

Radiological Threat Review

John C. White CNMT

Radiation Safety Officer

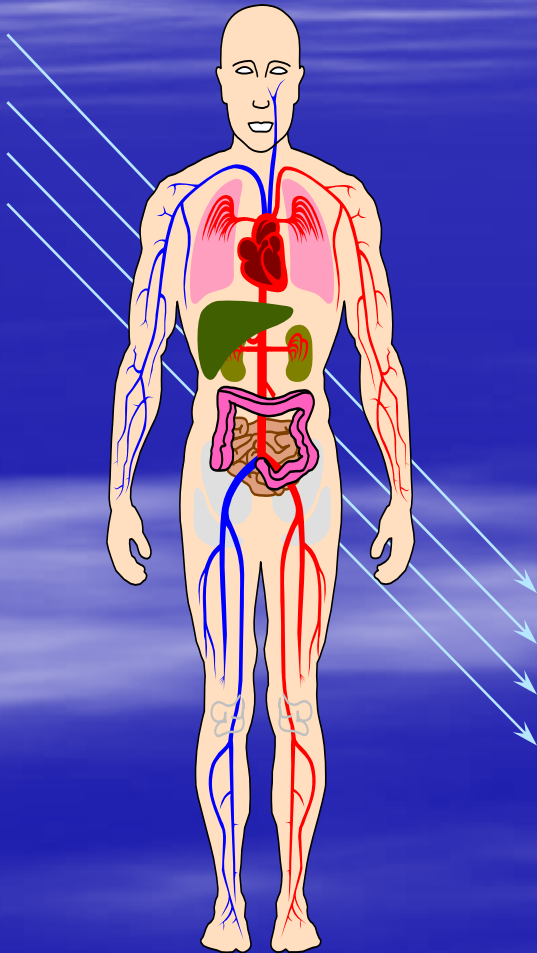
The University of Texas Southwestern Medical Center at Dallas

Potential Nuclear/Radiological Hazards in the U.S.

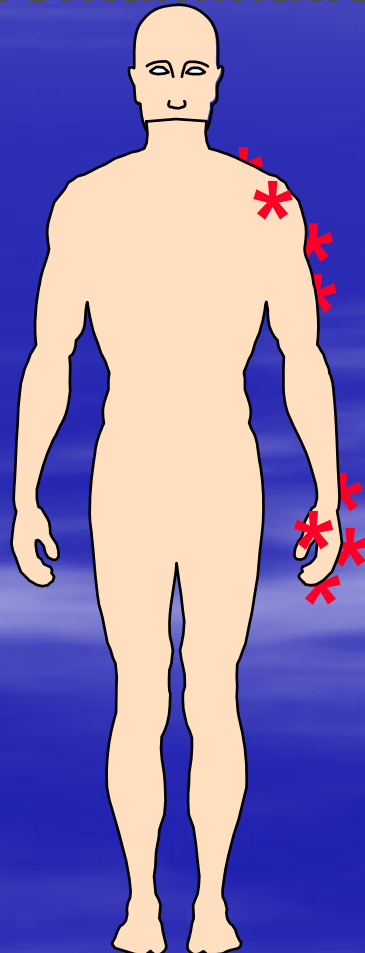
- Simple Radiological Device - Exposure
- “Dirty” Conventional Bomb
- Improvised Nuclear Device (IND)
- 1kT “Suitcase Nuke”
- Ballistic Missile Attack
- 250 kT Nuclear Weapon – “City Killer”
- Electromagnetic Pulse Weapon

