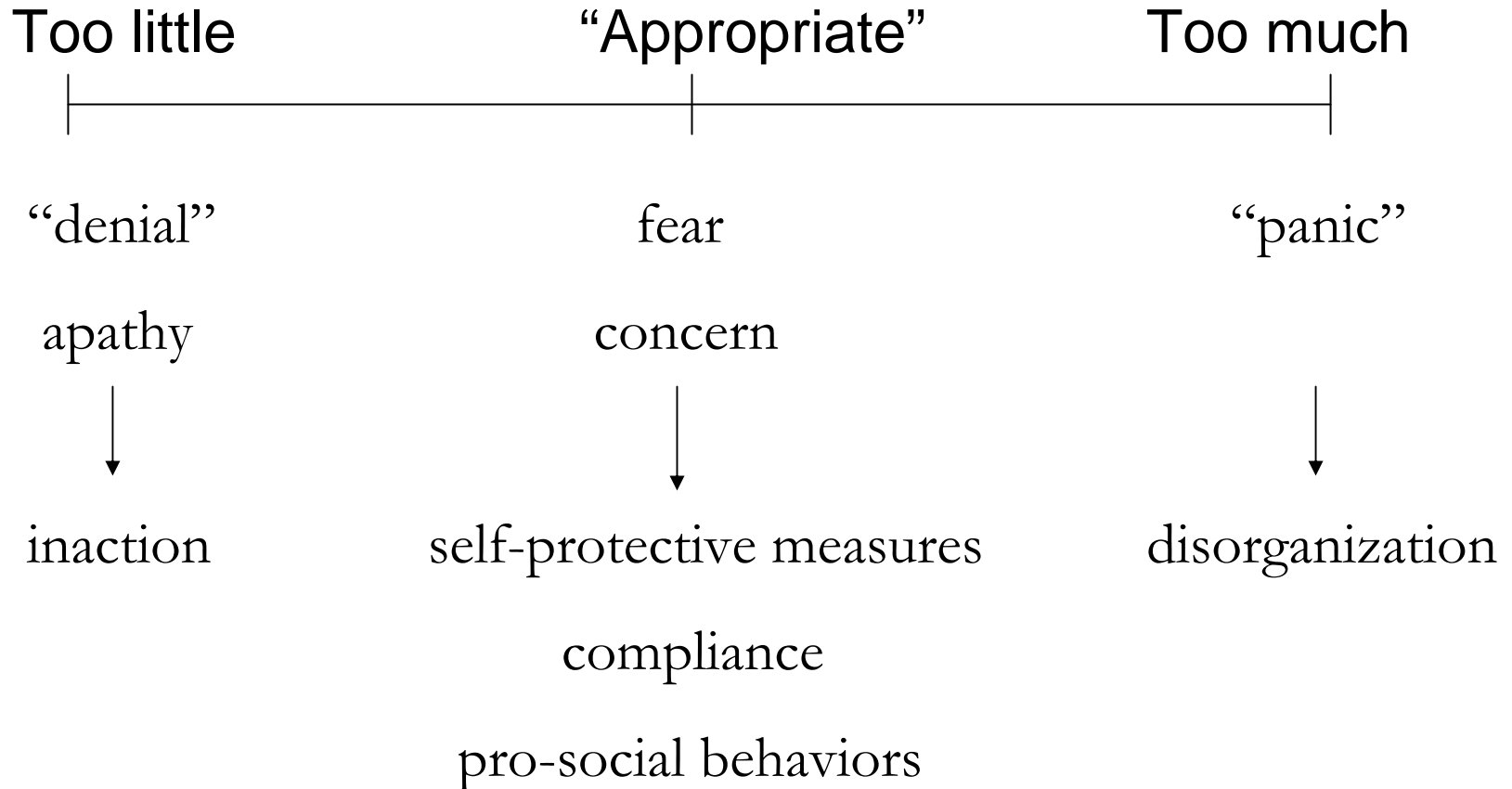
# Health Care Worker Issues

- Confusion/lack of information
- Convergence on hospitals
  - Looking for missing
  - Need for treatment
- Helplessness
- Psychological issues associated with mass triage
- Concern for own loved ones
- Scarcity of resources

# Issues In Fallout Areas

- Fear of exposure
- Demand for evaluation
- High demand for medical information
- As levels fall, receipt of patients from affected zone

# Manifestations of Fear



# Goiania, Brazil

September, 1987

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

J. Petterson, *Nuc. News*, 31:84, 1988

## Physiological Reaction to 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

# Differential Diagnosis Complexity

- **“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.”**
- Collins DL. (2002) “Human Responses to the Threat of or Exposure to Ionizing Radiation at Three Mile Island, Pennsylvania, and Goiania, Brazil.” *Military Medicine*, 167, Supple. 1:137-138.

## Misattribution of Normal Arousal

- Interpretation of normal arousal as serious illness
- Increased by rumors and false information
- Increased by hyper-suggestibility in initial victim transitional states secondary to environmental disruption
- Risk communication and rumor control

# 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**