Planning for a Nuclear Incident: Tackling the “Impossible”

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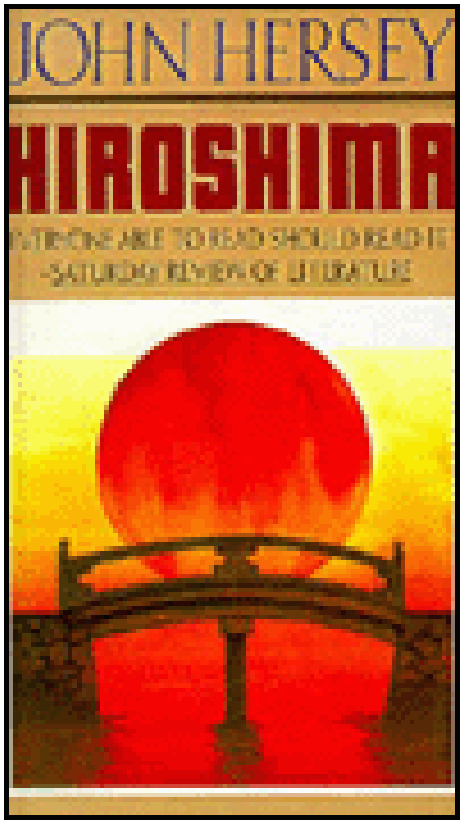
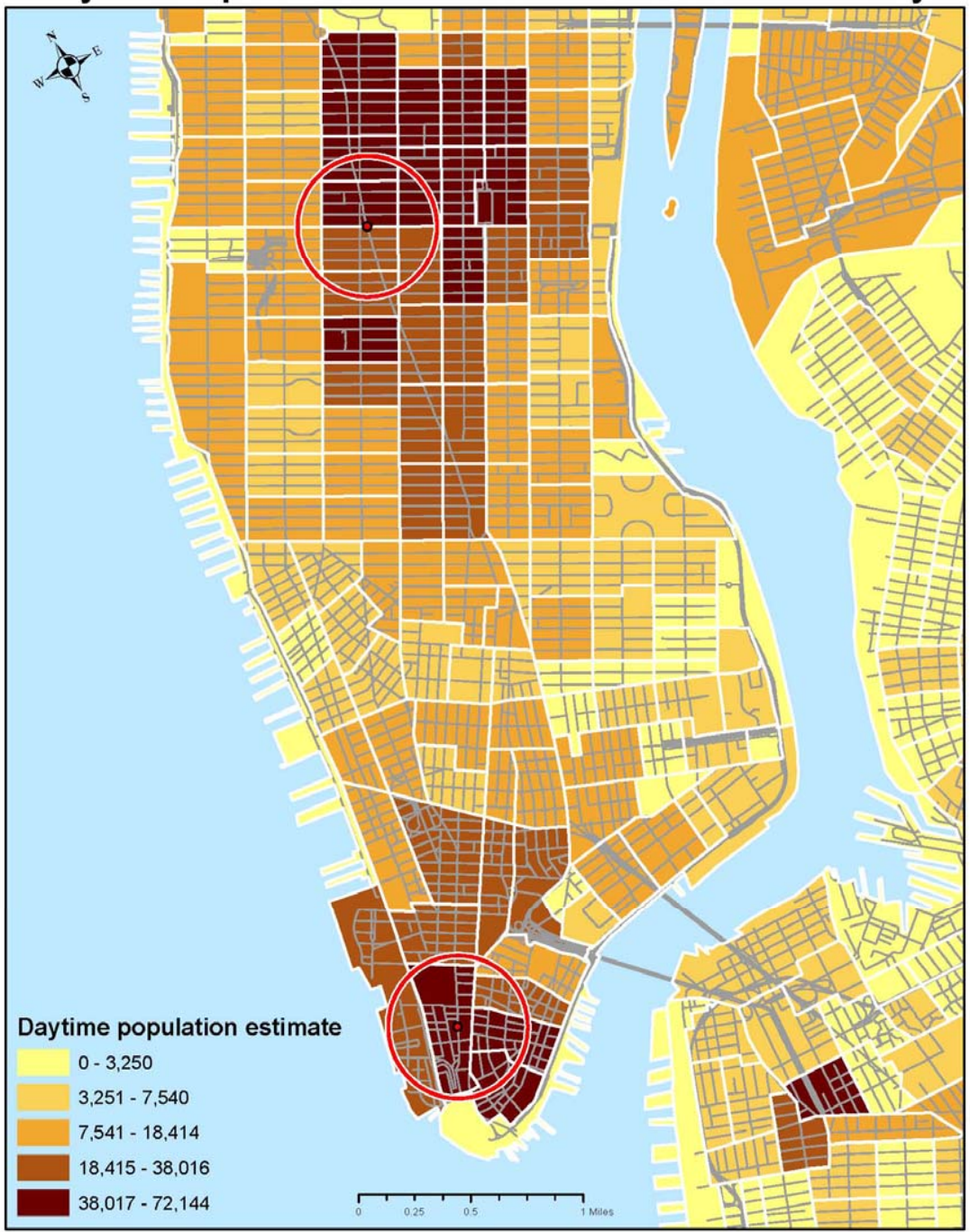
Objectives

