



# Mass Human Chemical Decontamination

Office of the Assistant Secretary for Preparedness & Response (ASPR)  
U.S. Department of Health & Human Services (HHS)

Office of Health Affairs  
U.S. Department of Homeland Security



March 2012

*Mass Human Chemical Decontamination Working Group*





# OUTLINE

- Background
- Scope & Framework
- Foundational Work
- Developing National Guidance



# Mass Human Chemical Decontamination Working Group

Executive Office of the President  
National Science & Technology Council  
Committee on Homeland & National Security  
Subcommittee on CBRNE Standards

Co-Chairs:

Department of Health and Human Services (HHS)  
Assistant Secretary for Preparedness & Response (ASPR)

Sue Cibulsky, PhD  
Chemical Science Branch Chief  
Medical Countermeasure Strategy & Requirements Division  
Office of Policy & Planning

Department of Homeland Security (DHS)  
Office of Health Affairs (OHA)

Formerly: Mark Kirk, MD  
Currently:  
Joselito Ignacio, MA, MPH, CIH, CSP, REHS  
CAPT, USPHS  
Director, Chemical Defense Program



# MANDATE

Directed by Homeland Security Presidential Directive (HSPD)-22 and White House National Security Staff through the Domestic Chemical Preparedness and Response Sub-Interagency Policy Committee to *“support the development of State and local plans and protocols for the decontamination of persons.”*

- Create and publish evidence based principles and best practices:  
National Guidance
  - Intended for the local first responder/first receiver communities
  - Facilitate their ability to implement a plan and execute mass decontamination in a high consequence chemical event
- Review literature and summarize current evidence
- Identify and prioritize research needs: research roadmap



# MEMBERSHIP

## Subject Matter Experts

First Responders

First Receivers

Military

Academia

Government

Public Health

Scientific Research

Health Care

Toxicology

Local Emergency Managers



## US Agencies

CDC/NCEH/ATSDR

CDC/NIOSH

DHS/OHA

DHS/S&T

DHS/Plum Island

DoD/CBIRF

DoD/ECBC/USAMRICD

DoD/US Army CBRN School

DoD/OSD Policy

EPA

HHS/ASPR



# SCOPE AND FRAMEWORK



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# SCOPE

## Limited to:

- HUMAN decontamination in a mass casualty incident
- From accidental or intentional CHEMICAL contamination
- EXTERNAL contamination

## Chemical agents addressed:

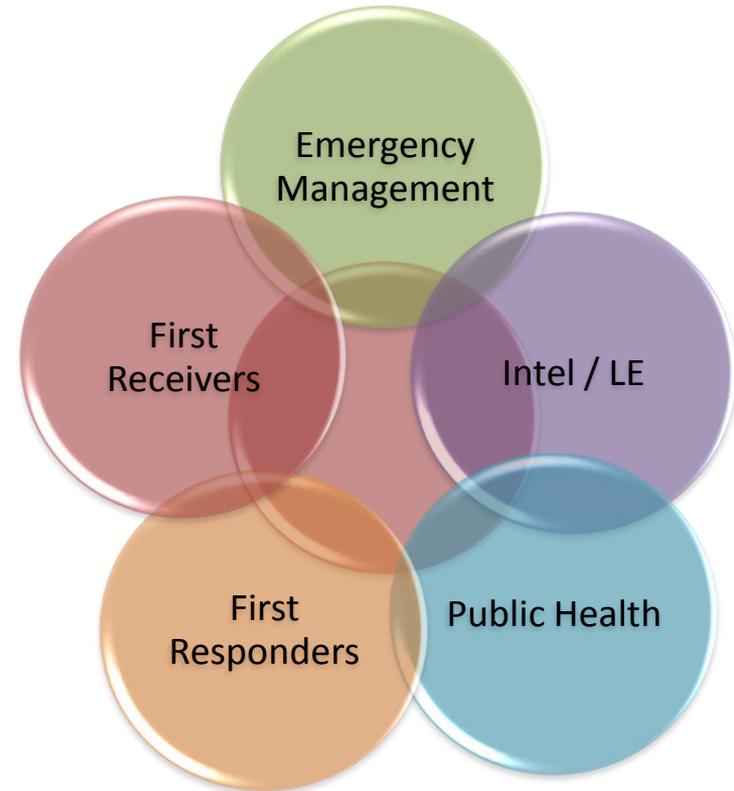
- Toxic Industrial Chemicals (TICs) & Toxic Industrial Materials (TIMs)
- Chemical Warfare Agents (CWAs)

