

# **Radiological Threat Review**

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**Radiation Safety Officer**

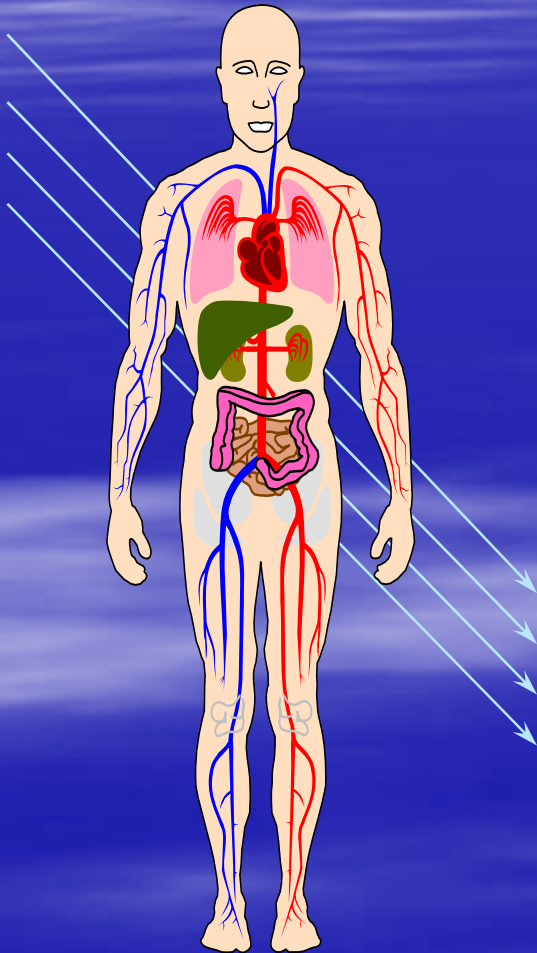
**The University of Texas Southwestern Medical Center at Dallas**

# Potential Nuclear/Radiological Hazards in the U.S.

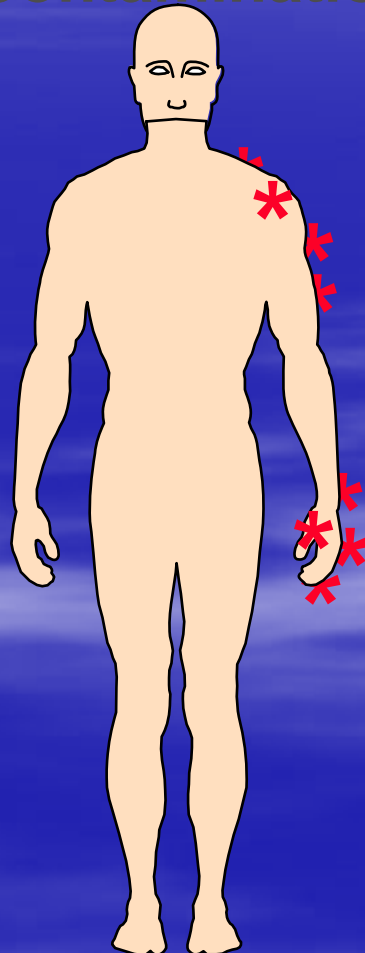
- Simple Radiological Device - Exposure
- “Dirty” Conventional Bomb
- Improvised Nuclear Device (IND)
- 1kT “Suitcase Nuke”
- Ballistic Missile Attack
- 250 kT Nuclear Weapon – “City Killer”
- Electromagnetic Pulse Weapon

