



**driving readiness in
dynamic times**

Disaster Planning for California Hospitals




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California Hospitals

Leading Practices in Decontamination and Triage

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Decontamination 101 & SALT Triage

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DECONTAMINATION EVENT

OVERVIEW

- While a disaster event requiring decontamination may be human-caused (intentional or unintentional) or caused by a natural disaster, regardless of the cause of the incident, it is imperative that hospital personnel are trained to receive, decontaminate and treat community members who may have been exposed to CBRNE materials and are seeking treatment at their facility

- C = Chemical
- B = Biological
- R = Radiological
- N = Nuclear
- E = Explosive



Defining What a “First Receiver” Is...



First Receivers, in a hospital environment, are defined as:

- Hospital personnel who have undergone hazard-specific training and play a role in receiving and treating CBRNE (Chemical, Biological, Radiological, Nuclear, Explosive) exposure victims who may be seeking medical care at local hospitals.
- This group is a subset of **first responders** (e.g., firefighters, law enforcement, HAZMAT teams and ambulance service personnel).
- *****NOTE***** First responders typically act at the site of an incident (i.e., the location at which the primary release occurred).

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Decontamination Event

- In contrast, inherent to the definition of **First Receivers**, is an assumption that the hospital is not itself the primary incident site, but rather is remote from the location where the hazardous substance release occurred.
- Thus, the possible exposure of first receivers is limited to the quantity of substance arriving at the hospital as a contaminant on victims and their clothing or personal effects



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CBRNE Events in History

- **Chemicals – Tokyo Subway Sarin attack in March 1995**
 - 5 plastic bags of liquid sarin dropped on Tokyo Subway during rush hour
 - 12 dead, 50 injured, 5,000 reports of vision issues
- **Biological – Anthrax attacks in 2001**
 - Letters laced with Anthrax mailed to news station and political figures
 - 22 anthrax infections reported, 11 life threatening, 5 deaths due to inhalational anthrax

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CBRNE Events in History (cont.)

- **Nuclear/Radiological – 2011 Fukushima Power Plant March, 2011**
 - Following major 9.0 earthquake off the coast of Japan, which caused a massive tsunami, a nuclear emergency was declared when 3 nuclear reactors reached level 7 meltdowns in the Fukushima Daiichi Nuclear Power Plant
- **Explosives – Boston Marathon Bombing – April 15, 2013**
 - Two pressure cooker bombs explode 12 seconds apart near the marathons' finish line
 - 3 dead and 264 maimed or injured

