



***Managing  
Hazardous  
Materials  
Incidents***

***Volume I  
Volume II  
Volume III***

***Including  
ToxFAQs™***

**A Planning  
Guide for the  
Management of  
Contaminated  
Patients**

**U.S. Department Of Health And Human Services  
Public Health Service  
Agency for Toxic Substances and Disease Registry**

Under the authority of the Superfund Amendments and Reauthorization Act of 1986 (SARA), the Agency for Toxic Substances and Disease Registry (ATSDR) works to prevent or mitigate adverse human health effects and diminished quality of life resulting from exposure to hazardous substances in the environment. In pursuit of this mission, *Managing Hazardous Materials Incidents, Volume I, II, & III*, and the training video have been developed to provide emergency medical services (EMS) personnel and hospital emergency departments (EDs) with the necessary guidance to plan for, and improve their ability to respond to, incidents that involve human exposure to hazardous materials. The guidelines inform emergency personnel how to appropriately decontaminate, treat, and recommend follow-up care to exposed persons, as well as take measures to protect themselves.

**HIGHLIGHTS:** ATSDR's *Managing Hazardous Materials Incidents* is a three volume set (with video) comprised of recommendations for on-scene (prehospital), and hospital medical management of patients exposed during a hazardous materials incident. *Volume I - Emergency Medical Services: A Planning Guide for the Management of Contaminated Patients* and *Volume II - Hospital Emergency Departments: A Planning Guide for the Management of Contaminated Patients* are planning guides to assist first responders and hospital emergency department personnel in planning for incidents that involve hazardous materials. *Volume III - Medical Management Guidelines for Acute Chemical Exposures* is a guide for health care professionals who treat persons who have been exposed to hazardous materials. *Community Challenge: Hazardous Materials Response and the Emergency Medical System* - is a training video for Volumes I & II (50 minutes total; 25 minutes for each volume).

### MANAGING HAZARDOUS MATERIALS INCIDENTS:

(a three-volume series plus a training video)

- |            |  |
|------------|--|
| Volume I   | Emergency Medical Services: A Planning Guide for the Management of Contaminated Patients.  |
| Volume II  | Hospital Emergency Departments: A Planning Guide for the Management of Contaminated Patients.  |
| Volume III | Medical Management Guidelines for Acute Chemical Exposures.  |
| Video      | Community Challenge: Hazardous Materials Response and the Emergency Medical System - a training video for Volumes I & II (50 minutes total; 25 minutes for each volume). |

The ATSDR Internet address is < <http://www.atsdr.cdc.gov> >

Volume III of the Managing Hazardous Materials Incidents contains Medical Management Guidelines for 40 hazardous substances. Each Medical Management Guideline is divided into five easy to use sections:

- *General Information* (synonyms, appearance, routes of exposure, potential for secondary contamination, sources/uses, physical properties, and exposure standards).
- *Health effects* (organ systems affected by acute exposure, potential sequelae, and chronic effects).
- *Pre-hospital management* (personal protection, decontamination, support, triage, and transportation, organized by hot zone, decontamination zone, and support zone).
- *Emergency department management* (management and treatment)
- *Patient information sheet* (information of exposure, potential effects, and follow-up instructions).

The general hazardous substances (35)

Acrylonitrile	Formaldehyde	Phosgene
Ammonia	Gasoline	Phosphine
Aniline	Hydrogen Chloride	Sodium Hydroxide
Arsenic Trioxide	Hydrogen Cyanide	Sulfur Dioxide
Arsine	Hydrogen Fluoride	Tetrachloroethylene
Benzene	Hydrogen Peroxide	Toluene
Butadiene	Hydrogen Sulfide	Toluene Diisocyanate
Chlordane	Methyl Bromide	Trichloroethane
Chlorine	Methylene Chloride	Trichloroethylene
Elemental Mercury	Nitrogen Oxides	Vinyl Chloride
Ethylene Glycol	Parathion	Xylene
Ethylene Oxide	Phenol	Unidentified Chemical

The DOD-related hazardous substances (5)

Phosgene Oxime	Blister Agents: Lewisite, Mustard - Lewisite Mixture (L, HL)
Nerve Agents (GA, GB, GD, VX)	Blister Agents: Nitrogen Mustard (HN-1, HN-2, HN-3)
	Blister Agents: Sulfur Mustard (H, HD, HT)

**PEDIATRIC ISSUES:** Children's unique physiology and behavior can influence the extent of their exposure, and they may differ in their susceptibility to hazardous chemicals. As a result of ATSDR's Childhood Health Initiative, the three volume set has been updated to include any pediatric specific information/data on each substance listed above.