*Although radiological materials and biological agents are important and share some basic similarities, they do not fall under the purview of this working group. Only human exposures that potentially need medical care will be addressed.*

# FRAMEWORK

## Holistic Point of View (System of systems)

- Looking at the role of decontamination (decision-making, procedural processes, human factors) within the complete response system
- Examining the interdependencies within the entire community response





# PHILOSOPHY

## Decontamination is a medical countermeasure

- Decontamination is a first aid procedure
  - Reduces amount of agent absorbed
  - Reduces symptom severity
  - Reduces need for antidotes and medical support
- Decontamination permits faster access to medical care
  - Providers will not be hindered by PPE
  - Supportive medical devices can be used without being contaminated and possibly damaging equipment
- Decontamination reduces the risk of secondary contamination of responders, equipment, infrastructure

# Unique aspects of workgroup efforts

- Evidence based recommendations
- Scope: response of entire community/system
- Asking impactful questions
  - Focused on operational questions
  - Asking most critical question: not “how do we perform decon?” but “why and when do we perform decon?”
- Developing a long term strategy
  - Attempting to get buy-in and change culture
  - Incorporate into training curriculum
  - Planned periodic updates to incorporate newest research findings and make recommendations for change





# FOUNDATIONAL WORK

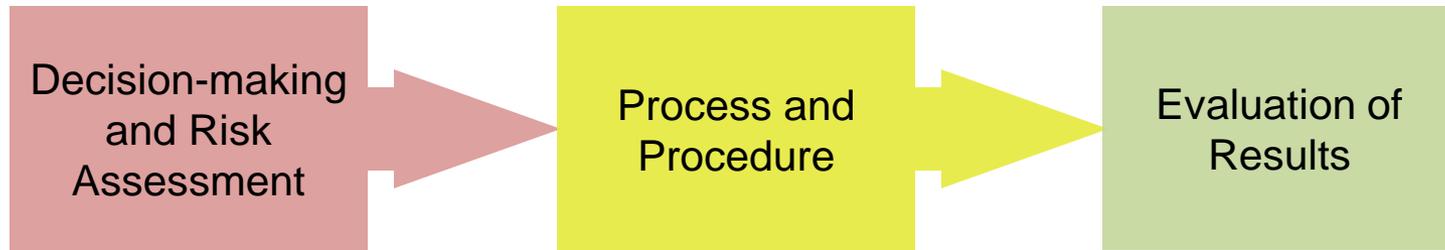


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# DEFINE THE PROBLEM

- Three main categories that establish logical response timeline:



- Two main areas:
  - Individual Decontamination
  - Mass Casualty Decontamination
- Six Core Questions
  - Operational relevance: questions likely to have greatest impact on mounting an effective response



# SIX CORE QUESTIONS

## Individual Decontamination

Decision making and risk assessment	What criteria are available to decide if the patient needs decontamination or not?
Process and Procedure	What is the optimized procedure for definitive decontamination for a multi-peril scenario of unknown agent and unknown exposure?
Evaluation of results	What is the metric for determining effective decontamination?

## Mass Patient Decontamination

Decision making and risk assessment	What is the best evidence-based method for assessment and triage of victims (both at the scene and at hospitals) to prioritize decontamination and medical treatment?
Process and Procedure	Where and when should decontamination take place?
Evaluation of results	Risk Communication - What evidence-based, best practice crisis communication techniques can be best applied to a mass casualty chemical incident to promote patient compliance and safety during decontamination?



# LITERATURE REVIEW

- Using the six core questions as a guide:
  - Conducted an extensive **review of the literature**
  - Assessed the **type and quality of evidence**
  - Created a comprehensive **bibliography**
  - Invited wider audience to review at 2010 symposium
- Significant gaps exist in the available evidence
- Currently developing a matrix of research questions to address these gaps



# IDENTIFIED GAPS

- Insufficient data available to suggest the best criteria to determine need for decontamination
- Efficacy of clothing removal has not been quantitatively established
- Optimal parameters for water-based decontamination have not been determined (e.g., pressure, temp, duration)
- No definitive studies comparing efficacy of water-only vs. soap-and-water