Radiation Exposure Types

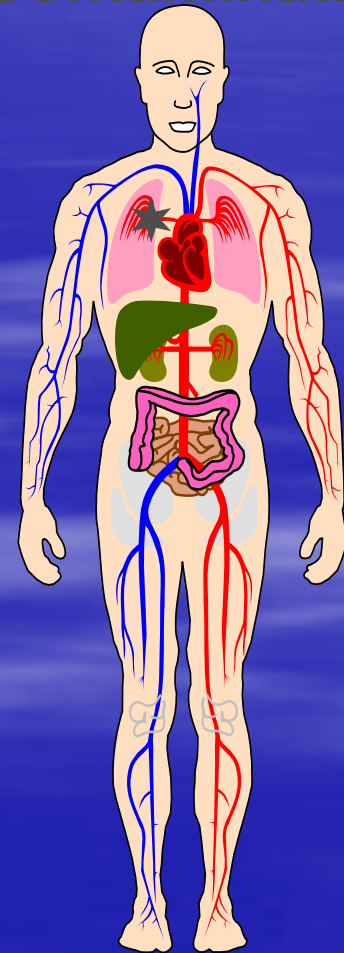
Irradiation



External Contamination



Internal Contamination



Radiation Exposure Device

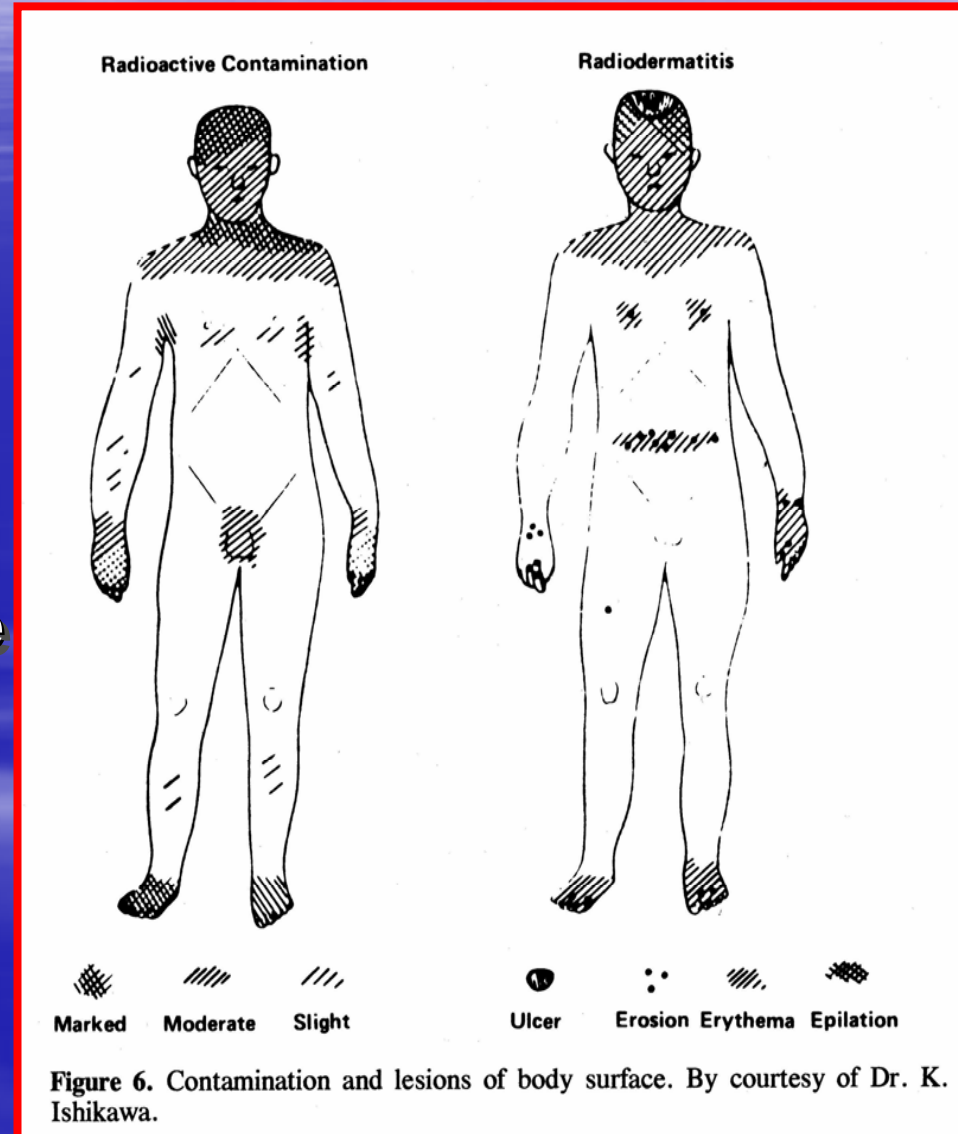


Burned, Possibly Blind, but NOT Irradiated



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