**INTENDED AUDIENCE:** HAZMAT Teams, Emergency Medical Personnel, Hospital Emergency Department Personnel, DHHS, DOD, DOE, FBI, FEMA, U.S. Marine Corps Chemical and Biological Incident Response Force (CBIRF), U.S. Uniformed Services University, City and County Emergency Management Agencies, International/Foreign Agencies and Organizations.

**Where can I get more information?** For more information about the Managing Hazardous Material Incidents publications including the Medical Management Guidelines contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-57, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-639-6359. The ATSDR Internet address is < <http://www.atsdr.cdc.gov> >.





***Managing  
Hazardous  
Materials  
Incidents***

**Volume I**  
*(revised)*

**Emergency  
Medical Services**

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**A Planning Guide for  
the Management of  
Contaminated Patients**

**U.S. Department Of Health And Human Services  
Public Health Service  
Agency for Toxic Substances and Disease Registry**

***Managing  
Hazardous  
Materials  
Incidents***

***Volume I  
(Revised)***

**Emergency Medical  
Services:**

**A Planning Guide  
for the Management of  
Contaminated Patients**



**U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES**  
Public Health Service  
Agency for Toxic Substances and Disease Registry

The Agency for Toxic Substances and Disease Registry (ATSDR) has produced a three-volume series entitled Managing Hazardous Material Incidents. The series is designed to help emergency response and health care professionals plan for and respond to hazardous material emergencies.

Volume I      Emergency Medical Services: A Planning Guide for the Management of Contaminated Patients

Volume II     Hospital Emergency Departments: A Planning Guide for the Management of Contaminated Patients

Volume III    Medical Management Guidelines for Acute Chemical Exposures

Volumes I and II are planning guides to assist first responders and hospital emergency department personnel in planning for incidents that involve hazardous materials.

Volume III is a guide for health care professionals who treat persons who have been exposed to hazardous materials.

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Agency for Toxic Substances  
and Disease Registry .....Jeffrey P. Koplan, Ph.D., M.P.H., Administrator  
Henry Falk, M.D., M.P.H., Assistant Administrator

Division of Toxicology .....Christopher T. DeRosa, Ph.D., Director

Additional copies of this report are available from:

Agency for Toxic Substance and Disease Registry (ATSDR)  
Division of Toxicology  
Information Center (E57)  
1600 Clifton Road, N.E.  
Atlanta, Georgia 30333  
(404) 639-6357  
Internet address: [www.atsdr.cdc.gov/prevent.html](http://www.atsdr.cdc.gov/prevent.html)



**DEPARTMENT OF  
HEALTH & HUMAN SERVICES**

Public Health Service  
Agency for Toxic Substances and Disease Registry (MS-E57)  
Atlanta, GA 30333

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*Emergency Medical Services:*  
*A Planning Guide for the Management*  
*of Contaminated Patients:*

2000 Revision of *Volume II*  
*Hospital Emergency Departments:*  
*A Planning Guide for the Management*  
*of Contaminated Patients:*

Craig DeAtley, P.A.-C., C.C.T.  
Associate Professor, Emergency Medicine  
Disaster Medicine and Special Operations Section  
George Washington University School of Medicine  
and Health Sciences  
Washington, D.C.

George C. Rodgers, Jr., M.D., Ph.D.  
Professor of Pediatrics and Pharmacology/Toxicology  
University of Louisville  
Louisville, KY

Peer Review Panel for revised (2000) Volumes I and II:<sup>1</sup>

Sella Burchette (U.S. Environmental Protection Agency)  
Keith Burkhart, M.D., F.A.C.E.P. (American College of Emergency Physicians)  
Andrea Carlson (Physicians for Social Responsibility)  
Linda Cochiarella, M.D. (American Medical Association)  
Paul Cousins (The National Association of Emergency Medical Technicians)  
Richard Duffy (International Association of Firefighters)  
Philip Edelman, M.D. (Association of Occupational and Environmental Clinics)  
Robert McCunney, M.D. (American College of Occupational and Environmental Medicine)  
Kent Olson, M.D. (American Association of Poison Control Centers)  
Leslie Stein-Spencer, R.N. (Emergency Nurses Association)  
Milton Tenenbein, M.D. (American Academy of Pediatrics)  
John Turley (Emergency Management Institute)

<sup>1</sup> The above reviewers were recommended by the organizations listed but do not necessarily represent them.

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The following panel of experts contributed to the original (1992) development of Volumes I and II:

Phillip Currance, EMT-P; Ralph B. Monty Leonard, Ph.D., M.D., F.A.C.E.P.; Mary Beth Michos, R.N.; Eric Noji, M.D., M.P.H., F.A.C.E.P.; Martin J. O'Neill; Paul Seidlitz, R.N.

