Nuclear, Chemical, Biological Terrorism Emergency Response and Public Protection

Mark E. Byrnes David A. King Philip M. Tierno, Jr.



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Foreword

The authors of this excellent book provide a concise but comprehensive review of various types of weapons of mass destruction, along with sound advice and simple actions that can be taken by emergency responders and the general public to reduce risks and avoid panic in the event of a terrorist attack. By simply reading through this book, emergency responders and the public will learn what they can do to minimize danger to health and life after an attack. The most important actions are summarized at the end of the book. This summary becomes a convenient checklist.

Through my own personal experiences facing high intensities of radiation and radioactive materials, managing patients who have been exposed to intakes of radioactive material, and training and discussing concepts and actions with emergency responders and the public, I've found that people want to do the right thing when faced with dangerous situations. In the event of a terrorist attack, they want to respond by protecting health and saving life. This book helps them do that.

I recommend that emergency responders and persons establishing homeland security programs read this book, along with every person who wants to conserve health and save life. The more people that know the material in this book, the less will be the panic and loss of life in the terror that follows a weapon of mass destruction attack. There are other books on this subject that are less complete and largely out-of-date. This book is comprehensive, up-to-date, and provides sound advice for protection in the event of a terrorist attack involving weapons of mass destruction.

Allen Brodsky, Sc.D., CHP, CIH, DABR

Adjunct Professor of Radiation Science Georgetown University Chair Ad Hoc Committee on Homeland Security Health Physics Society

Preface

Following the events of September 11, 2001, the United States began a strategic assault against terrorist groups around the world with the objective of ridding the world of large terrorist organizations that could potentially repeat a September 11 type event. As an added level of security, President George W. Bush established a new Department of Homeland Security that has the responsibility for reducing America's vulnerability to terrorism. While both actions represent good first steps in helping rid the world of terrorism, the American public has been forced to come to grips with the reality that the nation faces a strong possibility of future large-scale terrorist events occurring within its borders. The American public has also come to realize that it must play a critical role in helping prevent these types of events.

While everyone can gain valuable information from this book on how to protect themselves from terrorist activities involving nuclear, chemical, and biological weapons, its target audiences are emergency response personnel, safety professionals, law enforcement officials, and Federal Bureau of Investigation agents (all referred to as emergency responders) because they are likely to receive first-hand exposure to one or more terrorist events involving these types of weapons. The primary objectives of this book are to provide emergency responders with guidance on:

- Weapons of mass destruction that could be used in a terrorist attack
- Mechanisms by which terrorists could disperse various types of nuclear, chemical, and biological agents
- · Conventional explosives that terrorists could use to disperse these agents
- Routes by which individuals are exposed to these agents
- · Health hazards that may result from exposure to these agents
- Techniques by which safety professionals can minimize exposure to these agents
- Potential medical treatment options for those exposed to these agents
- · Methods to increase chances of surviving a nuclear explosion
- · Emergency preparedness measures for a variety of settings
- Techniques for prioritizing injuries
- Personnel decontamination methods to be administered prior to medical treatment
- Radiation exposure guidelines
- Training guidelines

It is the authors' intent that the information in this book will help reduce exposure of emergency responders to these types of agents, and as a result, help save lives.

Authors



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The authors would like to express their appreciation for all the support provided by their families, particularly Karen Byrnes, Christine Byrnes, Kathleen Byrnes, Frieda Byrnes, and Shelley King, Josephine Tierno, Alexandra and Francois Payard, and Meredith and Thomas Mallon.

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Contents

Dedication	xviii
Abbreviations and Acronyms	xix
Glossary	xxi

Chapter 1 Introduction

1.1	Purpos	se and Sco	эре	1
1.2	Histori	storical Perspective on Terrorism Targeted against the U.S		
1.3	Histori	ical Devel	opment of Nuclear Weapons	9
	1.3.1	The Rac	e to Develop the First Nuclear Weapon	9
	1.3.2	Modern	Nuclear Weapons	
	1.3.3	Modern	Weapons Using Depleted-Uranium Projectiles	13
	1.3.4	Other Po	tential Terrorist Uses for Radioactive Materials	14
1.4	Histori	ical Devel	opment of Chemical Weapons	
	1.4.1	Geneva l	Protocol	19
	1.4.2	A New A	Age of Chemical Weapons Development	
	1.4.3	Prohibiti	on of Development, Production, and Stockpiling	
		of Biolog	gic and Toxic Weapons	
	1.4.4	Weaponi	zation and Delivery of Chemical Agents	
1.5	Histori	ical Devel	opment of Biological Weapons	21
	1.5.1	Modern	Biological Weapons	
	1.5.2	Current	Genetic and Molecular Engineering	
	1.5.3	Post-Sep	tember 11 Anthrax Attacks	23
	1.5.4	Agroterr	orism	
1.6	Conve	ntional Ey	plosives Available for Dispersing Agents	
	1.6.1	Primary	Explosives	
		1.6.1.1	Lead Azide	
		1.6.1.2	Silver Azide	
		1.6.1.3	Tetrazene	
		1.6.1.4	Lead Styphnate	
		1.6.1.5	Mercury Fulminate	
		1.6.1.6	Diazodinitrophenol	
	1.6.2	Secondar	ry Explosives	
		1.6.2.1	Trinitrotoluene (TNT)	
		1.6.2.2	Tetryl	
		1.6.2.3	Picric Acid	
		1.6.2.4	Nitrocellulose	
		1.6.2.5	Nitroglycerine	
		1.6.2.6	Nitroguanidine	
		1.6.2.7	Cyclotrimethylenetrinitramine (RDX)	