# Radiation Exposure Types

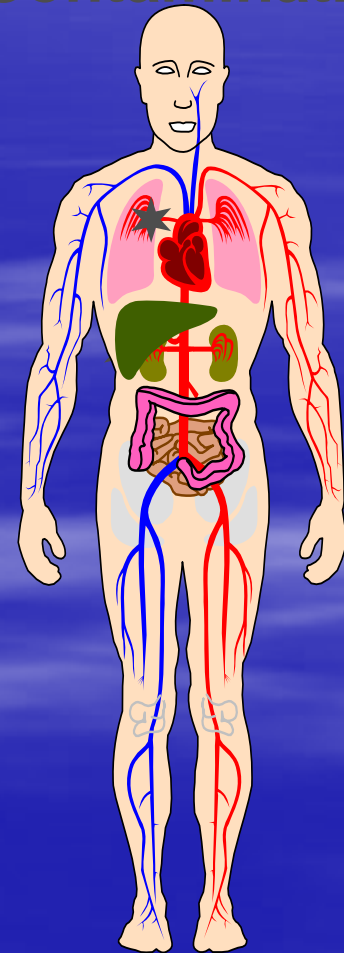
**Irradiation**



**External Contamination**



**Internal Contamination**



# Radiation Exposure Device

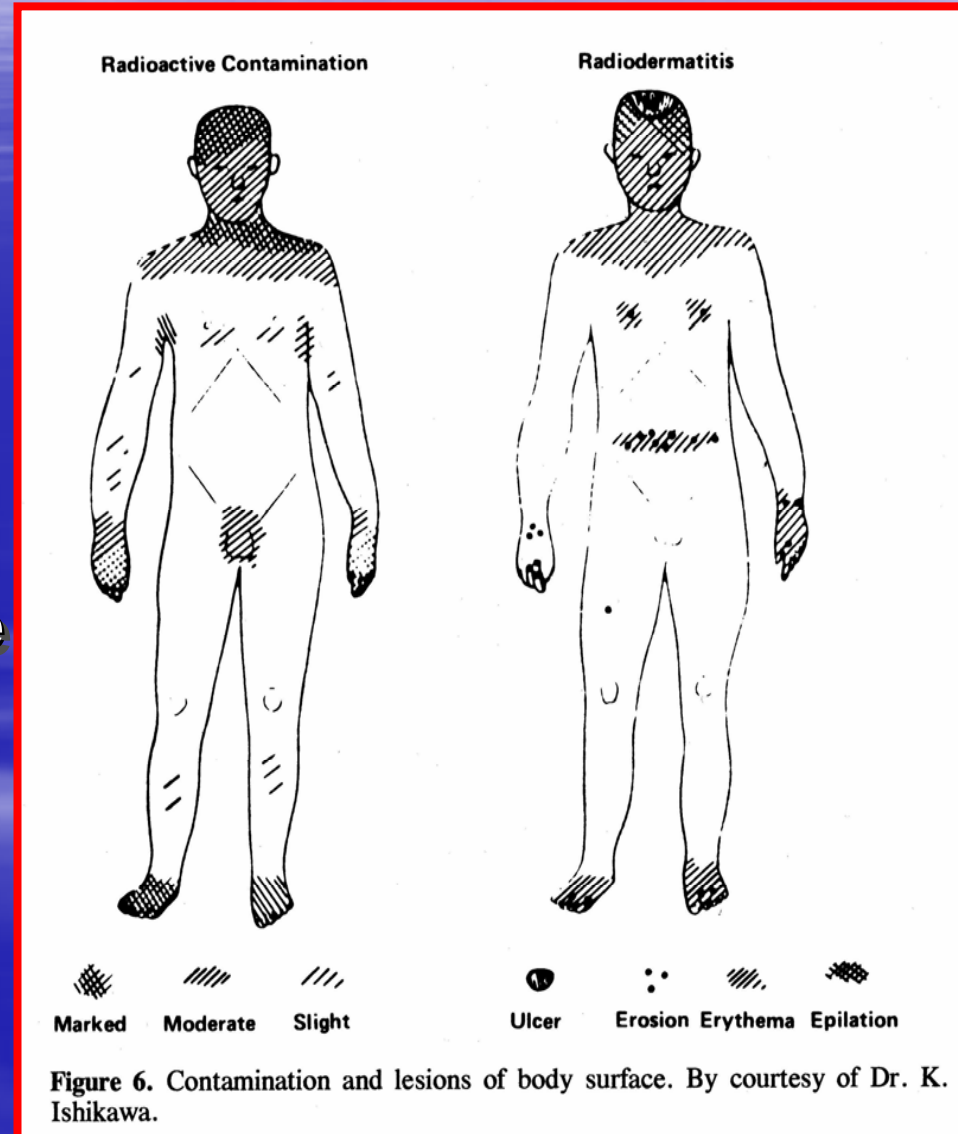


# Burned, Possibly Blind, but NOT Irradiated



# Bikini Atoll (1 Mar 1954)

- 15 MT Thermonuclear Detonation Fallout
- Population Affected: 300 in Public Domain
  - Int / Ext Contamination
  - Local Radiation Injury
  - Mild Radiation Syndrome
  - Thyroid Injury



