



# TRACIE

HEALTHCARE EMERGENCY PREPAREDNESS  
INFORMATION GATEWAY

Hospital Decontamination  
Topic Collection  
10/7/2016

## Topic Collection: Hospital Decontamination

The release of hazardous materials—whether accidental or intentional—has the potential to significantly harm the health of community members and first responders. No matter the cause, patients will require emergent medical care delivered by a team of healthcare providers. Because of the significant draw on human and material resources associated with these incidents, it is critical for emergency medical professionals to develop hospital victim decontamination plans that can help them provide the best medical care possible to patients while ensuring that caregivers are protected. The following resources highlight lessons learned, guidelines, plans, tools, and templates, and promising practices that can help emergency medical practitioners accomplish this goal.

Each resource in this Topic Collection is placed into one or more of the following categories (click on the category name to be taken directly to that set of resources). Resources marked with an asterisk (\*) appear in more than one category.

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### Must Reads

Center for Domestic Preparedness. (n.d.). [Hospital Emergency Response Training for Mass Casualty Incidents](#). (Accessed 10/7/2016.)

In addition to providing an overview of the Hospital Incident Command System, START and JumpSTART, this course teaches participants step-by-step decontamination procedures and the proper personal protective equipment to use in mass casualty incidents. It also discusses techniques for monitoring or surveying patients for chemical, biological, or radiological contamination.

Centers for Disease Control and Prevention. (2013). [Radiological Terrorism -Just in Time Training for Hospital Clinicians](#).

This brief video presents just-in-time training on recognition and management of radiation contaminated patients. It uses patient care scenarios to demonstrate key procedures.

Centers for Disease Control and Prevention. (2001). [Managing Hazardous Materials Incidents \(MHMIs\), Version 2001](#). Agency for Toxic Substances & Disease Registry.

This three-volume set of guidance documents and a video provide recommendations for on-scene and hospital medical management for patients exposed to hazardous materials.

Children's Hospital Boston. (2005). [Decontamination of Children](#). U.S. Department of Health and Human Services, Chemical Hazards Emergency Medical Management.

This scenario-based video shares specific considerations for caring for pediatric patients who require decontamination.

Cibulsky, S., Kirk, M., Ignacio, J., et al. (2014). [Patient Decontamination in a Mass Chemical Exposure Incident: National Planning Guidance for Communities](#).

This guide was written for executives, planners, incident commanders, emergency management personnel, and trainers, but it can also be used by first responders and others from the medical emergency field. The authors emphasize the need to plan for a local response to these types of incidents.

Harvard School of Public Health. (2014). [Hospital Decontamination Self Assessment Tool](#). Commonwealth of Massachusetts, Department of Public Health -Office of Emergency Preparedness and Emergency Management.

This tool can help hospitals assess their preparedness for a decontamination event. The authors include chapters on preparedness, response, and recovery, and provide planning and team matrices in the appendices.

Hospital and Healthcare System Disaster Interest Group, and California Emergency Medical Services Authority. (2005). [Patient Decontamination Recommendations for Hospitals](#).

This document provides recommendations for decontaminating and managing patients, and protecting emergency healthcare providers in the event of a hazardous materials exposure.

Occupational Safety and Health Administration. (2005). [Best Practices for Hospital-Based First Receivers of Victims from Mass Casualty Incidents Involving the Release of Hazardous Substances](#). U.S. Department of Labor.

This Occupational Safety and Health Administration report highlights promising practices that can enhance hospital employee protection and training as part of emergency planning for mass casualty incidents involving hazardous substances.

Pye, S. (n.d.). [Mass Casualty Decontamination for Hospitals: Instructor's Guide](#). (Accessed 5/1/2015.) County of Los Angeles, Emergency Medical Services Agency, Disaster Management Unit.

The Los Angeles County Emergency Medical Services Agency created this training to prepare hospital personnel to safely manage a mass casualty mass decontamination event. This instructor guide can be supplemented by a DVD that includes five separate video programs.

## Chemical Decontamination

\*Center for Domestic Preparedness. (n.d.). [Hospital Emergency Response Training for Mass Casualty Incidents](#). (Accessed 10/7/2016.)

In addition to providing an overview of the Hospital Incident Command System, START and JumpSTART, this course teaches participants step-by-step decontamination procedures and the proper personal protective equipment to use in mass casualty incidents. It also discusses techniques for monitoring or surveying patients for chemical, biological, or radiological contamination.

\*DeAtley, C. (2012). [Hospital Preparedness for "Chemical/Detergent" Suicides](#). Domestic Preparedness.

