Hospital Decontamination Response Teams
Presented by…

Your Facility Information
Welcome and Introductions

• Class Schedule
• Breaks
• Refreshment availability
• Restrooms
• And…please turn your cell phones and pagers off or to silent
Section I

Introduction
Course Objectives

• Develop an understanding of hazardous substances in an emergency
• Develop an understanding of the role of the First Receiver
• Develop an understanding of the selection on use of Personal Protective Equipment (PPE)
• Develop an understanding of detection devices and decontamination equipment
• Develop an understanding of basic decontamination procedures
Why are we here?

- People who have been contaminated by hazardous agents may arrive at the hospital for medical treatment.
- An estimated 33% of persons from a hazmat incident will bypass EMS and self present at hospital.
- We do not want to compromise the safety of our staff or our facility by exposing them to hazardous agents.
If a contaminated person is allowed inside our facility…

• What are the impacts:
  – To you?
  – To the emergency department?
  – To the hospital?
  – To the community?
Employee exposure and hospital closure is what we want to avoid!
Exposure vs. Contamination

• Exposure:
  A person has been in the area of a contaminate (generally a vapor)

• Contaminated:
  A person has come in contact with a contaminate (generally a liquid or solid)
How does a person become exposed?

- Exposure routes include:
  - Inhalation
  - Ingestion
  - Absorption
  - Injection

- Precautions, decontamination, and treatment options may vary based on exposure.
How does a person become contaminated?

- Home Chemical Exposures
- Agricultural Exposures
- Transportation Spills
- Industrial Spills
- Weapons of Mass Destruction
What is decontamination?

- While it has many definitions, it is a method for cleaning off contaminated patients.
- Decontamination reduces and prevents the spread of hazardous agents to employees and within the facility.
Section II

Hazardous Agents
Hazardous Agents

According to OSHA: Any substance to which exposure “results or may result in adverse affects on the health or safety of employees” or “any chemical which is a physical hazard or a health hazard.”

OSHA 29 CFR 1910.120 (a)
Hazardous Agents

- Class 1 – Explosives
- Class 2 – Compressed Gases
- Class 3 – Flammable Liquids
- Class 4 – Flammable Solids
- Class 5 – Oxidizers and Organic Peroxide
- Class 6 – Poisons or Infectious Materials
- Class 7 – Radioactive Materials
- Class 8 – Corrosive Materials
- Class 9 – Miscellaneous
How do you know if a patient has been exposed?

• Obvious physical signs and symptoms of hazardous agent exposure:
  – Liquids or powders on the patient
  – Odors emanating from the patient
  – Difficulty breathing
  – Burns, blisters
  – Foaming at the mouth or tearing
  – Emesis, defecation, urination
Bioagents - what to look for in triage…

• Patients who:
  – Have traveled out of the country
  – Exhibit unusual signs and symptoms
  – Are very sick

• Several patients who present with similar symptoms

• Patients who present from the same event or location
Don’t be deceived!

- Initial reports from the patient or EMS may not indicate exposure
- Ask questions – complete a thorough and accurate assessment
- Patient may not understand that they have been exposed
  - Mixed chemicals at home or work
Methods of detection: CHEMICAL

- Smart Strips - Changes colors when exposed to chlorine, pH, fluoride, nerve agents, oxidizers, arsenic, sulfides and cyanide in liquid or aerosol form at minute levels. To use, peel-and-stick adhesive strip or a clip to decon suit. Once the protective film is peeled off, the cards are operational for 12 hours, or until they are exposed to one of the eight substances.
Methods of detection: RADIOLOGICAL

Portals - Portable and Expandable!