- Scope of a Catastrophic Nuclear Incident
- Planning for Catastrophes
- Planning for Nuclear Catastrophes
- NYC Rad Planning Activities

Planning for the Aftermath of a Nuclear Incident



Daytime Population Estimate with 500m Radius Overlays



2/10/08

Estimated Initial Impact 10Kt

- Instant fatalities > 14 K
- Injured, but alive > 150 K
- Critical evacuation needed > 500K
- Shelter-in-place needed > 1.3 million
- Shadow evacuation > 3 -12 million
- Dose over 150 rem > 300K

Injury Predictions

Combined Injuries	**65-70%**
Burns + Irradiation	40%
Burns + wounds +irradiation	20%
Wounds + irradiation	5%
Single Injuries	**30-40%**
Irradiation	15-20%
Burns	15-20%
Wounds	<5%

Complicating Factors

- Electromagnetic Pulse (EMP) damage up to 1.2 km from GZ
- Loss of electrical power 1-4 weeks
- Loss of telecommunications 1-4 weeks
- Major Fires > 250
- Significant ground contamination
- Loss of supply chain (foods, medications ...)

Complicating Factors

- Significant loss of healthcare infrastructure
- Significant loss of responders and healthcare providers

Is it even possible to plan?

Levels of Preparedness

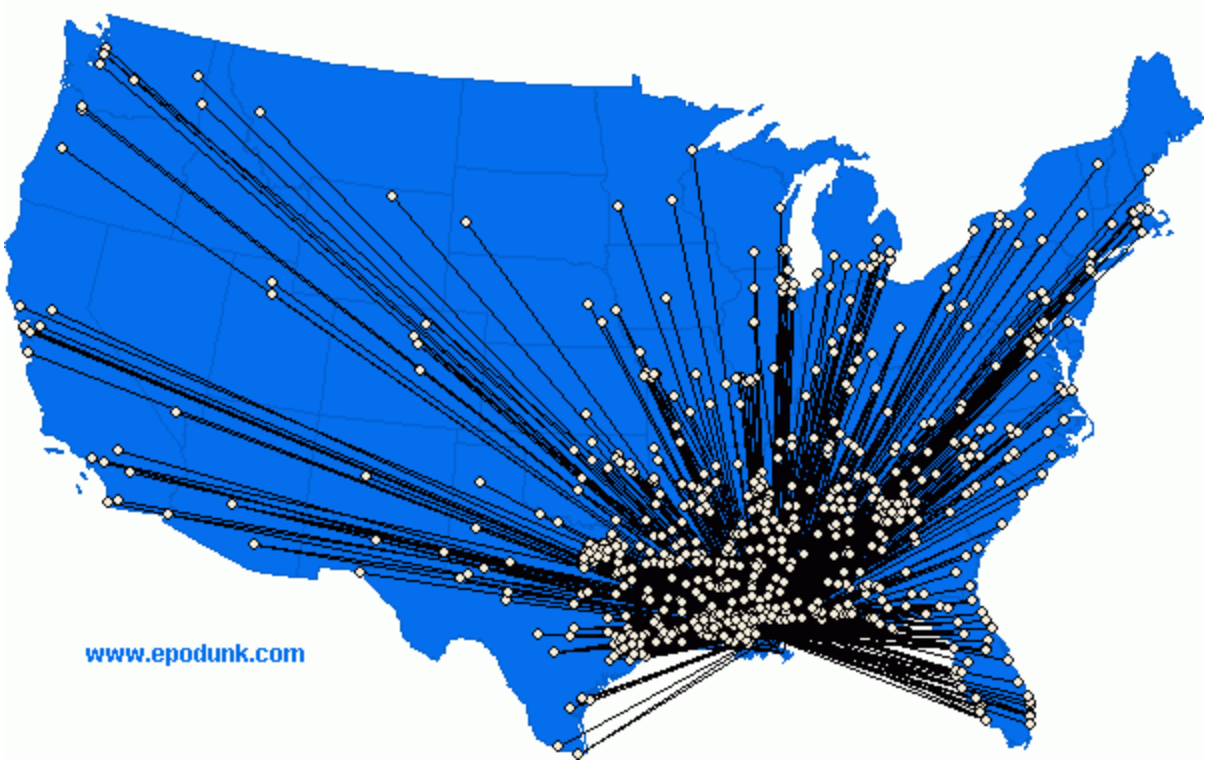
- **Level 1 Emergency** – Stressed locality/facilities with local resources intact