The author explains the trend in chemicals being ingested by suicidal patients, how these chemicals may make patients' bodies dangerous to caregivers, and strategies for protecting medical staff from these hazards.

\*Freyburg, Cl, Arquilla, B., Fertel, B., et al. (2008). [Disaster Preparedness: Hospital Decontamination and the Pediatric Patient](#). Prehospital Disaster Medicine. 23 (2)166-172.

The authors discuss the medical and psychological planning needs associated with children and chemical decontamination. They developed an algorithm that includes steps for ambulatory and non-ambulatory patients.

\*Koenig, K., Boatwright, C., Hancock, J., et al. (2008). [Healthcare Facility-Based Decontamination of Victims Exposed to Chemical, Biological, and Radiological Materials](#). American Journal of Emergency Medicine. 26(1):71-80.

The authors review the basics of health care facility-based decontamination (e.g., regulatory concerns, types of contaminants, and comprehensive decontamination procedures).

## Education and Training

- \*Center for Domestic Preparedness. (n.d.) [Hospital Emergency Response Training for Mass Casualty Incidents](#). (Accessed 10/7/2016.)

In addition to providing an overview of the Hospital Incident Command System, START and JumpSTART, this course teaches participants step-by-step decontamination procedures and the proper personal protective equipment to use in mass casualty incidents. It also discusses techniques for monitoring or surveying patients for chemical, biological, or radiological contamination.

- \*Centers for Disease Control and Prevention. (2013). [Radiological Terrorism -Just in Time Training for Hospital Clinicians](#).

This brief video presents just-in-time training on recognition and management of radiation contaminated patients. It uses patient care scenarios to demonstrate key procedures n.

- \*Centers for Disease Control and Prevention. (2014). [Radiological Terrorism: Medical Response to Mass Casualties](#).

This course provides medical professionals with an overview of key concepts of radiological terrorism and includes medical response scenarios and patient triage and treatment recommendations.

- \*Children's Hospital Boston. (2005). [Decontamination of Children](#). U.S. Department of Health and Human Services, Chemical Hazards Emergency Medical Management.

This scenario-based video shares specific considerations for caring for pediatric patients who require decontamination.

- Emergency Film Group. (n.d.) [Patient Decontamination DVD](#). (Accessed 5/26/2015.)

This video emphasizes the need for hospital decontamination plans in the event of a major terrorist or other disaster resulting in contaminated patients. It covers patient decontamination techniques, issues related to weather and modesty, equipment and supplies, integrating decontamination and triage, and post-decontamination.

- Hennepin County Medical Center. (n.d.) [Hazardous Materials Exposure Guide: A Step-by-Step Medical Response Guide](#). (Accessed 6/7/2015.)

This quick-reference cardset is intended for use by pre-hospital and hospital personnel and groups the exposure by class rather than agent (corrosives, asphyxiants, cholinergics) for easier initial assessment and treatment.

Hick, J. (2014). [HCMC Hospital HAZMAT Curriculum](#). Hennepin County Medical Center.

This series of five videos developed by Hennepin County Medical Center is part of the facility's eight-hour hazardous materials decontamination team training. Hands-on training follows completion of on-line video training.

\*Hick, J., Penn, P., and Hanfling, D. (2003). [Establishing and Training Healthcare Facility Decontamination Teams](#). (Abstract only.) *Annals of Emergency Medicine*. 42(3):381-90.

The authors of this article review Occupational Safety and Health Administration (OSHA) training requirements for healthcare personnel involved with decontamination responses. They discuss team selection and training and highlight relevant sample OSHA operations-level training curricula.

Pye, S. (n.d.). [Mass Casualty Decontamination for Hospitals: Instructor's Guide](#). (Accessed 5/1/2015.) County of Los Angeles, Emergency Medical Services Agency, Disaster Management Unit.

The Los Angeles County Emergency Medical Services Agency created this training to prepare hospital personnel to safely manage a mass casualty mass decontamination event. This instructor guide can be supplemented by a DVD that includes five separate video programs.

Ron Blank and Associates. (2008). [Principles & Design Considerations for Sterile Processes. An American Institute of Architects \(AIA\) Continuing Education Program](#).

Training participants can learn more about the importance of a sterile processing department and the concepts of decontamination and sterilization. They will also learn how to identify the type of equipment found in these departments and better understand the related nature of the workflow and design factors.

## Guidance Documents

Centers for Disease Control and Prevention. (2001). [Managing Hazardous Materials Incidents \(MHMIs\), Version 2001](#). Agency for Toxic Substances & Disease Registry.