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Tokyo Subway Attacks



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Tokyo Subway Attacks

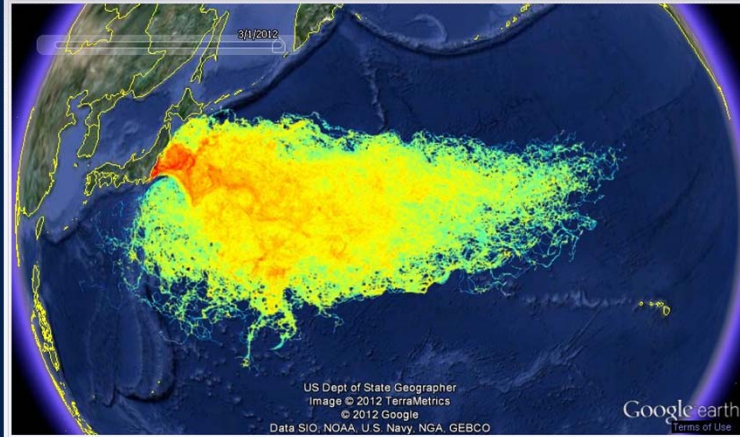


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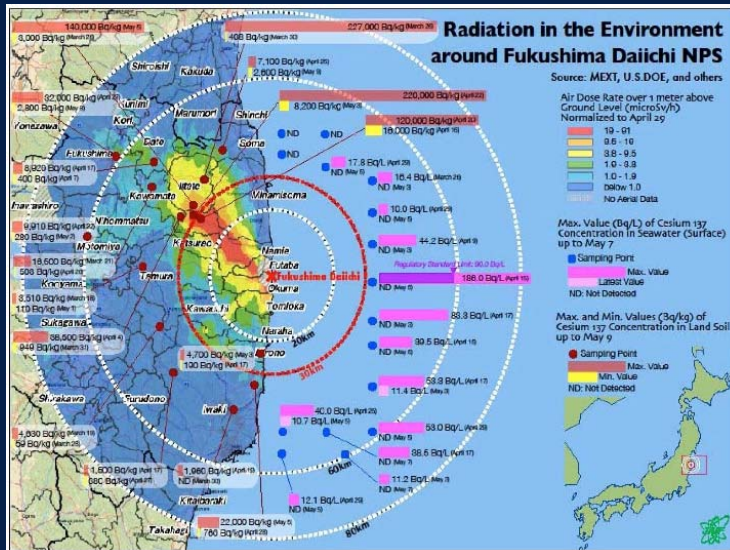
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Fukushima Power Plant Radiation Impact

Radioactive Seawater Impact Map (update: March 2012)



Fukushima Power Plant Radiation Impact



Boston Marathon Bombing



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Understanding the Risks



- Hospital personnel are at risk of exposure to CBRNE contaminants when they receive patients contaminated with these substances during mass casualty incidents
- It is **ABSOLUTELY** imperative that First Receivers understand the decontamination process in order to prevent contaminants from breaching hospital portals of entry
- First Receivers must be properly trained and have access to the appropriate Personal Protective Equipment (PPE) for adequate decontamination

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Decon Training Overview



- First Receiver decontamination training should address location-specific hazards found in your hospital's Hazard Vulnerability Analysis (HVA)
- Prepare hospital First Receivers to safely and effectively receive and influx of CBRNE victims
- PPE utilized in training should be very similar to PPE that will be used during the event

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Decon Training PPE Overview



- The amount of protection provided by PPE is material-hazard specific
- Selection of the appropriate PPE is a complex process which should take into consideration a variety of factors
- Key factors involved in this process are identification of the hazards, or suspected hazards; their routes of potential hazard to employees (inhalation, skin absorption, ingestion, and eye or skin contact); and the performance of the PPE materials (and seams) in providing a barrier to these hazards

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EPA & Cal/OSHA Levels of Protection

- Cal/OSHA 8 CCR 5192
- No “set in stone” one type for each level
- Main difference: type of respiratory protection & protective clothing
- Levels of protection
 - Level A
 - Level B
 - Level C
 - Level D



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Typical Hazards

- For chemicals: Most victims presenting to hospital will primarily present vapor hazard from clothing & hair
- General Guidelines for All Hazards: Removing clothing will remove up to 90% of contamination
- Soap & Water
 - Low Pressure – High Volume



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Decontamination PPE

Level A : To be selected when the greatest level of skin, respiratory, and eye protection is required



Level A protection should be used when:

- The hazardous substance has been identified and requires the highest level of protection for skin, eyes and the respiratory system based on either the measured (or potential for) high concentration of atmospheric vapors, gases or particulates; or particulates of materials that are harmful to skin or capable of being absorbed through the skin;
- Substances with a high degree of hazard to the skin are known or suspected to be present, and skin contact is possible; or
- Operations must be conducted in confined, poorly ventilated areas, and the absence of conditions requiring Level A have not yet been determined.

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Decontamination PPE

Level B: The highest level of respiratory protection is necessary but a lesser level of skin protection is needed.



Level B protection should be used when:

- The type and atmospheric concentration of substances have been identified and require a high level of respiratory protection, but less skin protection;
- The atmosphere contains less than 19.5 percent oxygen; or
- The presence of incompletely identified vapors or gases is indicated by a direct-reading organic vapor detection instrument, but vapors and gases are not suspected of containing high levels of chemicals harmful to skin or capable of being absorbed through the skin.

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Decontamination PPE



Level C: Used when concentration(s) and type(s) of airborne substance(s) is known and the criteria for using air purifying respirators are met

Level C protection should be used when:

- The atmospheric contaminants, liquid splashes, or other direct contact will not adversely affect or be absorbed through any exposed skin;
- The types of air contaminants have been identified, concentrations measured, and an air-purifying respirator is available that can remove the contaminants; and
- All criteria for the use of air-purifying respirators are met.