- **Level 2 Disaster** – Stressed but sustainable locality/facilities with damage to local resources/infrastructure
- **Level 3 Catastrophe** – Locality/facilities unsustainable in time frame of external support

Catastrophic Preparedness

- In catastrophes, the entire country will be impacted
- Therefore, catastrophic response is a national response

National Impact of Catastrophes

Diaspora of Hurricane Katrina Evacuees



Preparedness Based on Regions

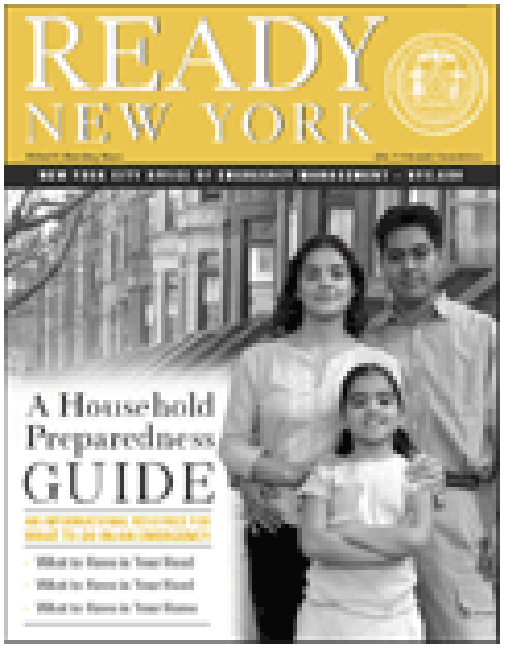
- Region of Primary Impact: greatest loss life, infrastructure & communication
- Region of Secondary Impact:
  - Infrastructure & communication mostly intact;
  - Includes area of significant fallout; and
  - May require significant shelter-in-place or evacuation to avoid acute health consequences
- Region of Tertiary Impact:
  - Infrastructure intact; and
  - No significant fallout

Regions of Primary Impact

- Plan for individual and facility self-reliance
  - 7 days sustainability
  - How to shelter-in-place/evacuate
- Plan for novel communications
- Hospitals: Plan for emergent care, shelter-in-place, evacuation

Regions of Primary Impact

- Self-Sufficiency Training for Citizenry
- Consider Hardening Communications
- Radiation Detection, Safety, and Equipment Training for 1st Responders and 1st Receivers