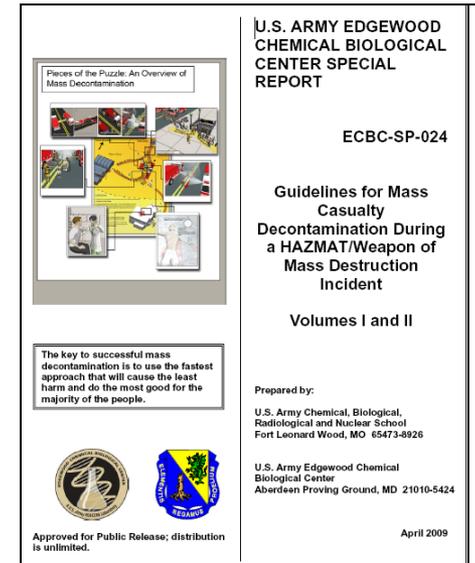
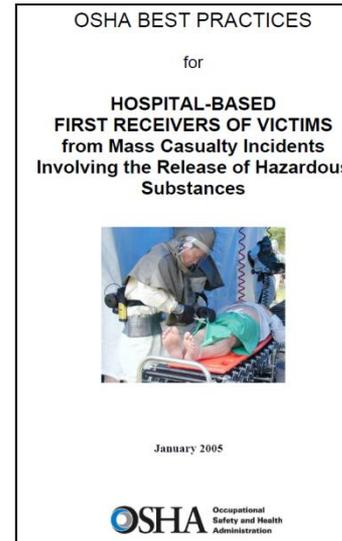
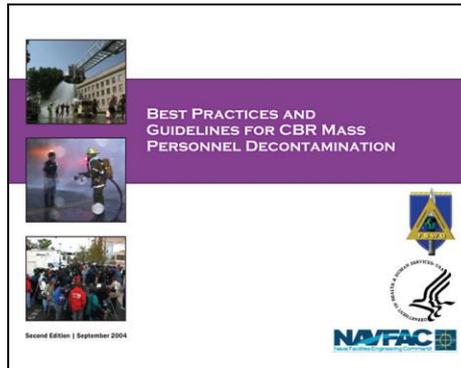
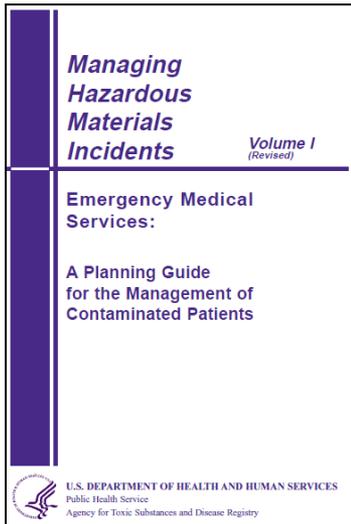
# IDENTIFIED GAPS

- No validated metrics for assessing the effectiveness of decontamination
- Little understanding of the types of information and other support that could be provided to patients to promote safety and compliance with decontamination procedures
- Few studies to examine potential harmful effects of decontamination (physiological and psychological)
- Little evidence to suggest optimal mechanisms for disseminating information to the community in a mass casualty incident



# GUIDANCE CROSSWALK

- Using core questions as a guide, identified 46 topics
- What do other guidance documents say on these topics?





# KEEPING THE END-USER IN MIND: PRACTITIONER INTERVIEWS

- Interaction design method
  - Providing end-user input in product development
  - One-on-one, scenario based interviews
  - Developed and analyzed using strategic choices
- What did we gain from this work?
  - A better understanding of current planning and practices
  - Identifying goals, priorities, and concerns of the individual responders and receivers





# DEVELOPING NATIONAL GUIDANCE



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# SCOPE

- Assist in decision-making from a planning perspective but *will not outline specific procedures.*



- Audience: First Responders AND First Receivers at the planning, training, and Incident Commander levels



# HIGH LEVEL PRINCIPLES

- Evidence-based where there is evidence
  - When there is no evidence, based on current practices, SME consensus, and previous experiences (anecdotal and case history reports, etc.)
- Promote the Risk-based Response (RBR) approach
- Fit within the NIMS/ICS framework
- Do the best for the most, with available resources



# FORMAT

- 2-part guidance document:
  - Part I: quick-reference guide
    - Functional Area
    - Guidance Statement
      - Includes additional considerations to this recommendation (if any)
    - Level of Certainty
      - Based on literature review, current guidance crosswalk, practitioner interviews and expert consensus
  - Part II: includes supporting documentation
    - Supplies the rationale behind the recommendation
    - Includes references to the published literature, when applicable



# EXAMPLE

## Functional Area 1: Determine Need for Decontamination

### Guidance Statement 1.1:

The decision to decontaminate should take into account a combination of information, including (but not limited to):