The following experts served as peer reviewers for the original 1992 Volumes I and II:

Ben Blankeshire, Kenneth Bouvier, MacNeil Cross, Robert Daughdril, Craig DeAtley, Eileen Faries, Steve Finefrock, John Friery, Niel Holtz, Winston E. Jones, William J. Keffer, Gus A. Koehler, Kenneth Kuntz, Paul Manascalo, Kent Olson, Chappell D. Pierce, Alonzo Smith, Clark Staten, Dave Tauber, Joe E. Taylor, Sandra L. Tirey, Wallace Weaver, Steve White



## Introduction

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The presence of hazardous materials or toxic chemicals at an incident location or other emergency situation adds a new dimension of risk to those handling and treating casualties. The fundamental difference between a hazardous materials incident and other emergencies is the potential for acute risk from contamination to both patient and responder. In some cases, traditional practices must be altered to avoid compounding a critical situation.

Emergency medical services (EMS) must protect their personnel on site and en route to the hospital, and other people within the hospital, while providing the best care for the chemically contaminated patient. This guide is intended to help emergency medical services plan for incidents that involve hazardous chemicals and improve their ability to respond to these incidents.

To ensure appropriate and timely patient care, as well as optimal response protection, emergency personnel must understand decontamination procedures and personal protective equipment, neither of which are routinely covered in the course of their professional training. They should also be aware of community resources that could be called upon to assist with an emergency response.

Current training curricula for emergency room physicians and nurses and emergency medical technicians (EMTs) often do not adequately prepare these professionals to manage the contaminated individual or to decontaminate patients exposed to toxic substances. Accurate, specific, and concise guidance is needed to describe appropriate procedures to be followed by emergency medical personnel to safely care for a patient(s), as well as to protect responders, equipment, hospital personnel, and others from risk of secondary exposure. In response to this need, the Agency for Toxic Substances and Disease Registry (ATSDR) contracted for the production of a three-volume series entitled *Managing Hazardous Materials Incidents: I. Emergency Medical Services: A Planning Guide for the Management of Contaminated Patients; II. Hospital Emergency Departments: A Planning Guide for the Management of Contaminated Patients; and III. Medical Management Guidelines for Acute Chemical Exposures*. The second document is designed for use by emergency department personnel to minimize their risks of exposure within the emergency department, and to provide for the safe and effective treatment of chemically contaminated patients.

This volume, written for emergency response personnel, is designed to familiarize readers with the terminology, concepts, and key operational considerations that affect the proper management of incidents of chemical contamination. It is designed not only to present uniform guidance for the emergency care of chemically contaminated patients, but also to provide basic information necessary to comprehensive planning and implementation of EMS strategies. It is intended to illustrate the characteristics of hazardous materials (hazmat) incidents that compel emergency response personnel to modify their preparations and response procedures.

Not all hospitals and community emergency response systems are prepared to respond to a hazardous chemical incident to the same degree. This document may be used to assess the capabilities of EMS with respect to potential community hazards and to develop response plans using national and community-specific resources. Employee safety and training are also key factors in effective management of medical emergencies. This document is intended to provide source material for developing local training and safety protocols.

Section I, *Systems Approach to Planning*, introduces guidelines for emergency preparedness and prehospital response planning. Government and private planning activities are outlined, including those established under Title III of the Superfund Amendments and Reauthorization Act (SARA); the National Response Team; the Community Awareness Emergency Response (CAER) program; and the Chemical Emergency Preparedness Program (CEPP). This chapter discusses the need for hazard identification and risk analysis pertaining to hazardous materials located in a community or transported through it. Recommended training for EMS personnel is also included.

Section II, *Emergency Medical Services Response to Hazardous Materials Incidents*, outlines general principles for hazard recognition, chemical exposure, and personal protective equipment. In addition, the hazard recognition section presents generalized guidance for determining whether a given situation constitutes a hazardous materials incident, and details various hazardous materials classification systems. This section provides basic toxicological and chemical terminology that emergency personnel need to understand to effectively conduct patient assessments. It also presents an outline of personal protective equipment, such as respiratory devices and protective clothing.

Section III, *Response and Patient Management*, includes guidelines for EMS preparation and response to a potential hazardous materials incident. This chapter also discusses patient assessment, clinical management, and decontamination guidelines.

This guidance document is intended to improve the safety of responders as well as of patients. It is not, however, all-encompassing, nor can it be regarded as a substitute for comprehensive instruction and training for hazardous materials incidents. Supplemental material that is vital to successful response to hazardous materials contamination is cited within the document. These materials should be carefully reviewed before preparing any strategic plans or conducting training exercises on this topic. Also, this document generally does not cover issues associated with weapons of mass destruction (WMD), although some of the information presented is pertinent to these situations as well. Other ATSDR documents specifically address WMD concerns.