Personal Pocket Dosimeter Detects Beta and Gamma Radiation

Pancake Probe (Ludlum) detects Alpha, Beta and Gamma radiation
Weapons of Mass Destruction (WMD)

CBRNE:

C = Chemical
B = Biological
R = Radiological
N = Nuclear
E = Explosives
Biological Agents

- Anthrax
- Botulism
- Plague
- Smallpox
- Tularemia
- Viral Hemorrhagic Fever (VHF)
- Infectious Respiratory Disease (SARS or Avian Flu)
Signs and Symptoms of exposure to biological agents

- Fever
- Headache
- Rash
- Neck stiffness
- Respiratory symptoms
Where can Radiation be Found?

• Found in:
  – Sunlight and natural elements
  – X-rays
  – Nuclear medicine procedures
  – Cancer-related radiation treatments
  – Industry
Radiological

- Alpha particles (common) - most harmful if inhaled or ingested. These can be stopped by a sheet of paper.
- Beta particles - smaller than alpha and stopped by regular PPE.
- Gamma/X-ray – not a particle and can penetrate skin and tissue. Will penetrate most PPE.
- Neutrons – found in nuclear reactions, can penetrate skin and tissue, cannot be stopped by PPE.
Radiation Exposure

Alpha Particles
Stopped by a sheet of paper

Beta Particles
Stopped by a layer of clothing or less than an inch of a substance (e.g., plastic)

Gamma Rays
Stopped by inches to feet of concrete or less than an inch of lead

Neutrons
Stopped by a few feet of concrete

(diagram courtesy of CDC)
Radiological Contamination

- Internal contamination may result when particles are ingested or inhaled.
  - Acute radiation sickness
- External contamination occurs when particles come in contact with the skin
- Minimal exposure risk to care giver. Treat acute injury first!
Radiation Protection

- Time – Limit exposure time
- Distance – Increase distance from source
- Shielding – Shield self from the hazard
- PPE – Use Standard Precautions
  - Respiratory
  - Contact
Chemical Agents

Nerve Agents
Blister Agents
Blood Agents
Choking Agents
Irritant Agents
Nerve Agents

Nerve agents (pesticides/military agents)
 – Affect the body’s nervous system
 – Signs and symptoms:
   • S – Salivation (drooling)
   • L – Lacrimation (tearing)
   • U – Urination (loss of bladder control)
   • D – Defecation (loss of bowel control)
   • G – Gastrointestinal (abdominal pain)
   • E – Emesis (vomiting)
   • M – Miosis (pinpoint pupils)
Chemical Agents

Blister Agents:
- Cause burns and blisters
- Examples include mustard gas and Lewisite

Blood Agents:
- Affect the body’s ability to transport and use oxygen
- Examples include cyanide
Chemical Agents

Choking Agents:
– Damage lung tissue and mucous membranes
  – Examples include phosgene and chlorine

Irritants:
– Cause a person to become incapacitated
  – Examples include tear gas, mace, and pepper spray
Section III

Response
If a contaminated person presents to the hospital, what do you do?

S-I-N

S = Shield
I = Isolate
N = Notify
Don’t become part of the problem…

– Protect yourself by using standard precautions
– Do not touch the patient or allow anyone else to have patient contact without at least an N-95 mask and gloves
ISOLATE

• Get the contaminated patient out of the facility to a pre-designated location
• If someone has something on them, don’t let them go away
• Isolate the exposed scene and deny entry until hazard assessment is completed and area is cleaned, if needed
NOTIFY

• Notify your Supervisor that a contaminated patient has arrived at the facility
• If needed, call Security to secure the area
  – Security should wear appropriate PPE while securing the area.
• Work with your Supervisor to determine your facility’s need to activate the Decontamination Response Team (DRT) or initiate disaster response procedures
Activation of the Decontamination Response Team

- A contaminated non-ambulatory patient presents to the facility
- More contaminated patients present to the facility than can be managed by staff on-site
- A Mass Casualty Incident (MCI) has been declared in your community
What is a Decontamination Response Team?

