

RADIOLOGICAL DISPERSAL DEVICE FDNY/EMS RESPONSE (RDD)



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Radiological Dispersal Devices

- Dirty bomb's greatest danger: **BLAST**
 - Immediate explosion area
 - Main purpose is widespread fear & making buildings or land unusable for a period of time
- Conventional explosive associated injuries/fatalities: blast, burn, lung, etc.
- Combined injury: synergism between traumatic injury & radiation exposure
 - ↑ Morbidity & mortality
 - Mechanical, thermal, infectious



Radiological Dispersal Devices (RDD) Assumptions



- Inhalation hazard greatest at explosion site
- Airborne radioactive material should dissipate quickly
- Principal contamination hazard to patients/responder: immediate detonation area 2⁰ radioactive fragments on ground & buildings
- Decrease initial exclusion area as surveys are conducted
- Victim evacuation: higher priority than decontamination
- Affected population from immediate vicinity will be directed away from blast site via routes that do not cross blast area

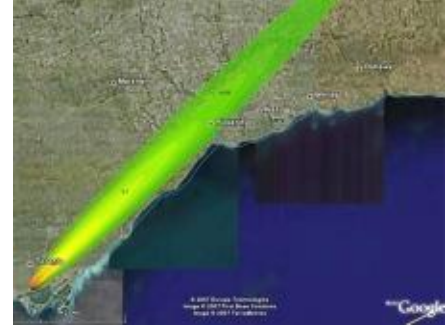
Radiological Dispersal Devices (RDD)

Assumptions

- Evacuation Areas will most likely change over time
- Hospitals should consider that individuals may have significant but not life-threatening levels of radioactive contamination
- City based screening/monitoring stations will not be immediately available
- Seriously ill/injured patients:
 - Avoid decontamination procedures that delay medical care, but rapid radiation survey is acceptable



FDNY/EMS RDD Explosion Response



- Protective actions & decisions in first few hours with little factual information (*+misinformation*)
 - Secondary device(s), multiple locations/threats, time-day, radioisotope, occupancy, local environment
- Incident notification will probably have few if any field measurements
 - No or limited knowledge of initial radioactive material characteristics
- RDD uses explosives (IED) with radioactive material AKA Dirty Bomb
 - ±Effectively disperse radionuclide
 - Not a nuclear explosion or device
 - Not likely to produce “large” dangerous radiation zone



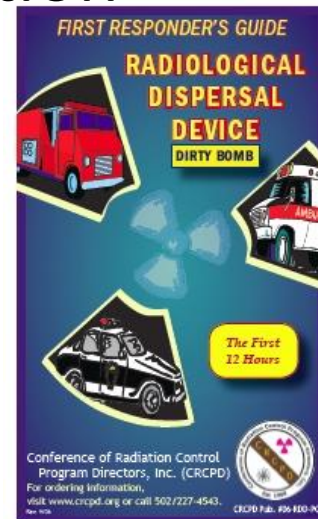
FDNY/EMS RDD Explosion Operations & Assumptions

- High concentrations of airborne radioactive particles post explosion & fires involving contaminated materials or poorly ventilated areas
 - Airborne radioactive particulates 2⁰ re-suspension
 - Loose dust & debris on people/clothing, ground & surfaces due to particle deposition & Hot Zone tracking
- Persons will require definitive clinical assessment
- Internal/external contamination unlikely to pose significant hazard to EMS or first responders
- Establish: Hot/Warm/Cold Zone boundaries



FDNY/EMS RDD Explosion Operations & Assumptions

- Perform Life Safety Operations
 - Coordinate evacuations: rescue injured, provide prehospital emergency medical care
 - Triage/Stabilize/Transport injured persons from site
 - Determine extent of evacuation area
- Control access & exit corridors: self evacuation
- Fight fires, scene assessment (i.e. stability)
- First Responders must follow agency respiratory protection policy



SORT, Triage, Treatment, Transport

- Life-threatening injuries ***shall*** be Transported prior to decontamination
- Contamination to health-endangering level unlikely
- Exit Corridors:
 - Not interfere with inbound emergency personnel/vehicles
 - Not traverse immediate source area
- Evacuation Operations:
 - Assist affected persons away from incident area
 - Triage prior to decontamination



SORT, Triage, Treatment, Transport

SORT:

- Continue victim assessment: **Dead or Alive**
 - SORT/Triage victims for Treatment & Transport
 - Assess affected people for life-threatening conditions
 - Critical patient transport pre-decontamination
 - Non-critical on-scene decontamination
 - Delayed Transport: post-decontamination
 - Deflect asymptomatic victims away from hospitals

RDD Triage and Transport

Trauma Without Radiation Injury Component	Triage Category	Positive Radiation Contamination [☆] Transport Priority	Facility
No injury	Not a patient	Ambulatory setting evaluation	Non-transport
Ambulatory + injury	Green	Delayed/Decon	911 Facility
Non-ambulatory	Yellow	Delayed/Decon	911 Facility*
Urgent	Orange	<i>Rapid/No Decon!</i>	Trauma 911 Facility*
Immediate/Critical	Red	<i>Rapid/No Decon!</i>	Trauma
Expectant	Black	Non-transport/No Decon	Non-transport