- Patients displaying signs and symptoms of exposure
- Visual evidence of contamination on the patient's skin or clothing
- Proximity of patient to the location of release
- Contamination is detected on patient using appropriate detection technology
- The chemical identity (if known), characteristics, and behavior

### Considerations:

- Signs and symptoms of chemical exposure may present as one or more recognized toxidromes or as single symptoms
- Some signs and symptoms may not reflect actual chemical exposure, but manifest as a result of fear, anxiety, or panic due to presence at the traumatic incident itself
- Environmental detectors are available for many CWAs, TICs, and TIMs but are not readily adaptable to the detection of contamination likely to be encountered in a hazardous materials incident on patients

**Level of Certainty:** TBD



# STAKEHOLDER ENGAGEMENT

Guidance Statements revised based on 2012 symposium

Submit to Key Partners for review and comment – March 23

**Deliver full draft Guidance Document to Subcommittee on CBRNE Standards and Chem sub-IPC/National Security Staff – June**

Submit to Committee on Homeland and National Security and Domestic Resilience Group; HHS and DHS Exec Sec Departmental clearances - July

Federal interagency/state/local coordination

Public comment period – July/August

**Final publication and implementation plan**

Plan for future revisions



# KEY PARTNERS (Partial List)

- *Interagency Board*
- *National Fire Protection Association*
- *International Association of Fire Chiefs*
- *National Association of EMS Physicians*
- *National Association of EMS Educators*
- *National Association of State EMS Directors*
- *Joint Commission on Accreditation of Healthcare Organizations*
- *American College of Emergency Physicians*
- *American College of Medical Toxicology*
- *Emergency Nurses Association*
- *National Association of Emergency Medical Technicians*
- *National Registry of Emergency Medical Technicians*
- *American Hospital Association*
- *American Nurses Association*
- *American Medical Association*
- *National Emergency Management Association*
- *American College of Occupational and Environmental Medicine*



# LONG-TERM OBJECTIVES

- **Recommended** evidence-based principles and best practices
- A systems engineering **approach** to delivering an optimized response in a mass casualty incident
- **Decision support tools** for triage and altered standards of care
- **Metrics** for measuring individual and community competencies
- National training **standards** and professional education **curriculum** derived from guidance
- **Grants** directed at facilitating each community's ability to achieve competencies in delivering mass decontamination
- **Equipment** that meets standards that support optimized response or facilitate systems approach to delivering optimized response more efficiently
- **Research program** to continually refine the evidence in support of delivering an effective, efficient and easily achievable decontamination response



# REQUEST FOR THE AUDIENCE

- Contribute edits and comments on the draft guidance document
  - Work through identified Point of Contact for your organization





# CONTACT INFORMATION

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# EXTRA SLIDES



# Guidance Statement 1.1



The decision to decontaminate should take into account a combination of information, including (but not limited to):

- Patients displaying signs and symptoms of exposure
- Visual evidence of contamination on the patient's skin or clothing
- Proximity of patient to the location of the release
- Contamination is detected on patient using appropriate detection technology
- The chemical identity (if known), characteristics, and behavior
- If patient requests or demands decon, even if contamination is unlikely

*Functional Area #1: Determine Need for Decontamination*



# Guidance Statement 1.1



## Considerations:

- Signs and symptoms of chemical exposure may present as one or more recognized toxidromes or as single symptoms
- Some signs and symptoms may not reflect actual chemical exposure, but manifest as a result of fear, anxiety, or panic due to presence at the traumatic incident itself
- Environmental detectors are available for many CWAs, TICs and TIMs but are not readily adaptable to or available for the detection of contamination on patients likely to be encountered in a hazardous materials incident

*Functional Area #1: Determine Need for Decontamination*



# Guidance Statement 1.2



Decontamination should be performed if the potential contamination on patients requiring transport to, or care in, a medical facility poses a reasonable risk of exposure to first responders/receivers or contamination of critical infrastructure.

## Considerations:

- As a sole criterion, prevention of secondary contamination alone may not justify patient decontamination; the following patients are unlikely to pose a significant risk to responders and receivers:
  - Have neither signs nor symptoms
  - Have no visible contamination on skin or clothing, AND
  - Have a history that makes exposure unlikely (i.e., not near the location of release)

*Functional Area #1: Determine Need for Decontamination*



# Guidance Statement 1.3



If the likelihood of adverse consequences of immediate or thorough water-based decontamination itself outweighs the likely health outcome gains of decontaminating patients, then decontamination should be performed using alternative procedures.