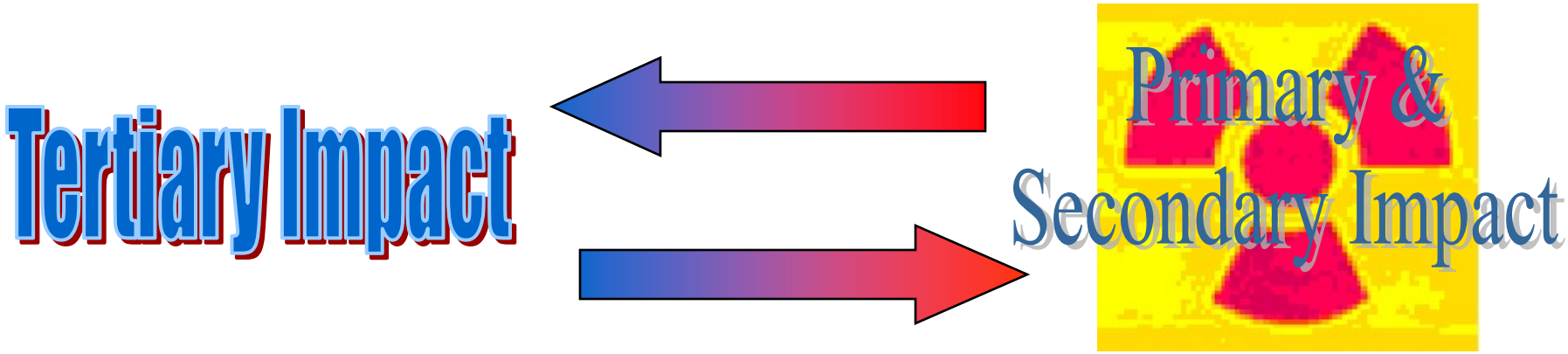


Regions of Secondary Impact

- Plan on rapid decisions for shelter-in-place *and* mass evacuation
- Plan on rapid dissemination of information
- Plan mass decontamination

Regions of Tertiary Impact/Support

- PLAN FOR RECEIVING



- PLAN FOR SENDING

Plan for Receiving

- Reception and Screening of Evacuees
- Reception and Triaging of Injured
- Reception and Integration of Support Teams and Portable Disaster Medical Facilities

Receiving Evacuees

- Evacuees will have extensive medical, psychological, and physical needs
- Decontamination may not have occurred prior to arrival
- All cities should have ability to detect radiation by 1st responders and 1st receivers