This three-volume set of guidance documents and a video provide recommendations for on-scene and hospital medical management for patients exposed to hazardous materials.

Cibulsky, S., Kirk, M., Ignacio, J., et al. (2014). [Patient Decontamination in a Mass Chemical Exposure Incident: National Planning Guidance for Communities](#).

This guide was written for executives, planners, incident commanders, emergency management personnel, and trainers, but it can also be used by first responders and others from the medical emergency field. The authors emphasize the need to plan for a local response to these types of incidents.

Department of Health (Victoria, Canada). (2007.) [Decontamination Guidance for Hospitals.](#)

This guide features diagrams, tables, antidote suggestions, and templates that can be tailored by medical facilities when preparing for patient, responder, and facility decontamination.

Hospital and Healthcare System Disaster Interest Group, and California Emergency Medical Services Authority. (2005). [Patient Decontamination Recommendations for Hospitals.](#)

This document provides recommendations for decontaminating and managing patients and protecting emergency healthcare providers in the event of a hazardous materials exposure.

Hurst, C. (2007.) [Decontamination.](#) Medical Aspects of Chemical and Biological Warfare.

The author reviews methods of decontamination (physical, chemical), wound decontamination, and identifying and assessing biological agents.

National Research Council. (1999). [Patient Decontamination and Mass Triage.](#) Chemical and Biological Terrorism Research and Development to Improve Civilian Medical Response.

This chapter includes a comprehensive review of mass decontamination and triage practices. Recommendations for further research on the process, cleaning agents, showering equipment, crowd control, and related topics are provided at the end of the chapter.

\*Occupational Safety and Health Administration. (2005). [Best Practices for Hospital-Based First Receivers of Victims from Mass Casualty Incidents Involving the Release of Hazardous Substances.](#) U.S. Department of Labor.

This Occupational Safety and Health Administration report highlights promising practices that can enhance hospital employee protection and training as part of emergency planning for mass casualty incidents involving hazardous substances.

U.S. Army Soldier and Biological Chemical Command. (2003). [Guidelines for Cold Weather Mass Decontamination During a Terrorist Chemical Agent Incident.](#) U.S. Department of the Army.

Emergency medical professionals can learn about military practice for performing decontamination in cold weather situations. The document includes charts, figures, and photographs of decontamination equipment and techniques.

U.S. Army Soldier and Biological Chemical Command. (2003). [Guidelines for Mass Casualty Decontamination during a Terrorist Chemical Agent Incident.](#) U.S. Department of the Army.

Originally written as guidance for military personnel, the decontamination guidelines in this document can be applied by medical personnel in civilian facilities. The document includes charts, figures, and photographs of decontamination equipment and techniques.

## Lessons Learned

- \*Occupational Safety and Health Administration. (2005). [Best Practices for Hospital-Based First Receivers of Victims from Mass Casualty Incidents Involving the Release of Hazardous Substances](#). U.S. Department of Labor.

The Occupational Safety and Health Administration shares best practices document for hospitals to enhance employee protection and training as part of emergency planning for mass casualty incidents involving hazardous substances.

- Okumura, T., Suzuki, K., Fukuda, A., et al. (1998). [The Tokyo Subway Sarin Attack: Disaster Management, Part 2](#). Hospital Response. Academic Emergency Medicine. 5(6):618-24.

The authors describe the response effort of St. Luke's International Hospital to the Tokyo sarin attack.

## Pediatric

- \*Children's Hospital Boston. (2005). [Decontamination of Children](#). U.S. Department of Health and Human Services, Chemical Hazards Emergency Medical Management.

This scenario-based video shares specific considerations for caring for pediatric patients who require decontamination.

- \*Freyburg, CI, Arquilla, B., Fertel, B., et al. (2008). [Disaster Preparedness: Hospital Decontamination and the Pediatric Patient](#). Prehospital Disaster Medicine. 23 (2)166-172.

The authors discuss the medical and psychological planning needs associated with children and chemical decontamination. They developed an algorithm that includes steps for ambulatory and non-ambulatory patients.

- Rotenberg, J., Burklow, T., and Selaniko, J. (2003). [Weapons of Mass Destruction: The Decontamination of Children](#). (No abstract available.) Pediatric Annals. 32(4):261-7

The authors share challenges specific to pediatric decontamination planning and issues healthcare providers clinicians will face in the response phase.

- U.S. Department of Health and Human Services, Agency for Healthcare Research and Quality. (2005). [Decontamination of Children](#).

This video explains how children differ from adults physically and emotionally, and provides recommendations for pediatric decontamination.