# Emergency Response

- Protection

- Protection can be achieved by:

- Time

- Distance

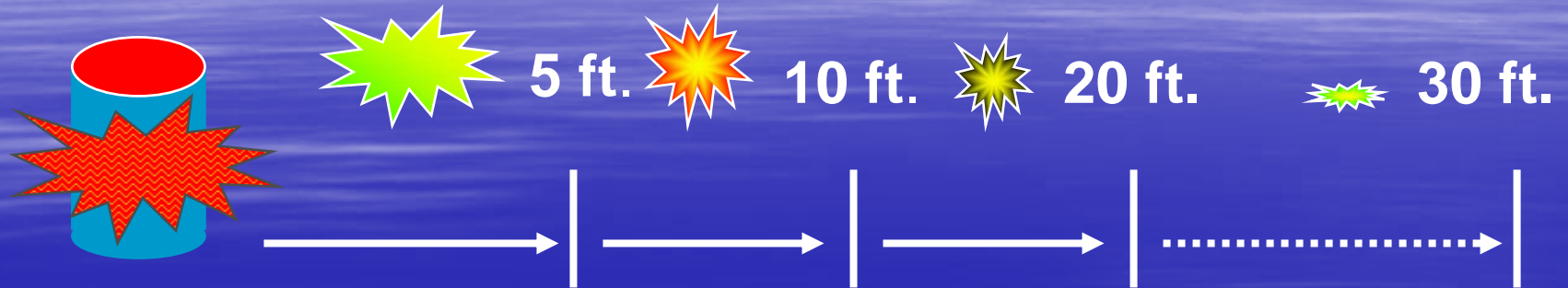
- Shielding

All of these should be in-place when working a Radiological Emergency

- ‘Universal Precautions’ for Airborne Biological Hazard are Excellent for Radiological Hazard - *PUT ON A MASK !!!*

# Distance As Protection from Radiation

- Protection Factor



1000 mR/hr    40 mR/hr    10 mR/hr    2.5 mR/hr    1.1 mR/hr

$$5 \times 5 = 25$$

$$\frac{1000}{25} = 40 \text{ mR/hr}$$

$$10 \text{ mR/hr}$$

$$2.5 \text{ mR/hr}$$

$$30 \times 30 = 900$$

$$\frac{1000}{900} = 1.1 \text{ mR/hr}$$

**Three Myths  
That Can  
Paralyze  
Medical  
Response**

# Myth 1

**Radioactive Contamination  
is Highly Dangerous and  
Requires Extraordinary  
Protective Measures**

# Myth 2

**Decontamination of the  
Patient is the Highest  
Medical Priority**

# Myth 3

**You need “special skills” to handle radioactive patients**

# Simple Contamination Protection

- Universal Precautions' for Airborne Biological Threat Work Perfectly for Radioactive Contamination
- It's not a Chemical Agent that will kill you if it gets on your skin
- It's not a Biological Agent that can make you sick if it gets on your skin
- It's Radioactive Dirt.
- DO NOT Get it Inside You !!!

# The 800 Pound Gorilla of Radiological Response:

## Self-Referral by the Worried Well

How do  
you triage  
the merely  
distressed  
from the  
truly  
exposed?

In Goiania, Brazil, a large teletherapy source was opened by scavengers and the radioactive material circulated through a neighborhood. 249 people were contaminated by the material; four died.

However, 120,000 townspeople went to a soccer stadium to get checked for contamination (12% of the population)

In this group, a number of people presented symptoms (nausea, vomiting, etc.) which are features of radiation sickness. Of these,