Receiving Evacuees

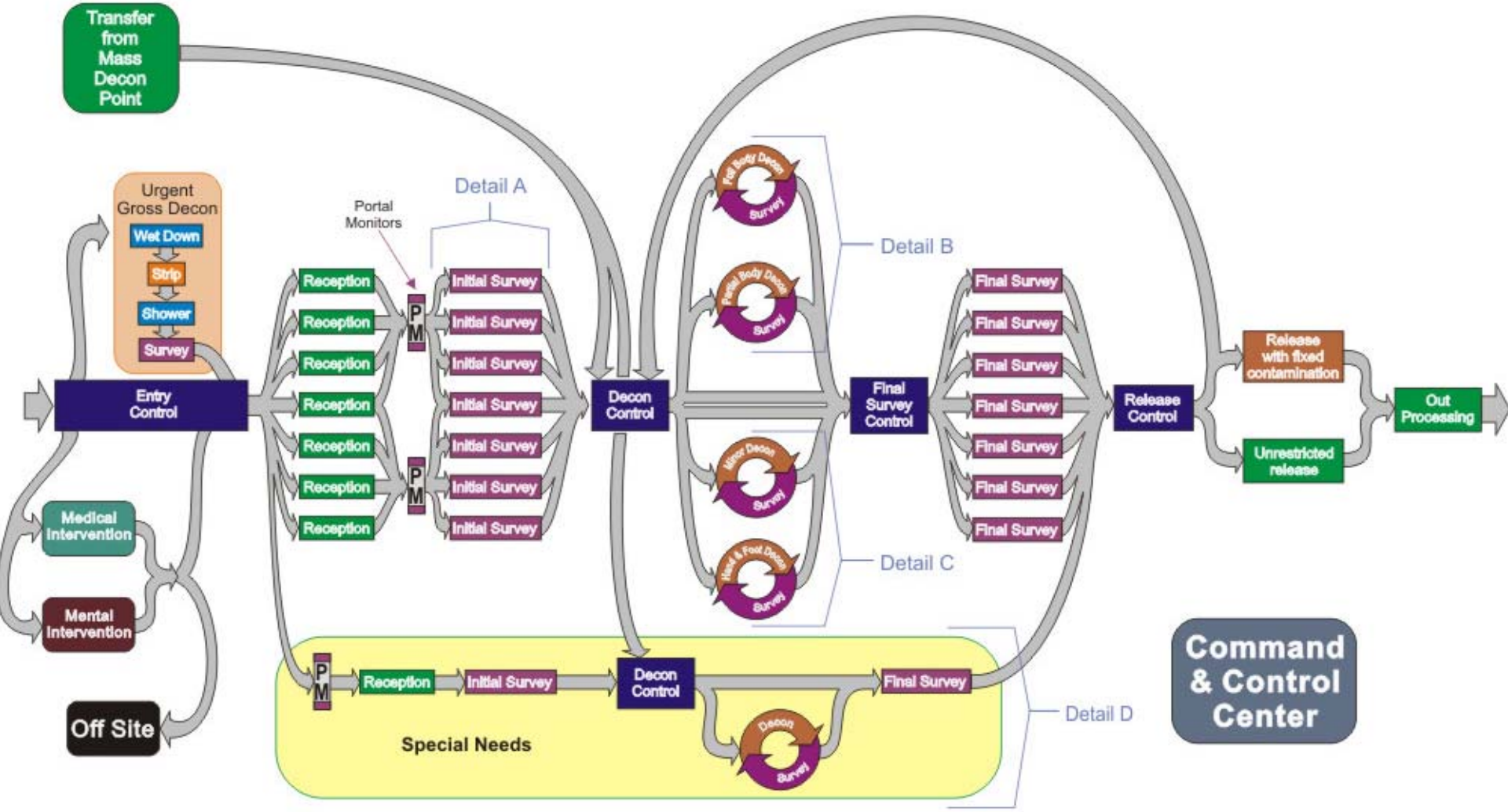
- Plan locations for Reception/Screening
- Plan locations for mass sheltering
- Plan locations for special needs sheltering
- Radiation Detection and Control Plan needed at each site

Photo Daniel Cima/American Red Cross

Potential Shelter Sites

- Aircraft hangers
- Military facilities
- Churches
- National Guard armories
- Community/recreation centers
- Surgical centers / medical clinics
- Convalescent care facilities
- Sports facilities / stadiums
- Fairgrounds
- Trailers
- Government buildings
- Tents
- Hotels/motels
- Warehouses
- Meeting halls

Mass Screening Point



Recruit Radiation Trained Volunteers into MRCs/DMATS

- University Research Facilities Personnel
- Nuclear Power Facilities Personnel
- Health Physics Societies
- Radiation Safety Personnel

PHOTO: REAC/TS
http://www.orau.gov/reacts/

Receiving Injured

- Plan for arrival of patients over days to weeks
  - Delays in Dose Reconstruction
  - Delays in Treatment
- Plan for burn, trauma, isolation, and psych surge capacity
- Plan for limited resources
- Plan for prioritizing care
  - “Greatest good for the greatest number”
- Radiation Detection and Control Plans for Mass Casualties needed at each Hospital

Receiving Injured

- Plan Alternative Treatment Sites
  - Only if you have staff to spare
  - Or if to be staffed by external support teams from other regions/military/countries

Receiving Support Teams

- Federal Radiological Emergency Response
  - Radiological Assistance Program (RAP) Teams
  - EPA
- Domestic Emergency Support Teams
- Strategic National Stockpile
- DMAT/DMORT/DVET/PHS Teams

Plan for Sending

- Utilize EMAC
- Support Teams
  - Medical, Environmental, Logistical, Transport, etc.
- Supplies

Sending Support Teams

- Plan in advance
- Intact teams better than ad-hoc
- Plan for self-sufficiency for length of stay (food, water, PPE, detectors,...)
- Train teams in radiation detection and safety

