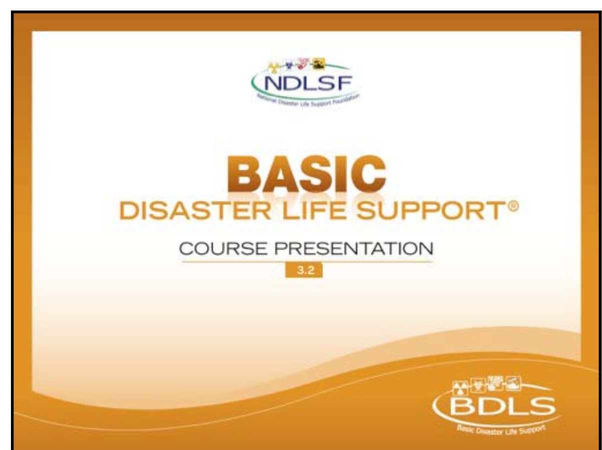

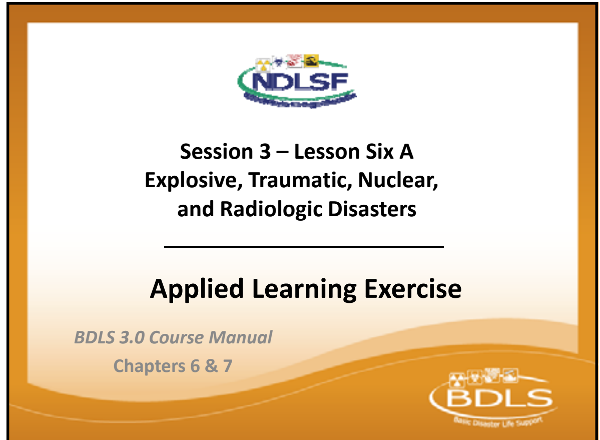

Scenario

- Hospital contracted to provide medical direction for Department of Public Health
- Oversee medical aspects of EMS, fire, police, and disaster preparedness city services

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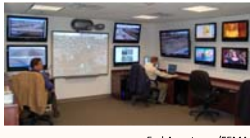
Scenario

- Breaking news reports of explosion at large entertainment and shopping complex nearby
- Receive call that MCI occurred and summoned to city's EOC



Earl Armstrong/FEMA

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Scenario

- Explosion at movie theater that appears to be intentional:
  - Stability of building unknown
  - USAR teams dispatched
  - EMS units reach scene and triage ongoing

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Scenario

- Self-referred patients inundating nearest hospital (Level I trauma center)
- EMS crews' dosimeters alerting and HAZMAT units have been dispatched to investigate

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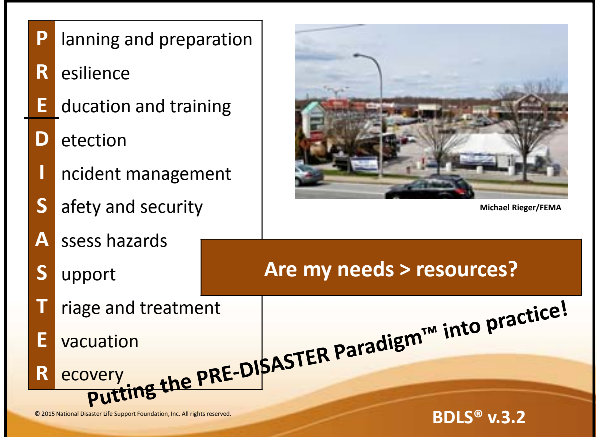

PRE-DISASTER Paradigm™
Planning and Practice

- Do MOUs exist between hospitals and city for distribution/transfer of patients during MCI?
- Would hospital and city disaster plans provide instructions and action steps?
- Are hospital drills and field exercises practiced?
- What about personal and family plans?

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PRE-DISASTER Paradigm™
Resilience

Ability of individuals and communities to adapt and overcome adversity due to disaster

- Does city have sufficient resources to manage first 96 hours until external assets arrive?
- As news of event spreads through city, how can you foster public resilience?

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PRE-DISASTER Paradigm™
Education and Training

- Are health and medical providers in area ready to manage a catastrophic event?
- What "just-in-time" educational and training actions could be considered?
- Should you preempt media by putting out your own message, or wait to gather more information?

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Scenario
Update

SitRep, 30 Minutes After Initial Notification:

Worried well and walking wounded crowd ED

Hospital security locks down entrances

City police cordon off evacuation route from scene

Ambulances arrive with "immediate" patients

Initial Reports Incomplete, Inaccurate

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Scenario
Update

SitRep, 60 Minutes After Initial Notification:

City HAZMAT teams identified radioactive debris

City USAR and HAZTEC teams begin extricating victims

Hospitals notified of MCI and need for decontamination

Hospital decontamination teams mobilized and deployed

Early Situational Awareness

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The DISASTER Paradigm™
Detection

- How to gain early situational awareness following explosion?
  - Is disaster present?
  - What happened?
  - What is needed now?
  - Who should be called?
- Is there suspected threat or HAZMAT present?

