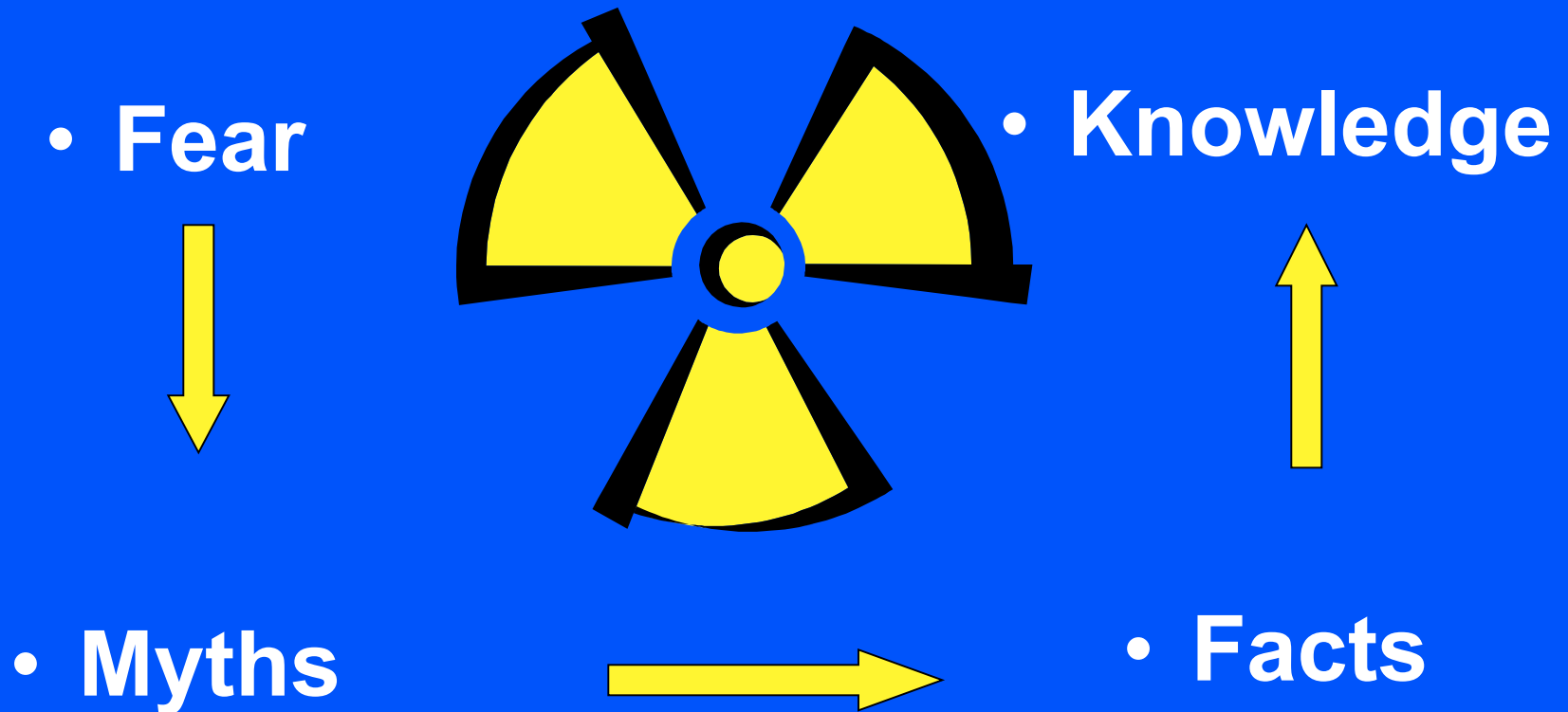


Nuclear Terrorism



(Ionizing) Radiation

- **Energy emanating from a source**
- **Intensity falls rapidly with distance**
 - **Absorbed by objects**
- **Absorption of energy may cause damage**