**NONE were contaminated!!!**



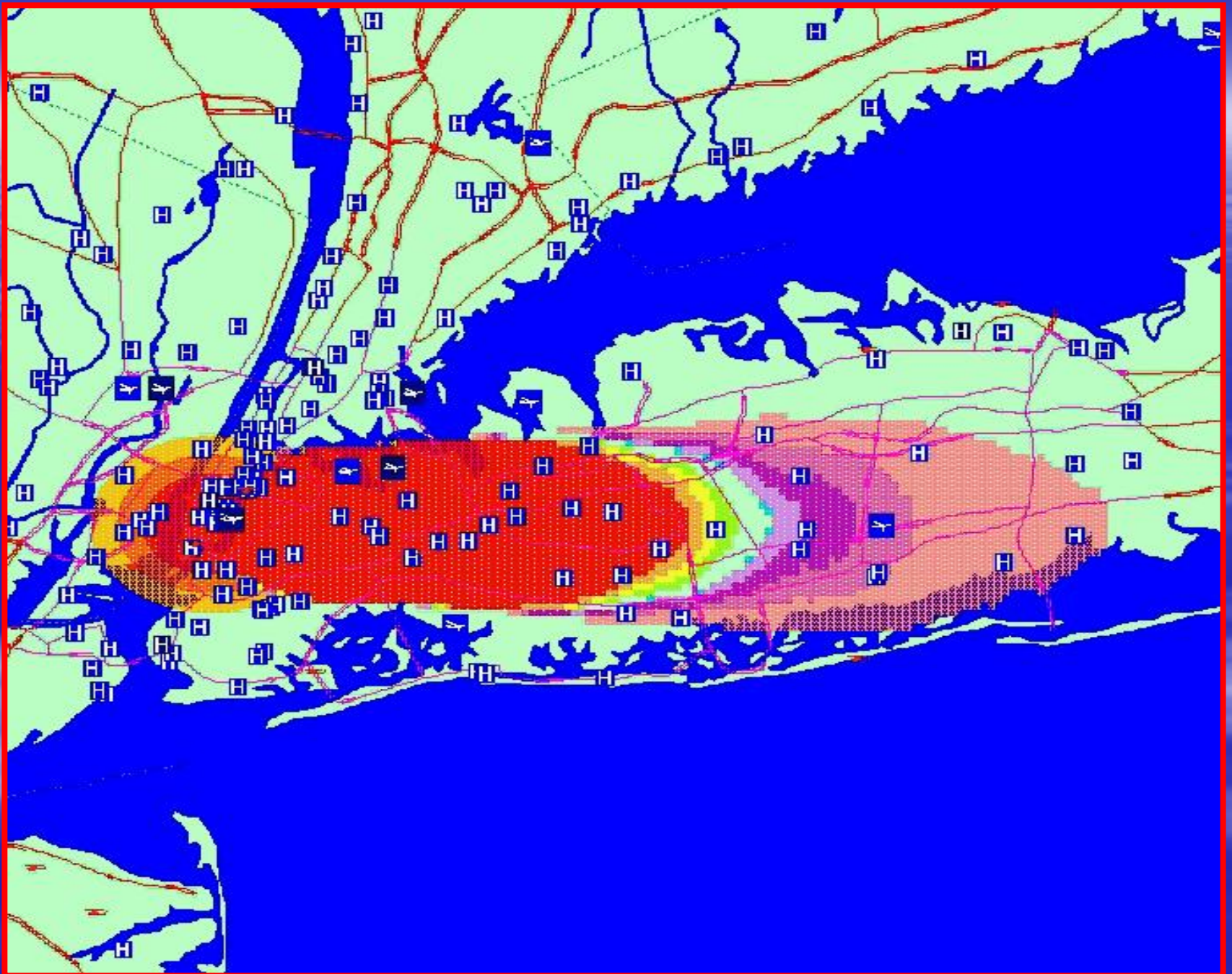
# Nuclear Weapon Threat

- 'Backpack' Nukes 1kt
- Tactical Weapons 5-50kt
- Strategic Weapons 100kt - 1Mt+
  
- Threat: City Damage
- Threat: Economic/Population Damage
- *Different:*
- Threat: Electromagnetic Pulse