## **Plans, Tools, and Templates**

California Emergency Medical Services Authority. (2005). [Patient Decontamination Recommendations for Hospitals.](#)

This document provides recommendations for protecting staff and managing patients during events involving a hazardous material. The document also includes decision trees and algorithms as well as equipment recommendations for specific hazards.

Department of Health (Victoria, Canada). (2007.) [Decontamination Guidance for Hospitals.](#)

This guide features diagrams, tables, antidote suggestions, and templates that can be tailored by medical facilities when preparing for patient, responder, and facility decontamination.

Harvard School of Public Health. (2014). [Hospital Decontamination Self-Assessment Tool.](#) Commonwealth of Massachusetts, Department of Public Health -Office of Emergency Preparedness and Emergency Management.

This tool can help hospitals assess their preparedness for a decontamination event. The authors include chapters on preparedness, response, and recovery, and provide planning and team matrices in the appendices.

\*National Association of County and City Health Officials Advanced Practice Centers. (n.d.). [Hospital Emergency Operations Plan: Appendix N – Patient Decontamination Plan and Personal Protective Equipment Template.](#) (Accessed 5/28/2015.)

This document, developed as part of the National Association of County and City Health Officials Advanced Practice Centers program, is a hospital decontamination plan template designed to be modifiable by any facility. Spaces for customization are noted in red throughout the document.

## **Radiological Decontamination**

Alexander, G. (2006). [Radiation Decontamination.](#) Disaster Medicine. (Book available for purchase.)

The author of this chapter shares information on radiation emergencies and patient/hospital decontamination principles.

\*Centers for Disease Control and Prevention. (2013). [Radiological Terrorism -Just in Time Training for Hospital Clinicians.](#)

This brief video presents just-in-time training on recognition and management of radiation contaminated patients. It uses patient care scenarios to demonstrate key procedures.

\*Centers for Disease Control and Prevention. (2014). [Radiological Terrorism: Medical Response to Mass Casualties](#).

This course provides medical professionals with an overview of key concepts of radiological terrorism. It includes medical response scenarios, and patient triage and treatment recommendations.

\*Center for Domestic Preparedness. (n.d.) [Hospital Emergency Response Training for Mass Casualty Incidents](#). (Accessed 10/7/2016.)

In addition to providing an overview of the Hospital Incident Command System, START and JumpSTART, this course teaches participants step-by-step decontamination procedures and the proper personal protective equipment to use in mass casualty incidents. It also discusses techniques for monitoring or surveying patients for chemical, biological, or radiological contamination.

\*Koenig, K., Boatwright, C., Hancock, J., et al. (2008). [Healthcare Facility-Based Decontamination of Victims Exposed to Chemical, Biological, and Radiological Materials](#). American Journal of Emergency Medicine. 26(1):71-80.

The authors review the basics of health care facility-based decontamination (e.g., regulatory concerns, types of contaminants, and comprehensive decontamination procedures).

## Resource Allocation

Cahill, J. (2005). [Hospital Staffing for Decontamination](#). Domestic Preparedness.

The author suggests hospital staff prioritize preparing for hazardous materials incidents, specifically maintaining the ability to function in a hazardous materials incident (which includes protecting and caring for staff), and providing related patient care.

DeAtley, C. (2013). [Hospital Decontamination - High Costs & Limited Benefits](#). Domestic Preparedness.

The author discusses the costs associated with hospital decontamination preparedness.

Tully, T. (2008). [Hospital Decontamination: Many Questions Few Answers](#). Domestic Preparedness.

In this article, the author presents challenges facing hospitals of all sizes as they prepare to conduct decontamination. Issues include the cost of decontamination equipment, the

number of staff needed for a small number of contaminated patients, and mass decontamination incidents.

## Responder Health and Safety

\*Center for Domestic Preparedness. (n.d.) [Hospital Emergency Response Training for Mass Casualty Incidents](#). (Accessed 10/7/2016.)

In addition to providing an overview of the Hospital Incident Command System, START and JumpSTART, this course teaches participants step-by-step decontamination procedures and the proper personal protective equipment to use in mass casualty incidents.

\*DeAtley, C. (2012). [Hospital Preparedness for “Chemical/Detergent” Suicides](#). Domestic Preparedness.

The author explains the trend in chemicals being ingested by suicidal patients, how these chemicals may make patients' bodies dangerous to caregivers, and strategies for protecting medical staff from these hazards.

Hick, J., Hanfling, D., Burstein, J., et al. (2003). [Protective Equipment for Healthcare Facility Decontamination Personnel: Regulations, Risks, and Recommendations](#). *Annals of Emergency Medicine*. 42(3):370-80.