Myth

- **Ionizing Radiation makes people radioactive**

Fact

- **Contamination by radioactive materials makes people radioactive**
 - (For all practical purposes)

Radioactive Material

- **Material that emits ionizing radiation**
- **When dispersed causes contamination**
- **Contamination causes radiation exposure**
- **Decontamination reduces radiation exposure**

Myth

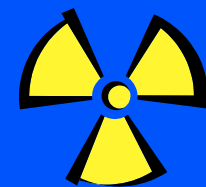
- **Special decon sprays can destroy radioactivity**

Fact

- **They help move radioactive material**



Nuclear Terrorism



- Nuclear bombs
- Dirty bombs
- Damage to nuclear power plants

Nuclear Bombs

- **Explosion**
- **Radiation**
- **Creation & Dispersal of Radioactive Material**

Dirty Bombs

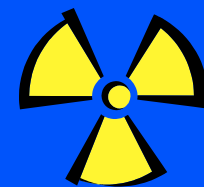
- **Explosion**
- **(Radiation)**
- **Possible embedded fragments**
- **Dispersal of Radioactive Material**

Nuclear Plants

- (Explosion)
- Radiation
- Dispersal of Radioactive Material



Nuclear Terrorism



- Very large to small scale events
- Conventional damage and injury
 - Possible radiation injury
- Contamination is the primary compounding factor

Myth

- Potassium Iodide protects against radiation

Fact

- Limits the uptake of radioactive iodine
 - Might be spread from a nuclear plant

Radiation Effects

- How much energy absorbed? (dose)
 - Which tissues exposed?
- Rapid or protracted exposure?
 - Age and other factors

How much dose?

- **Depends on the source**
 - **Strength (activity)**
 - **Emissions (alpha, beta, gamma etc)**
- **And on Time, Distance and Shielding**
 - **alpha, beta easily shielded**

Biological Effects of Radiation

- **Threshold Effects (cell killing)**
 - large doses
 - **A potential concern for survivors**

- **Stochastic Effects (cancer)**
 - **A potential concern for staff**
 - **A secondary concern for survivors**

Myth

- Radiation is a potent carcinogen

Fact

- Radiation is a weak carcinogen

Medical Resources

- **Nuclear Medicine**
 - familiar with contamination control
 - can evaluate patient activity
- **Radiation Oncology**
 - Familiar with effects of large doses
 - Manage highly radioactive patients
- **(Radiology)**
 - (Training in Radiobiology and Safety)

Medical Physics Resources

- **Medical/Health Physicists**
- **Make radiation measurements**
 - Have equipment
- **Are familiar with Radiation Safety**
 - Have shields, badges etc

Other Resources

- **Facilities for conventional decon**
- **Heavy shields for Brachytherapy**
 - **Waste monitors**
 - **Surgical Probes?**

Protect the Hospital

- Control Access
- Detect contamination
 - Segregate
- Decontaminate and secure or sewer

Evaluating Contamination

- **Use Geiger Counters or similar**
 - **Count Rate**
 - **Efficiency**

(Compare to background)

Treat the Patient

- Segregate if contaminated
 - Immediate care
 - Decontaminate
- Evaluate potential exposure
- Normal or specialty care

Inhalation or Ingestion

- **Can be evaluated by nasal swabs**
- **Can be detected in urine, feces etc**
 - **Can be evaluated by counting**
 - **(after decontamination)**

Protect the Staff

- **Detect contamination**
- **Use barrier techniques**

Myth

- Contamination multiplies by transfer

Fact

- Contamination diminishes on transfer

Estimate Staff Exposure

- **Use Ion Chamber or similar**
 - Geiger reading may be deceptive
- **Consider Time Distance Shielding**
 - With proper regard to the situation
- **Provide (film) badges if possible**

Overview

- **Contamination is the compounding issue**
- **Use available resources and expertise**
 - **Adapt conventional procedures**

Final Thoughts

- **Hospitals handle highly radioactive patients every day**
- **Radiation is a weak carcinogen**