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Decontamination PPE



Level D Protection A work uniform affording minimal protection: used for nuisance contamination only.

Level D protection should be used when:

- The atmosphere contains no known hazard; and
- Work functions preclude splashes, immersion, or the potential for unexpected inhalation of or contact with hazardous levels of any chemicals.

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Cartridges & Filters

- Cartridges – Sorbents – Activated Carbon
 - Protect against
 - Specific gases & vapors (ammonia, mercury)
 - Classes of gases & vapors (organic vapors, acid gases)
- Filters – Protection against dusts, particulates, aerosols
 - N95
 - HEPA Filter



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3M PAPR Cartridge FR-57/453-03-02



- Combination
 - HEPA Filter
 - Organic vapor
 - Can be used for certain chemical warfare agents

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Mobilization



- During an emergency incident/event affecting the Medical Center, a “Code Triage NBC” will be announced overhead.
- First Receivers will be notified via the UCSF Medical Center mass notification system at the direction of the HICS HazMat Branch Director. First Receivers are to report to a designated area near the decontamination showers at the Parnassus Emergency Department parking lot to check in and receive assignment(s).

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Powered Air-Purifying Respirator (PAPR)

- Battery pack/filtering media attached to belt
- Facepiece can be:
 - Half-mask
 - Full-face
 - Loose-fitting hood



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3M Breathe Easy™ PAPR w/ Hood



- Turbo Unit with 3 filters or 3 cartridges
- Breathing tube (26" or 36" length)
- R-Series Hood Tyvek® QC (1.25 Mil Polyethylene)
 - Regular: size 6 1/2 to 7 3/8
 - Large: size 7 to 8
- Battery pack
 - Lithium (one-time use)
 - NiCad (rechargeable)



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Maintenance & Cleaning of PAPRs

- Inspect routinely
 - Before and after each use
 - During cleaning
- Clean & sanitize hood using soap & water, or manufacturer's cleaner/sanitizer
- After each use
 - Before hood is worn by another employee
 - Emergency use – after each use
- Air dry

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Fit-Testing

- Initially & annually thereafter
 - N95 TB Respirators: annual fit-testing required
- **Loose-fitting hood: no fit-testing required!!!**
- Types of fit-testing
 - Qualitative fit-test: pass/fail
 - Quantitative fit-test: measure amount of leakage

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Donning PPE – Outer Suit

- Take off shoes
- Slip on Tychem Suit Protective Suit
- Then zip up front of suit (seal front of suit with tape after hood is in position)



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Donning PPE – Boots

- Put on boots
- Put suit over boot to allow contamination to roll off suit and not into boot
- Tape boot and allow pant leg to blouse to allow free movement of knee



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Donning PPE – Inner Glove

- Put on nitrile liner glove first
- Put nitrile glove underneath sleeve of suit so contaminants do not leak into gloves
- Tape glove down to suit



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Donning PPE – Outer Gloves

- Put on butyl rubber glove with assistance
- Tape glove on outside of suit
- Inspect gloves for holes prior to donning



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Powered Air Purifying Respirator

- Get help putting on unit

Remember:

- Check flow rate of PAPR (>6LPM)
- Make sure tab on each filter is removed
- Plug in battery (8-10 hours per charge) then turn on
- Not to be used in oxygen deficient environments



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Donning Hood

- Push hood down on top of head
- Inner skirt should be tucked into chemical resistant suit



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Decontamination Zones

- **First Receiver Hospital Decontamination Zones**
- OSHA has found it appropriate to define two functional zones during hospital-based decontamination activities.
- These zones, which guide the application of OSHA's recommendations, are:
 - Hospital Decontamination Zone
 - Hospital Post-decontamination Zone
- The *Hospital Decontamination Zone* includes any areas where the type and quantity of hazardous substance is unknown and where contaminated victims, equipment, or waste may be present. It is reasonably anticipated that employees.

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Decontamination Zones (cont.)