The authors provide an overview of the issues related to choosing the appropriate personal protective equipment (PPE) for healthcare facility decontamination personnel.

\*Hick, J., Penn, P., and Hanfling, D. (2003). [Establishing and Training Healthcare Facility Decontamination Teams](#). (Abstract only.) *Annals of Emergency Medicine*. 42(3):381-90.

The authors of this article review Occupational Safety and Health Administration (OSHA) training requirements for healthcare personnel involved with decontamination responses. They discuss team selection and training and highlight relevant sample OSHA operations-level training curricula.

Horton, D., Berkowitz, Z., and Kaye, W. (2003). [Secondary Contamination of ED Personnel from Hazardous Materials Events, 1995-2001](#). (Abstract only.) *American Journal of Emergency Medicine*. 21(3):199-204.

The authors examined hazardous materials events from 1995-2001 and found that the main injuries sustained by emergency medical responders were respiratory and eye irritation. They found that victim decontamination procedures, field-to-hospital communication, and appropriate personal protective equipment can help prevent these types of injuries and responder contamination.

Levitin, H., Siegelson, H., Dickinson, S., et al. (2003). [Decontamination of Mass Casualties - Reevaluating Existing Dogma](#). (Abstract only.) *Prehospital Disaster Medicine*. 18(3):200-207.

The authors review standards for handling human survivors of a mass hazardous materials exposure.

\*National Association of County and City Health Officials Advanced Practice Centers. (n.d.). (Accessed 5/28/2015.) [Hospital Emergency Operations Plan: Appendix N – Patient Decontamination Plan and Personal Protective Equipment Template](#).

This document, developed as part of the National Association of County and City Health Officials Advanced Practice Centers program, is a hospital decontamination plan template designed to be modifiable by any facility. Spaces for customization are noted in red throughout the document.

### **Books Available for Purchase**

Blumen, I. (2002). *Radiation Emergencies*. *Pediatric Emergency Medicine: A Comprehensive Study Guide*, Chapter 117. American College of Emergency Physicians.

Burgess, J. (2004). *Hazardous Materials Incidents*. In Dart, R. *Medical Toxicology*, 3rd Edition, Chapter 259.

Christenson, D., Becker, S., Whitcomb, Jr., R., et al. (2010). *Emergency Management of Radiation Injury and Illness*. *International Disaster Nursing*, Chapter 13. Cambridge University Press.

Colwell, C. (2014). *Radiation Injuries*. *Rosen's Emergency Medicine Concepts and Clinical Practice* 8th Edition, Chapter 146. Elsevier Saunders.

Fong, F., Jr. (2007). *Medical Management of Radiation Accidents*. *Disaster Medicine*, Second Edition. (Partial preview of chapter contents. Book available for purchase.)

Hakozaki, Y. (2010). - *Chemical Preparedness and Response*. *International Disaster Nursing*, Chapter 11. Cambridge University Press.

Levitin, H. and Siegelson, H. (2007). *Hazardous Materials*. *Disaster Medical Planning and Response*. In Hogan, D. and Burstein, J. *Disaster Medicine, Second Edition*.

Nadig, R.J. (2014). *Hazardous Materials Release and Decontamination*. *Goldfrank's Toxicologic Emergencies*, 10th Edition, Chapter 92.

Powers, R. (2010). *Decontamination*. *International Disaster Nursing*, Chapter 15. Cambridge University Press.

Sorenson, B. and Sorenson, J. (2006). Chemical Decontamination. Disaster Medicine, Chapter 69. Mosby, Inc.

### **Agencies and Organizations**

California Hospital Association. <http://www.calhospitalprepare.org/decontamination>

Chemical Emergency Medical Management (CHEMM). [CHEMM.nlm.nih.gov](http://CHEMM.nlm.nih.gov)

Occupational Safety & Health Administration (OSHA).  
<https://www.osha.gov/SLTC/hazardouswaste/training/decon.html>

Radiation Emergency Medical Management (REMM). [Remm.nlm.nih.gov](http://Remm.nlm.nih.gov)

*This ASPR TRACIE Topic Collection was comprehensively reviewed in June 2015 by **Craig DeAtley**, PA-C, Director, Institute for Public Health Emergency Readiness, MedStar Washington Hospital Center, and Administrative Director, D.C. Emergency HealthCare Coalition and **John Hick**, MD, HHS ASPR and Hennepin County Medical Center.*

*Additional assistance provided by **James Paturas**, Director, Center for Emergency Preparedness and Disaster Response, Yale New Haven Health System.*