Training for Staff

- CDC on-line courses
  - "Radiological Terrorism: Medical Response to Mass Casualties "

  http://www.bt.cdc.gov/radiation/masscasualties/training.asp
  - "Preparing for Radiological Population Monitoring and Decontamination"

  http://www.phppo.cdc.gov/PHTN/Radiological2006/default.asp
- REAC/TS courses http://www.orau.gov/reacts/courses.htm
- NYC DOHMH Radiation Equipment Training http://www.nyc.gov/html/doh/html/bhpp/bhpp-focus-rad.shtml

NYC Radiation Preparedness Projects

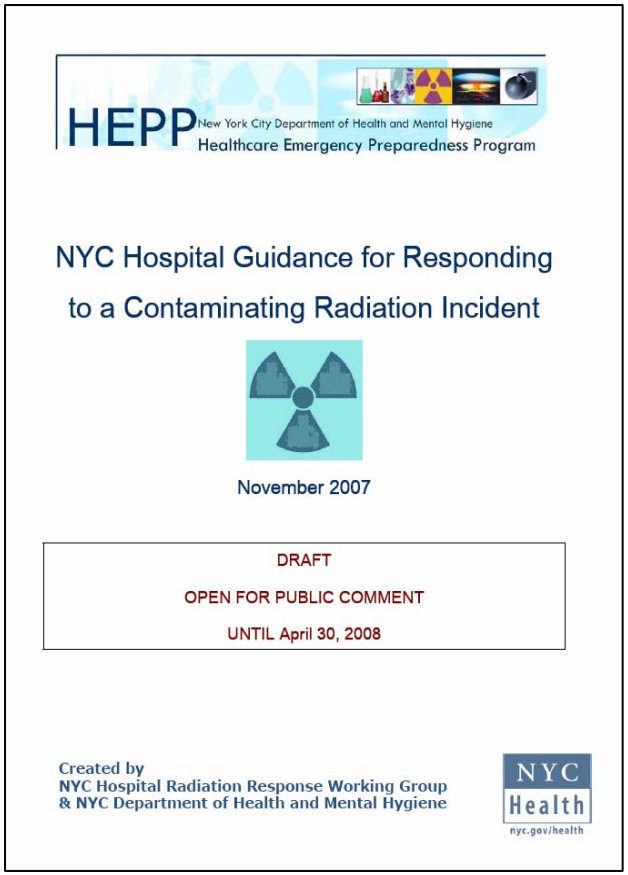
- Hospital Radiation Equipment Project
- Hospital Radiation Response Working Group
- EMS Radiation Equipment Project
- Hospital Radiation Materials Security Project
- Mass Screening Planning
- Internal Contamination for Mass Populations Project
- Burn Surge Project

NYC Hospital Radiation Detection Project

- 58/67 NYC hospitals participating
- Equipment includes:
  - Personal digital dosimeters, survey meters, and area monitors
- Training provided to all hospitals
- Plan to drill 2008-2009

NYC Hospital Radiation Response Working Group

- Creating NYC specific guidance on hospital response to contaminating radiation incidents
- Draft open for public comment



Emergency Department Schematic

Radiation Survey Meter Deployment during a Radiation Incident

Searches for high activity sources on incoming
2— Red Area Survey Meter Survey on entry to Red Area, surveys during treatment
3—Post Decon Survey
4— Survey meter at Buffer areas. Surveys those leaving treatment areas to go into hospital
5—Green Area Survey Meter
Survey's prior to discharge

Buffer Area

4

Controlled Red Treatment Area

5

2

Controlled Green Treatment Area

Controlled Yellow Treatment Area

3

1

NYC Burn Project

- Surge Capacity plan to increase burn beds from 71 to 400 using an additional 30 hospitals for up to 5 days
- Creating of Burn Care Training for clinicians and nurses centers
- Provided burn supply/equipment carts for participating hospitals

Conclusions

- Shift paradigm of planning for catastrophes to include secondary and tertiary regional response
- Rapid decisions for shelter-in-place / evacuation of primary importance
- Include radiation response plans for EMS, shelters, hospitals, cities

Questions?

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