- A trained group of personnel with resources to operate in a contaminated area and perform the following functions:
  - Maintain Safe Environment – Safety Officer and RSO
  - Decon Set Up / Support – Team Leader
  - Site Access Control - Security
  - Triage – Nurse or Physician
  - Stripper / Bagger
  - Washer / Rinser
  - Dryer / Dresser
  - Hospital Gatekeeper
Duties of DRT Members in the Hospital Decontamination Zone

- Ensure the safety of the facility and personnel
- Setup of decon operations
- Triage, reassure and direct contaminated patients through the process
- Perform decontamination procedures
- Recovery operations:
  - Equipment cleaning
  - Management of wastewater
  - Team debriefing
Hospital Decontamination Zone
Control Zones – Contamination Reduction Corridor

- Contaminated Area **HOT**
  - Area of isolation
  - MUST use appropriate hazardous agent PPE
- Hospital Decontamination Zone **WARM**
  - Area where decontamination activities take place
  - MUST use appropriate hazardous agent PPE
- Hospital Post-Decontamination Zone **COLD**
  - Safe area
  - Use Standard Precautions

**HOT**
Site Access Control
START Triage
Stripper / Bagger

**WARM**
Washer / Rinser
Dryer / Dresser

**COLD**
Hospital Gatekeeper
Hospital Decontamination Zone

• To ensure that the agent does not contaminate the ‘clean’ area, set-up decontamination activities so that they are:
  – Up Hill
  – Up Wind
  – Up Stream
Ensure the Safety of the Facility and Personnel

- Secure the area
- Establish a perimeter
- Establish control zones
- Initiate crowd control measures
- Ensure proper PPE is worn and safety procedures are followed
Setup of Decon Operations

- Establish Decontamination Zone
- Access decontamination supplies
- Assemble the decontamination shelter and adjunct equipment
- Ensure access to contaminated waste for ease of removal during decon operations
- EPA requires run-off be contained if at all possible for proper disposal
Our Hospital’s Decon Set-Up

- HOT ZONE
  - Arrival Point
  - Triage Station

- WARM ZONE
  - Ambulatory Decontamination
  - Non-Ambulatory Decontamination

- COLD ZONE
  - Clean Triage Area
Triage, Reassure and Instruct Contaminated Patients

- Utilize START (Simple Triage and Rapid Treatment)
- Explain the decontamination process
- Collect contaminated belongings
Triage during a Mass Casualty Incident

- Focus on doing the most for the most
- Utilize START Triage method
Collection of contaminated belongings

- Separate clothing and valuables
- Place in transparent and sealable collection bags
- Label clothing and valuables for tracking, retrieval and investigation purposes
Directed Decon

• Appropriate for conscious and ambulatory patients
• Directed decon can be used for small numbers of contaminated patients
• Protect yourself first:
  – Use Standard Precautions
  – May require use of hazardous agent PPE
• Consider patient modesty
Process for Performing Directed Decon

- Have patient remove all valuables and clothing
- Place contaminated valuables and clothing in a sealable bag
- Starting from the head down, have patient:
  - Wash body with soap and warm water for 5 minutes
  - Rinse body with warm water for 5 minutes
- Have patient dry their body
- Provide patient with a clean covering
- Re-evaluate patient
Decontamination of Non-Ambulatory Patients
“Assisted Decon”
Special Populations

- Children
- Infants
- Disabled
- Service Animals
- Law Enforcement
- Deceased Individuals
- Other Special Needs
Special Population: Children

• Parents
• Ease fears
• Decon parent and child
• Extend rule of thumb time
• Additional assistance for parent
Special Population: Infants

- Take precautions against dropping infant
- Enter through non-ambulatory side
- Precautions against hypothermia
- Parental accommodations
- Ease fears
- Decon parent and child
- Extend rule of thumb time
- Additional assistance for parent
Special Population: Disabled

- Consider type of disability and associated equipment
- Wheelchair, walker, etc., is treated as personal property
- Casts (temporary or fixed) will require removal for decon
- Considerations for deaf and or blind population
Special Population: Service Animals