- Initial triage and/or medical stabilization of possibly contaminated victims occur, pre-decontamination waiting (staging) areas for victims, the actual decontamination area, and the post-decontamination victim inspection area. This area will typically end at the ED door.
- In other documents this zone is sometimes called the "Warm Zone."
- The Hospital Post-decontamination Zone is an area considered uncontaminated. Equipment and personnel are not expected to become contaminated in this area. At a hospital receiving contaminated victims, the Hospital Post-decontamination Zone includes the ED (unless contaminated). In other documents this zone is sometimes called the "Cold Zone."

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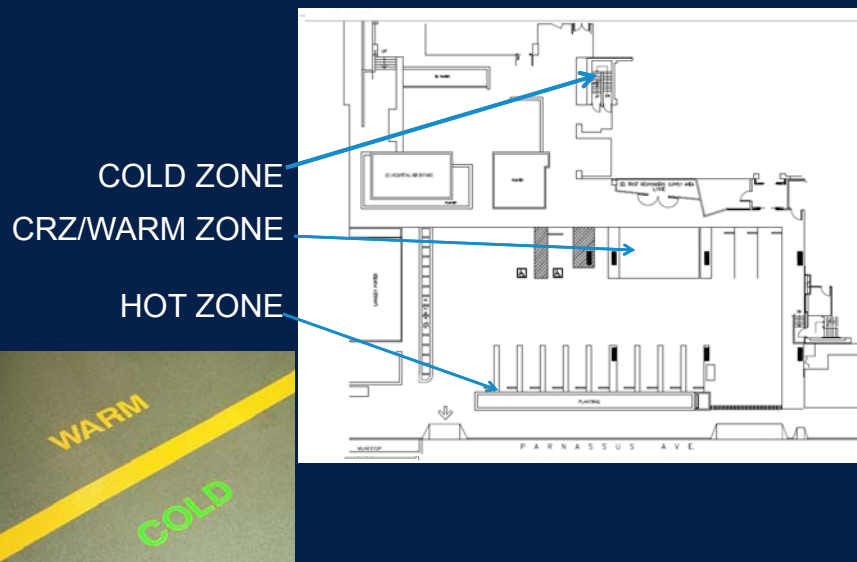
Zones

- **Hot Zone:** Site of incident (Dirty Zone) – Generally away from hospital
- **Warm Zone:** Contamination reduction zone (decon takes place here) – in hospital world this is the Hospital Decontamination Zone
- **Cold Zone:** Uncontaminated – in hospital world this is the Hospital Post Decontamination Zone

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Know the Zones



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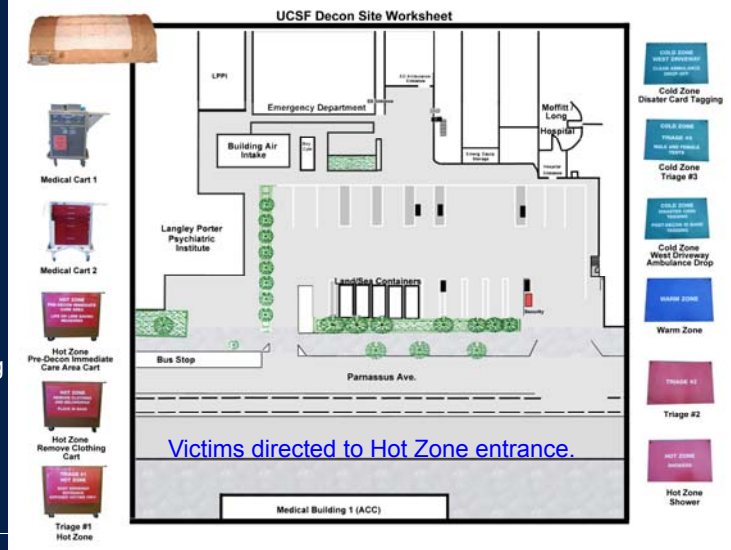
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Emergency Department Parking Lot