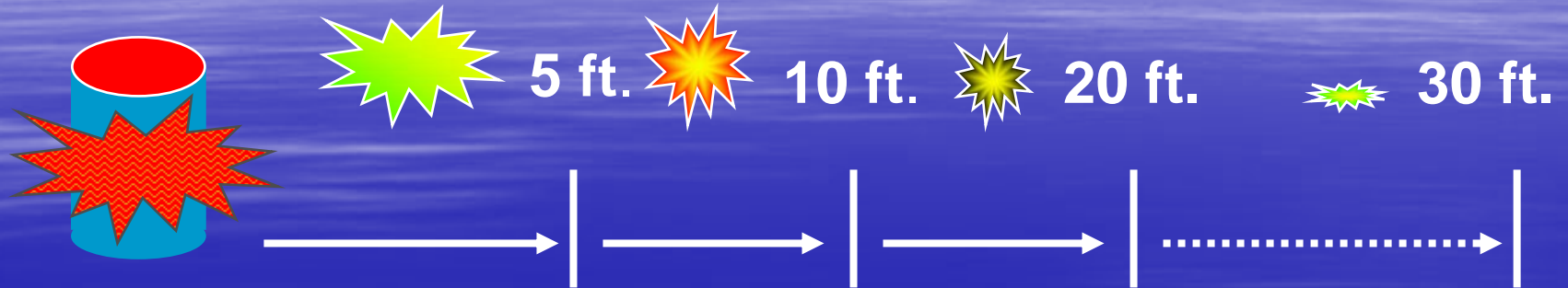
- Protection
 - Protection can be achieved by:
 - Time
 - Distance
 - Shielding

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

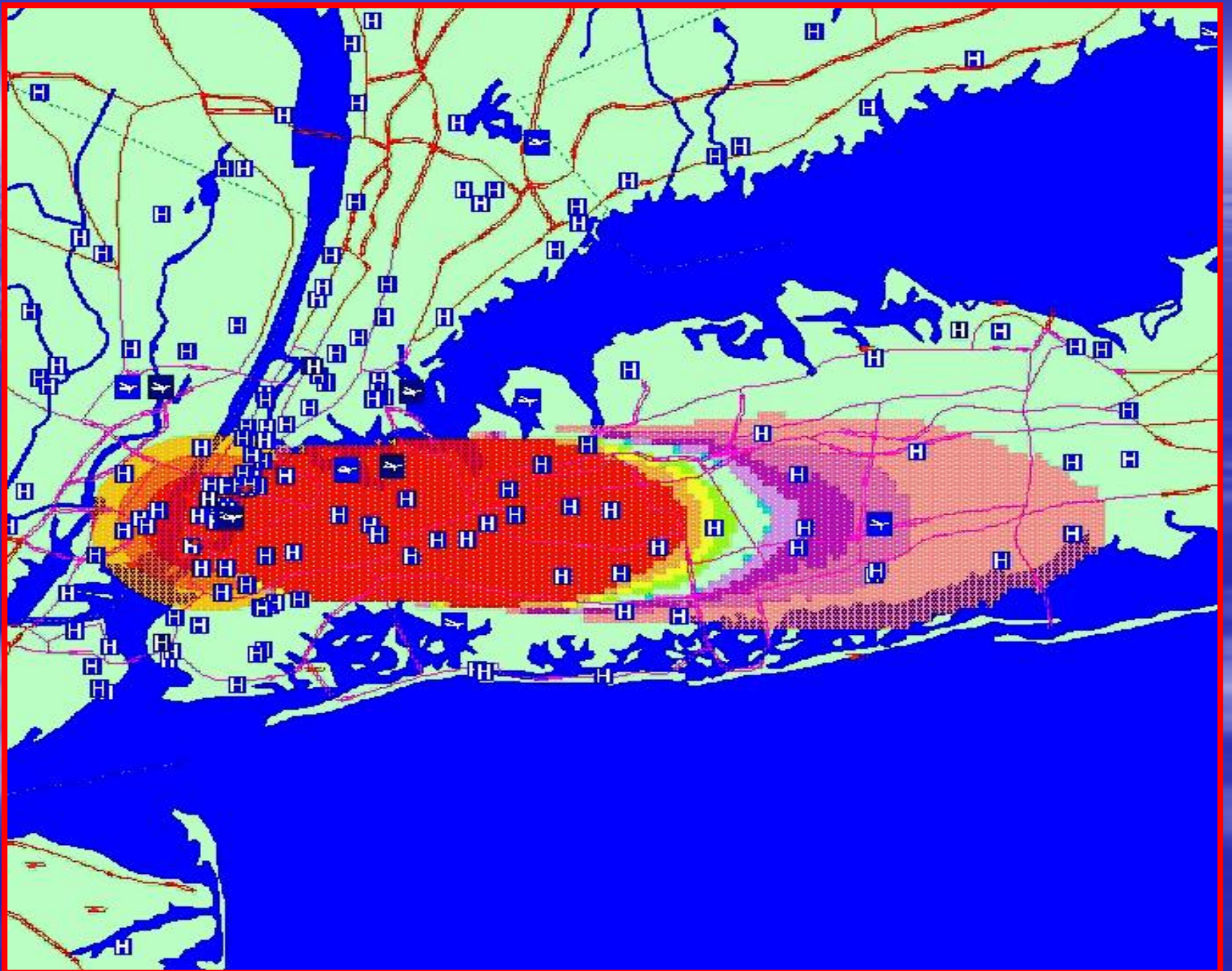
- 'Backpack' Nukes 1kt
- Tactical Weapons 5-50kt
- Strategic Weapons 100kt - 1Mt+