- Muzzle’s for all animals should be requirement
- Handler should be kept with the service animal when possible
- Animal: wash for 10, rinse for 10
- Consider vinyl collar or muzzle to ensure all areas rinsed
- Leather apparatus will be disposed of
Special Population: Law Enforcement

- Weapons must be rendered safe prior to decon
- Inventory & secure weapon
- Weapons may be government property not personal
Special Population: Decedent

- Decedent handled last
- Move decedent through non-ambulatory line
- Treat decedent with reverence
- Ensure decedent is properly covered
- Secure personal effects
Special Population: Other Needs

- Language considerations: federal requirement to provide translation services
- Cultural considerations: nationality, religion, etc.
Duties of DRT Members in the Hospital Post-Decon Zone

- Evaluate decontamination efforts
- Re-triage
- Begin patient tracking
- Transport to patient care areas
SECTION IV

PERSONAL PROTECTIVE EQUIPMENT
How are you at risk?

• Many hazardous agents are odorless, colorless and tasteless; you may be exposed before you know it!
• Recent studies have shown that only a small number of health care workers have had adverse effects following exposure to contaminated patients
  – These could have been prevented with the use of appropriate safety measures and personal protective equipment
Personal Protective Equipment (PPE)

- Unfortunately, no one type of PPE will protect against all hazardous agents!
- Appropriate PPE is determined by the characteristics and amount of the hazardous agent present.
- PPE must be used correctly in order to reduce exposure.
- When the agent is unknown – use the highest level of PPE available prior to starting any decon procedure.
Standard Precautions

- Hazardous agents may require, at a minimum, specific types of Standard Precautions to prevent exposure.
- Examples include:
  - Face shield
  - Mask
  - Gown
  - Gloves
  - Booties
  - Bonnet
Hazardous Agent PPE

• Four levels:
  – Level A PPE
  – Level B PPE
  – Level C PPE
  – Level D PPE

• Each level provides for a certain amount of skin and respiratory protection against biological and chemical agents
Level A PPE

• Provides the highest level of skin and respiratory protection:
  – Vapor protective suit (fully encapsulating)
  – Self contained breathing apparatus (SCBA)
  – Chemical resistant gloves and boots

• Weakness: bulky, heavy, and increased potential for heat stress and slip, trip or fall injuries, requires a great deal of education for safety
Level A Protection
Level B PPE

• Provides a lower level of skin protection with the highest level of respiratory protection:
  – Liquid splash protection suit (chemical resistant)
  – Self contained breathing apparatus (SCBA)
  – Chemical resistant gloves and boots

• Weakness: bulky, heavy, increased potential for heat stress and slip, trip or fall injuries and may not reduce exposure to all agents, requires a great deal of education
Level B Protection
Level C PPE

• Provides a lower level of skin and respiratory protection:
  – Liquid splash protection suit with or without a hood (chemical resistant)
  – Air-Purifying Respirator (filters vary)
  – Chemical resistant gloves and boots

• Weakness: bulky, heavy, increased potential for heat stress and slip, trip or fall injuries and may not reduce exposure to all agents, cannot be used in an oxygen-deprived area.
Level C Protection
Level D PPE

• Provides the lowest level of skin and respiratory protection:
  – Clothes (uniform, scrubs, street clothes)
  – Standard Precautions

• Weakness: provides no chemical protection and limited respiratory protection
Level D Protection

• Your every day work clothes!
Radiation PPE

• “Trauma Team” gear:
  – Face shield
  – Mask
  – Gown
  – Gloves
  – Booties
  – Bonnet
Risks of Hazardous Agent PPE

- Incorrect use or improper selection
- Penetration into the PPE (holes/rips)
- Slips, trips and falls
- Loss of dexterity, limited vision, impaired communication
- Heat-related illness
  - Heat Exhaustion
  - Heat Stroke
Heat Cramps

