



Managing Hazardous Materials Incidents

Volume II
(revised)

**Hospital Emergency
Departments**

**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 II
(Revised)***

Hospital Emergency Departments:

**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.

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

Division of ToxicologyChristopher 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

**DEPARTMENT OF
HEALTH & HUMAN SERVICES**

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

Official Business

Penalty for Private Use \$300

SPECIAL FOURTH-CLASS RATE
POSTAGE & FEES PAID
PHS/CDC
Permit No. G-284

Volume II - Table of Contents

	Page
Acknowledgments .....	.iii
Introduction .....	.v
I. Systems Approach to Planning .....	.1
The Role of the Hospital in a Systems Approach to Planning .....	.1
The Spectrum of Hazardous Materials Incidents .....	.2
Joint Commission on Accreditation of Healthcare Organizations (JCAHO) .....	.3
SARA Title III .....	.3
The State Emergency Medical Services (EMS) Agency .....	.4
Federal Emergency Response Activities .....	.5
Hazard Analysis .....	.7
Selected Bibliography .....	.9
II. Emergency Department Response to Hazardous Materials Incidents .....	.11
Hazard Recognition .....	.11
Principles of Toxicology for Emergency Department Personnel .....	.19
Personnel Protection and Safety Principles .....	.25
Respiratory Protection .....	.32
Emergency Department Personnel Decontamination .....	.35
Communications .....	.36
Selected Bibliography .....	.39

Volume II - Table of Contents (Continued)

III. Patient Management 41

 Emergency Department Preparation 42

 Patient Arrival 45

 Patient Decontamination 45

 Considerations for Patient Treatment 46

 Community Education and Briefing 48

 Critique 48

 Patient Management Under Mass Casualty Conditions
 Involving Hazardous Chemicals 48

 Critical Incident Stress Management 48

 Selected Bibliography 48

Appendix A Hazardous Materials Classification Systems A1

Appendix B Types of Respiratory Protection B1

Appendix C Levels of Protection C1

Acknowledgments

This document was first published in 1992 and updated in 2000. ATSDR wishes to thank all those who participated in making this a useful guidance document, including:

2000 Revision of *Volume I*
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:¹

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)

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

This project was directed by Scott V. Wright, ATSDR. For the 2000 revision, Linda Stein of Eastern Research Group, Inc. (ERG) was the project manager, and Chris Reid of ERG was the editor (under ATSDR Contract No. 205-93-0641).

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

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.

Hospital emergency departments must protect their personnel and other people within the hospital, while providing the best care for the chemically contaminated patient. This guide is intended to help hospital emergency departments plan for incidents that involve hazardous materials and to improve their ability to respond to these incidents.

To ensure appropriate and timely patient care, as well as optimal worker 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, as well as to protect equipment, hospital personnel, patients, 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 first document is designed for use by emergency medical technicians and other prehospital care providers to minimize their risks of exposure during the prehospital period and to provide for the safe and effective treatment of chemically contaminated patients.

This volume, written for emergency department personnel, is designed to familiarize readers with the concepts, terminology, and key operational considerations that affect the management of incidents of chemical contamination. It presents uniform guidance for the emergency care of chemically contaminated patients; provides basic information critical to advance planning and implementation of emergency medical strategies; illustrates the characteristics of hazardous materials incidents that compel modifications to traditional emergency response procedures; and presents effective preparatory response actions.

Not all hospital 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 a hospital's capabilities 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 the effective management of medical emergencies. This document also is intended to provide source material for developing local training and safety protocols.

Section I, *Systems Approach to Planning*, introduces the guidelines for emergency preparedness and hazardous materials and waste programs of the Joint Commission on Accreditation of Healthcare Organizations (JCAHO). Government and private planning activities are also 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 Stockpile Emergency Preparedness Program (CSEPP). This chapter discusses the need for hazard identification and risk analysis pertaining to hazardous materials located in a community or transported through it.

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

Section III, *Patient Management*, includes guidelines for emergency department preparation and response to a potential hazardous materials incident. This chapter also discusses patient assessment 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.