## Considerations:

- Patient decontamination is not without risk; appropriate measures should be taken to mitigate these risks and reduce the negative impact on patients
- Reference Guidance Statement 2.10 for alternative procedures
- Adverse consequences might include contraindications due to weather (freezing temperatures, hypothermia) or chemical reactivity (water-reactive chemicals or metals, e.g., lithium or sodium metal)

*Functional Area #1: Determine Need for Decontamination*



# Guidance Statement 2.1



A risk-based approach should be employed by the responding or receiving organization to determine the appropriate response level (including PPE, medical interventions, decontamination).

## Considerations:

- An appropriately trained person (e.g., see Hazardous Waste Operations and Emergency Response (HAZWOPER) standards) in appropriate PPE should perform the assessment
- PPE determination should be made based on applicable guidance, regulations, subject matter expertise and manufacturer's specifications (e.g., OSHA, NIOSH, NFPA, etc.)

*Functional Area #2: Optimized Technical Parameters for the Process*



# Guidance Statement 2.2



Patient decontamination should be performed using a tiered approach. The level and nature of decontamination is determined by the level and nature of contamination, as estimated through a risk-based response, as well as available resources. The tiered decontamination response is flexible and adaptable to various types of incidents.

Three tiers\* are recommended:

- Self-care: actions that patients can perform for themselves, including distancing themselves from the site of release, removing clothing, and wiping visible contamination from skin and clothing
- Immediate: likely to be performed by or with the assistance of first responders or first receivers in order to achieve a gross or hasty reduction in contamination as soon as possible, e.g., water decon with fire hoses at the scene
- Thorough: likely to be performed under the guidance of first responders or first receivers in order to achieve a level of contamination reduction that is as low as reasonably achievable, e.g., water- or soap and water-based shower

\*Tier names still under consideration



# Guidance Statement 2.3



Consider clothing removal for patients who have been visibly contaminated or who are suspected of having been contaminated. Efforts should be made to collect and account for clothing and personal items removed for patient decontamination.

## Considerations:

- If clothing removal is to be conducted outside, be mindful of environmental risks and, if applicable, ensure warming or cooling methods are available (e.g., warming tent, indoor location, shaded area)
- Some patients may require assistance in removing clothing
- Ensure proper levels of modesty (e.g., separate lines for males and females and cover from bystanders)

*Functional Area #2: Optimized Technical Parameters for the Process*



# Guidance Statement 2.3



Considerations, continued:

- Clothing and personal items should be handled in such a manner to address the following priorities
  1. Protect the health and safety of patients, responders and receivers
  2. Evidence collection for law enforcement
  3. Logistical capabilities
- Patients should be allowed to maintain identification (e.g., ID card, driver's license) that can be processed through decontamination without being destroyed or retaining contamination
- If the incident is a criminal or terrorist activity, clothing and personal items may become evidence; law enforcement should be incorporated into response planning to develop standard operating procedures for collecting contaminated material and ensuring chain of custody

*Functional Area #2: Optimized Technical Parameters for the Process*



# Guidance Statement 4.1



Prioritize patients for decontamination by estimating relative risk and grouping patients into imminent and delayed decontamination groups. Risk assessment should take into consideration the following criteria (and others as appropriate):

- Need for immediate lifesaving care or antidotal therapy
- Visual evidence of contamination on patient's skin or clothing
- Patients displaying signs and symptoms of exposure
- Proximity of patient to the location of release
- Contamination detected on patient using appropriate detection technology

*Functional Area #4: Patient Prioritization for Decontamination*



# Guidance Statement 4.1



## Considerations:

- Priority should begin with those patients who require decontamination in order to receive immediate, lifesaving care or antidotal therapy
- Children should be prioritized before adults within the same decontamination priority group
- Age, pregnancy and chronic medical conditions should also be considered when estimating relative risk and prioritizing patients for decontamination
- In a mass casualty chemical incident, patients needing decontamination most urgently may not be the first to present; ambulatory patients may reach first responders or first responders more quickly than non-ambulatory patients
- Self-reporting patients arriving at a Health Care Facility should also be prioritized according to these criteria

*Functional Area #4: Patient Prioritization for Decontamination*



# Guidance Statement 5.1



Attempt to immediately decrease ongoing exposure by removing ALL patients out of the danger area and provide an area of refuge.

## Considerations:

- First responders should not enter the danger zone without appropriate PPE and training
- Determination for subsequent need and level of decontamination may be decided based on criteria in Guidance Statements 1.1, 2.1, 2.10 and 4.1

*Functional Area #5: System-wide coordination of patient decontamination*