Citizen Readiness

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The DISASTER Paradigm™
Incident Management

- What NIMS areas and emergency support functions (ESFs) impact public health and medical services?
- What actions should local hospitals and trauma centers take to prepare for surge of patients?
- Given reports that closest Level I trauma center is overwhelmed with self-referrals, should trauma patients be directed to other hospitals?

Health Emergency Operations Center

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Scenario
Update

SitRep, 90 Minutes After Initial Notification:

ESF-8

- Regional hospital association liaison briefs ESF-8 "desk" on status of closest Level I trauma center
- Requests additional trauma patients be diverted to other Level I trauma centers

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The DISASTER Paradigm™
Safety and Security

- What likely human systems failures may occur after explosion?
- What are safety and security concerns about crowd control at scene and hospital?
- Have felonious acts been committed requiring involvement of law enforcement agencies?
- Are there perpetrators among victims?

Beware of Secondary Devices

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The DISASTER Paradigm™
Assess Hazards

- While providing emergency medical care, are there hazards to be considered?
- Is there a possibility that secondary devices might be activated at scene or hospital?
- What measures can be used to minimize exposure of victims and providers to radiation?

Time, Distance, Shielding

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The DISASTER Paradigm™
Support

When providing emergency medical care at scene or hospital, remember…

- **What** do I have?
- **What** is needed?
- **Where** is it?
- **When** will it arrive?
- **What** if it is unavailable?

PPE For Rescue Personnel

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Scenario
Update

SitRep, 120 Minutes After Initial Notification:

"Immediate" patients bypassed decontamination, resuscitated by ED staff

Hospital teams decontaminated "delayed," then "minimal," patients

ED staff evaluating "delayed" patients once decontaminated

Clinic staff evaluating "minor" patients once decontaminated

Continuous Situational Awareness

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The DISASTER Paradigm™
Triage and Treatment

- Does possibility of radiation change triage or treatment?
- Is staff prepared and readied for medical care of radiation injury?
- What are among key elements of such care?

Blast >>> Radiation Effects

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The DISASTER Paradigm™
Triage and Treatment

Early care of blast trauma: **Airway** and **Breathing**

- Airway
  - HAINES position for blast trauma if no equipment for spinal immobilization
- Breathing
  - Needle decompression for blast lung causing tension pneumothorax

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The DISASTER Paradigm™
Triage and Treatment

Early care of blast trauma: **Circulation**

- Tourniquets for active bleeding from traumatic amputation
- Zeolite, chitosan for active bleeding from soft tissues
- Hypotensive resuscitation to SBP 90 (70 + 2x age in children)
- Damage control laparotomy/thoracotomy for hemorrhage
- Completion amputations for unsalvageable mangled limbs
- Fasciotomy/escharotomy to avoid compartment syndromes

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The DISASTER Paradigm™
Triage and Treatment

Early care of blast trauma: **Circulation**

- Selective use of vascular shunts for arterial injuries
- Aggressive use of vacuum dressings for open wounds
- Active/passive rewarming to avoid coagulopathies
- Fresh whole blood for treatment of coagulopathies
- Recombinant factor VIIa for treatment of coagulopathies
- Judicious use of crystalloid in combined blast lung and burn

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The DISASTER Paradigm™
Triage and Treatment

Late care of blast trauma

- Compartment syndrome despite fasciotomy
  - Often develops during aeromedical transport
- Wound management
  - Many closed wounds must be reopened
- Tertiary survey
  - Should be performed by different team
- Vascular surgery
  - Intimal tears caused by blast wave

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The DISASTER Paradigm™
Triage and Treatment

Early care of radiation injury

- Probability of survival relates more to blast effect than radiation; initial focus on Advanced Trauma Life Support®
- Resuscitation before decontamination for patients in extremis; decontamination before treatment for other patients
- Fluids and electrolytes, antiemetics for patients with GI symptoms; survival is unlikely if onset of emesis <1 hour
- Infection control crucial for those with acute radiation syndrome; most nonsurvivors will succumb from sepsis

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The DISASTER Paradigm™
Triage and Treatment

Late care of radiation injury

- Cutaneous radiation syndrome (skin burns) associated with beta exposure >100 rad (1 Sv)
- Acute radiation syndrome is associated with whole-body gamma exposure >200 rad (2 Sv)
- Internal contamination requires isotope determination and decorporation
- Perform necessary operations within first 3 days after exposure

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The DISASTER Paradigm™
Evacuation

- Should public be advised to evacuate or shelter in place?
- When would you mobilize evacuation resources and issue orders?
- High risk of causing human systems failure disasters

Crisis and Risk Communication

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The DISASTER Paradigm™
Recovery

- How and where will you provide for food, shelter, and medical needs of those evacuated?
- Priority to restore health and medical infrastructure of impacted community
- What can you do to assist in recovery?
  1. Relief
  2. Rehabilitation
  3. Restoration

Mental Health Needs Of Survivors

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After-Action Review
Outcomes

- Potential deaths several hundred; scores are still missing
- Damage estimates in the billions to trillions of US dollars
- Largest search and rescue operation in most cities' history
- Most adjacent buildings destroyed or uninhabitable
- Permanent evacuation of people, structures in dispersal zones
- Impact on local health and medical providers lifelong

We Must Be Prepared

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