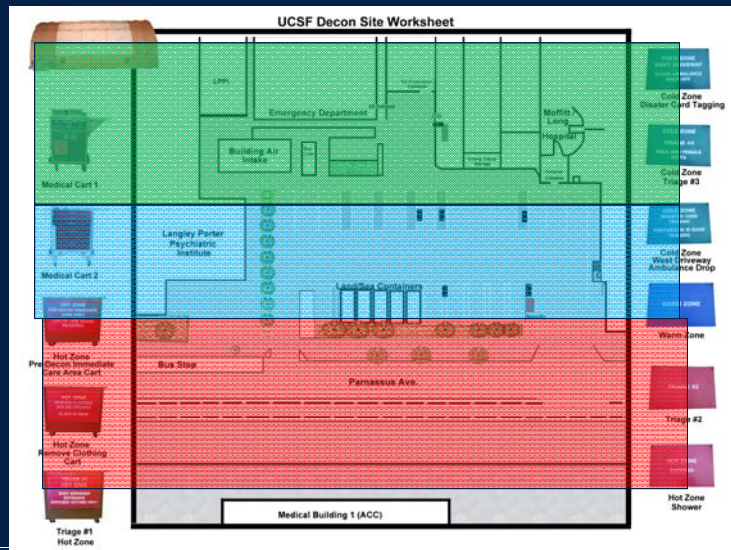
Guided through showers.

When fully decontaminated directed to Cold Zone.

Triaged to clothing removal area.



Zones



Decon Techniques: Non-Ambulatory Patients

- Cut clothing off, avoid “wringing out,” bag & tag
- Rinse, clean, rinse
- ~ 5 minutes per patient
- Start at head & work down in a systematic fashion
- Decon around wounds, working from in to out
- Good patient movement techniques/ work in groups
- Transfer to clean back board



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Decon Techniques: Ambulatory Patients

- Remove clothing, bag & tag
- Rinse, clean, rinse
- 5 minutes
- Start at head & work down
- Children stay with parents



Chemical decontamination drill
L.A. County Fire Department

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First Receiver Work Flow

- Patients arrive by any means and are received by triage staff in appropriate PPE.
- Patients are assessed by clinical staff.
 - Are they a causality of the MCI or trying to get somewhere else?
 - Do they need decon? Is everyone getting decon, regardless?
 - Do they need Life Saving Intervention (LSI) prior to decon?
 - Airway/Breathing intervention
 - Needle decompression
 - Hemorrhage control
 - Auto-injector antidotes

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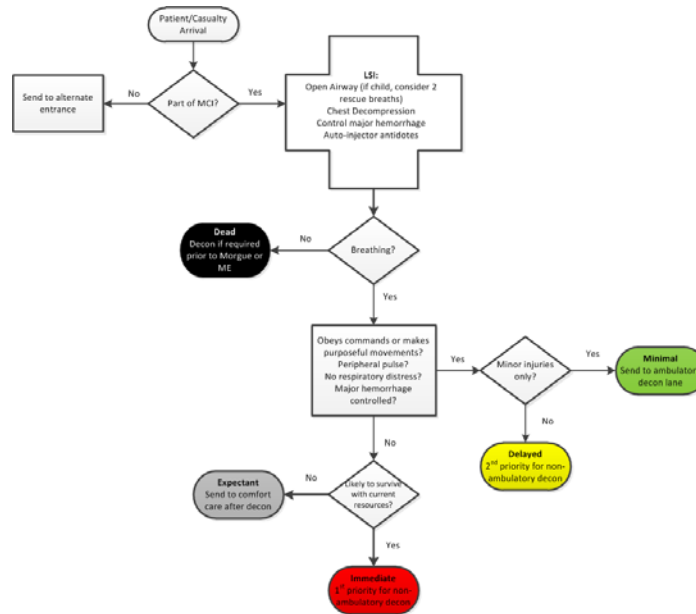
First Receiver Work Flow (cont.)

- Clinical Staff will perform triage
 - SALT
 - START/JumpSTART
 - SMART
- SALT is endorsed as best-practice by ACEP, ENA, etc.
 - Allows for the dynamic nature of disasters
 - Allows for the dynamic nature of people
 - Allows staff to triage to comfort care
 - One algorithm to learn for all ages

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SALT Triage Plus Decontamination



Teach Triage in Innovative Ways

- Games
 - Interactive patient interface
 - Games
 - Competitions



Thank you!

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