**Based on the Mechanism Of Injury*

[☆]No initial available baseline exposure assessment

AVERAGE DAILY	CRITICAL PATIENTS	NON-CRITICAL
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- No fixed allotment for Level D (Catastrophic) MCIs
- Hospitals should do all they can to prepare for large numbers of critical & non-critical patients

LEVEL A (MINIMAL TO MODERATE)				
≤200	1	NA	20	NA
>200	2	3	30	30
LEVEL B (SIGNIFICANT)				
≤200	2	NA	30	NA
>200	4	6	50	50
LEVEL C (MAJOR)				
22	4	NA	40	NA
>200	6	9	70	70

Not account for patients who self refer

FDNY/EMS Decontamination Priority

1. Serious injuries: stabilized, not requiring immediate transport
2. Most severely exposed: contaminated
3. Discretionary on scene: pregnant women, children, minor injuries, etc.
4. Correlate to Triage designations



- ✓ Establish screening & decontamination area for non-critical/non-ambulatory victims
- ✓ Conduct Post-Decontamination Screening: function of resources & incident magnitude

Victim Assumptions



1. Radiologically contaminated patients generally pose no danger to medical providers
2. External body/clothing contamination by liquids or particles (superficial shrapnel): not likely to exhibit any symptoms related to contamination
3. Internal contamination from shrapnel, inhaling &/or ingesting contaminated dust

Victim Assumptions

4. *Traumatic Blast injuries: explosion 1^o MOI*
5. “Normal” hospital barrier clothing provides protection
6. Hospitals will be inundated with large numbers of contaminated & uncontaminated patients
7. Victim radiation exposure measurements: generally not available



Victim Care

- *Acute medical/surgical treatment should never be delayed for decontamination or radioactive screening*
- Virtually impossible for living patient to be so contaminated as to medically threaten healthcare providers
- Medical personnel radiological hazard or exposure is negligible
- Establish screening & decontamination area of non-critical/non-ambulatory victim



ED Victim Medical Management



- *Med-Surg priorities for acute/life-threatening injuries*
- Consider secondary medical treatment area/facility for general public
- Potential mass care area
- Burn management
- Psychological effects



Hospital Decontamination

- Decontamination in parallel with life-saving activities
- Dynamic process
 - Adaptable to patient/event conditions
 - Real-time priorities: critical trauma management supersedes all other activities
- Casualties & facilities should be considered contaminated
- Clinical area management: Clean vs. Dirty
 - Moderately vs. Severely Contaminated more realistic

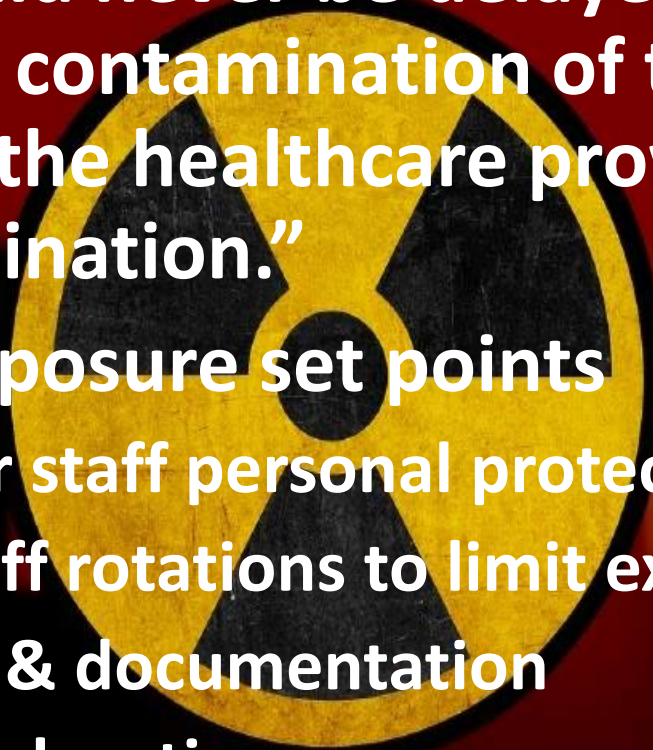


Hospital Actions

- Must be able to immediately receive, evaluate & treat victims
- Some victims will be ill & injured
 - Some will be exposed &/or contaminated
 - Others not exposed will be concerned about their own or child's potential exposure
- Major consequence will be low-level external contamination & significant psychosocial effects



Exposure Issues

- “...The stabilization of life-threatening injuries should never be delayed to address radionuclide contamination of the patient or exposure to the healthcare provider from such contamination.”
 - Radiation exposure set points
 - Planning for staff personal protection procedures
 - Develop staff rotations to limit exposure
 - Monitoring & documentation
 - Training & education
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Summary and Recommendations

- Radiation exposure may continue after initial event
- Contamination to health dangerous level unlikely:
 - Responders &/or hospital staff
 - Ingestion, inhalation & dermal absorption
- Quantitative patient/staff approach
 - Clear medical cutoff for consequence management with respect to dose
 - Discussion of relative risk, hazard, prevention, mitigation & health effects
 - Psychological effects



Summary and Recommendations

**“...MY HOSPITAL PLAN IS TO
NOT PERMIT ANY
RADIATION
CONTAMINATION INSIDE...”***



* NYC Hospital Guidance for Responding to a Contaminating Radiation Incident; NYC Hospital Radiation Response Working Group; April 2009