• Signs and symptoms:
  – Muscle spasms
  – Dry skin
  – Fatigue
  – Dizziness
  – Dry mouth
  – Increased heart rate and breathing
Heat Exhaustion

• Signs and symptoms:
  – Headache
  – Heavy sweating. Intense thirst
  – Light-headedness
  – Feeling faint/weakness
  – Pale and cool, moist skin
  – Increased pulse (120-200)
Heat Stroke

• Signs and symptoms:
  – High body temperature (>103 degrees)
  – Absence of sweating
  – Skin is hot and red
  – Rapid pulse; difficulty breathing; constricted pupils
  – Severe symptoms of Heat Exhaustion
  – Advanced symptoms may include seizure, loss of consciousness or death
Be careful…

• If you recognize any of these signs and symptoms in yourself or another team member, NOTIFY the DRT Leader
• Immediately remove the DRT member from their post
• Doff the DRT member
• Perform decontamination procedures
• Treat accordingly
Medical Screen Pre- and Post-Decon

• DRT members must receive a pre- and post-decon medical screen:
  – Blood Pressure
  – Pulse
  – Respirations
  – Temperature
  – Weight
  – Recent medical history for diarrhea, vomiting, etc…

• Orally hydrate during this time

• Team leader needs to be aware of environmental factors that may limit time in suits. Maximum time in suits is 45 minutes (including self-decon)
What are we going to be using?

- Tychem suits with duct tape to seal
  - Cooling Vest optional
- Air Purifying Respirators (APRs)
  - Scott O-Vista Full Face Mask
- Powered Air Purifying Respirators (PAPRs)
  - 3-M Breath Easy
- Chemical resistant booties or rubber boots
- Chemical-resistant and nitrile gloves
APRs

• Requires fit-testing and appropriate filter for use
PAPRs

- Does not require fit-testing
- Requires batteries and appropriate filters
Respiratory Protection Program

- Medical surveillance of DRT member
- Staff must be fit tested for APR
  - No fit testing needed for PAPR
- Equipment must be properly maintained and checked before and after each use
Donning PPE

Work with a Buddy!

• Put on:
  – Inner Gloves
  – Tychem Suit
  – PVC Boot Covers or chemical resistant rubber boots
  – Outer Gloves
  – Duct Tape around glove and boot openings and suit zipper
  – Respirator – if using APR, duct tape seal
  – Write identifier and don time on duct tape on back of suit
Communicating while using PPE

• It’s important to be able to communicate with the other members of the Decon Response Team while wearing PPE
• Some facilities have communication equipment that fits under PPE. If you do not have access to that equipment or it fails…
“I need help with this patient”
“I’m having trouble breathing”
“I’m OK”
The last patient has been decontaminated - now what?

- Decon Response Team must now decon themselves in their PPE and then the equipment
- Once in the Post-Decontamination Zone, DRT members can doff PPE
Doffing PPE

- Work with a Buddy!
- For speed, cut with scissors and peel off or
- Take off:
  - Duct tape at suit and glove seals
  - Outer gloves
  - Respirator
  - Peel suit away from body
  - PVC boot covers
  - Inner gloves
What do you do if one of the DRT Members goes down?

• If one of the team becomes a patient:
  – Remove them from their post
  – Remove their PPE suit and clothes
  – Perform assisted decon
  – Treat
Questions and Answers
Practice Activities

• Donning and Doffing PPE
  – Use of APRs
  – Use of PAPRs

• Setup of Decon Equipment
  – Connecting the Water Supply
  – Connecting the Electrical Supply
  – Setting up the Shower System

• Patient Decontamination
  – Directed Decon
  – Ambulatory Patient Decon
  – Non-Ambulatory Patient Decon
Medical Surveillance Questionnaire
Class Evaluation
Thank you for your time and your interest in being a member of your facility’s Decon Response Team.

We hope that you found this informative and fun!