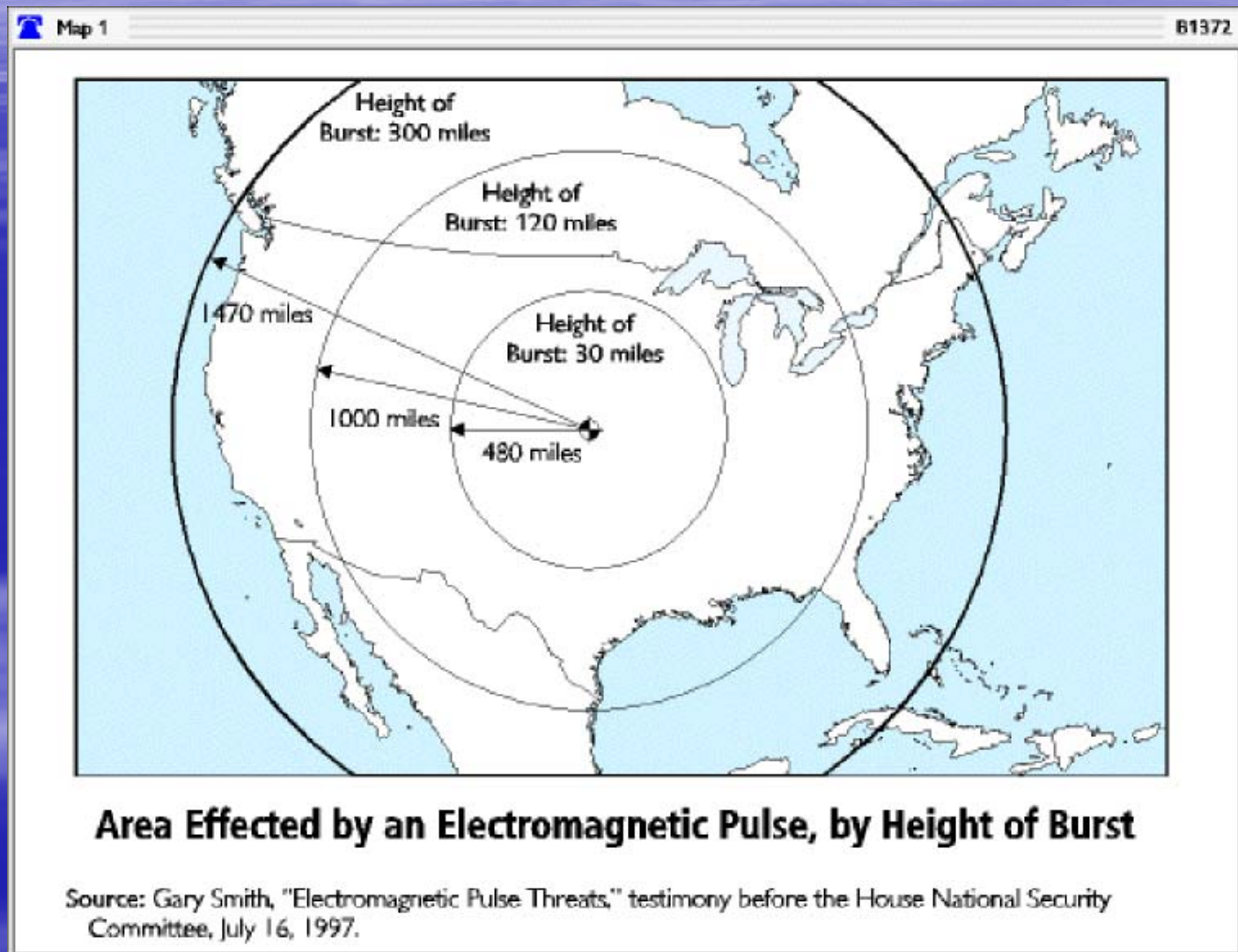
# Safe Separation Distance for Eye Injuries

Weapon Yield-1kT, Detonation Altitude-300 Meters Personnel Altitude-Sea Level





# Electromagnetic Pulse Coverage



# Current Threat Interest

- Terrorists are Actively seeking radioactives – Dirty Bombs??
  - Illegal means
  - Legal means – License Applications!!
- Weapons are available, But:
  - Significant Surveillance
  - Intelligence
  - Return of 'M.A.D.'
- **Emphasis in 2007** by Federal Government on Dirty Bomb Drills and other Radiological Scenarios

# Response Development

- Training and Drills for Fire and HAZMAT
- Training and Drills for Hospital Personnel
  - Physicians ??? Administrators?
- Evidence that Medical Community Suffers Same Fears as Society
- Improved Gov't understanding of needs of Medical Response personnel

# Your Resources

- **Health Physics Society** [www.hps.org](http://www.hps.org)
- **Homeland Security**
- **DOE (REACTS)/NRC/EPA, ABR**
- **Significant Online Resources**
- **Many new Training Courses and Videos**
- **Local:**
  - Nuclear Medicine personnel**
  - Fire Dept. HAZMAT**

# Solutions

- Choose a Location for Casualties
  - Acquire (Mobile) Supplies
  - Buy and Have Masks !!!
  - Make Realistic Plan
  - Train, Train, Train
  - Drill, Drill, Drill
- Overcoming Accultured Fear with  
Learned Knowledge