- Threat: City Damage
- Threat: Economic/Population Damage
- Different:
- Threat: Electromagnetic Pulse

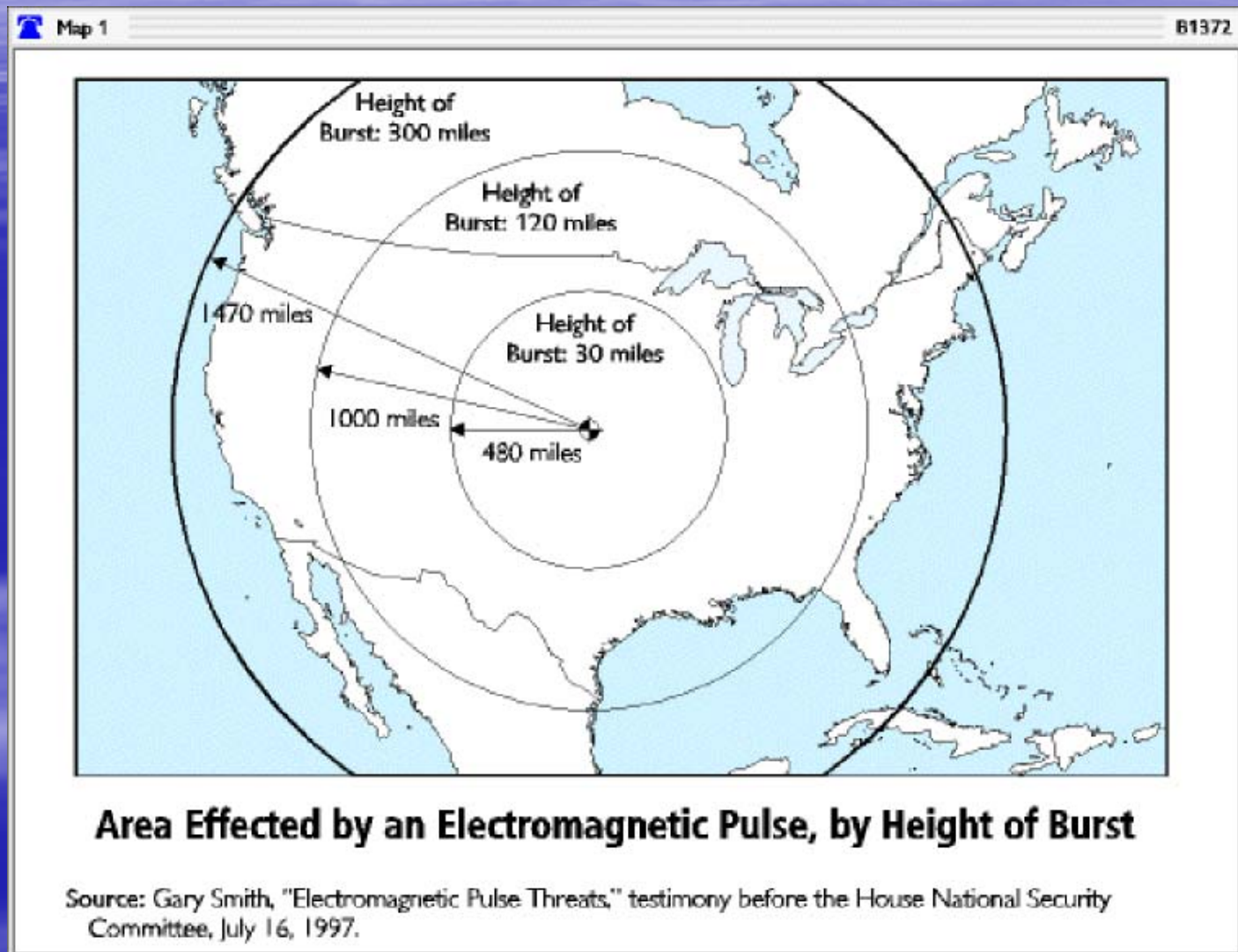
Safe Separation Distance for Eye Injuries

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
- **Homeland Security**
- **DOE (REAC/TS)/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