	1.6.2.8 Cyclotetramethylenetetranitramine (Octogen of	or HMX)29
	1.6.2.9 1,3,5-triamino-2,4,6-trinitrobenzene (TATB) .	
	1.6.2.10 Pentaerythritol Tetranitrate (PETN)	
	1.6.2.11 Hexanitrostilbene (HNS)	
1.6.3	Propellants	
	1.6.3.1 Gun Propellants	
	1.6.3.2 Rocket Propellants	
1.6.4	Pyrotechnics	
1.6.5	Other Compounds Used in Explosives	
1.6.6	Initiation Techniques	
1.6.7	Analytical Methods for Testing for Explosives	
1.6.8	Triggering Mechanisms for Explosive Devices	
References	-	

Chapter 2 General Types of Radiation and Warfare Agents

2.1	Radiat	ion		
	2.1.1	External	Radiation	
		2.1.1.1	Gamma Particles	
		2.1.1.2	Beta Particles	
		2.1.1.3	Alpha Particles	
	2.1.2	Internal	Radiation	
	2.1.3	Radiatio	n Source Material	40
		2.1.3.1	Potential Source Materials	40
		2.1.3.2	Black Market Activities involving Radiological	
			Materials	41
2.2	Chemi	cal Warfa	re Agents	44
2.3	Biolog	ical Warf	are Agents	46
Refer	ences			47

Chaj	pter 3 (General I	Hazards from Exposure to Radiation and War	fare Agents
3.1	Radiat	ion		49
	3.1.1	Radiatio	n Damage in Human Tissue	49
	3.1.2	Chronic	Radiation Exposures	
	3.1.3	Acute R	adiation Exposures	
3.2	Chemi	ical Agent	ts	52
	3.2.1	Blister A	Agents	
		3.2.1.1	Mustards	55
		3.2.1.2	Arsenicals	
		3.2.1.3	Nitrogen Mustards	59
		3.2.1.4	Oximes	62
		3.2.1.5	Mixes	63
	3.2.2	Blood A	gents	64
		3.2.2.1	Hydrogen Cyanide (AC)	64
		3.2.2.2	Cyanogen Chloride (CK)	65

		3.2.2.3	Arsine (SA)	.65
3.2	2.3	Choking	Agents	66
		3.2.3.1	Chlorine	.66
		3.2.3.2	Phosgene (CG)	.67
		3.2.3.3	Diphosgene (DP)	.67
3.2	2.4	Nerve Ag	gents	.68
		3.2.4.1	Tabun (GA)	.68
		3.2.4.2	Sarin (GB)	.69
		3.2.4.3	Soman (GD)	70
		3.2.4.4	V-Gas (VX)	.71
3.3 Bi	olog	ical Agen	ts	.71
3.3	3.1	Bacterial	Agents	.71
		3.3.1.1	Bacillus anthracis (Anthrax)	72
		3.3.1.2	Yersinia pestis (Plague)	.74
		3.3.1.3	Brucella melitensis (Brucellosis)	74
		3.3.1.4	Francisella tularensis (Tularemia)	.75
		3.3.1.5	Coxiella burnetii (Q Fever)	.76
		3.3.1.6	Vibrio cholerae (Cholera)	.76
		3.3.1.7	Burkholdera mallei (Glanders)	.77
		3.3.1.8	Burkholdera pseudomallei (Melioidosis)	.78
3.3	3.2	Viral Age	ents	.78
		3.3.2.1	Variola Major (Smallpox)	78
		3.3.2.2	Venezuelan Equine Encephalitis	79
		3.3.2.3	Crimean Congo Hemorrhagic Fever	.80
		3.3.2.4	Rift Valley Hemorrhagic Fever	.81
3.3	3.3	Toxins		.81
		3.3.3.1	Clostridium botulinum toxin	81
		3.3.3.2	Clostridium perfringens toxin	.82
		3.3.3.3	Staphylococcus Enterotoxin B	.83
		3.3.3.4	Ricin	.84
		3.3.3.5	Saxitoxins	.84
		3.3.3.6	Trichothecene Mycotoxins (T-2)	.85
Reference	ces .			103

Chapter 4 Minimizing Exposure to Radiation and Warfare Agents

4.1	Time of Exposure	105
4.2	Distance	107
4.3	Shielding	108
4.4	Summary	109

Chapter 5 Responding to a Nuclear Explosion

5.1	Nuclea	ar Explos	ion Basics	.111
	5.1.1	General	Discussion	.111
		5.1.1.1	Radius of Complete Destruction	112

		5.1.1.2	Air Blast	113
		5.1.1.3	Thermal Burns	113
		5.1.1.4	Initial Radiation	114
		5.1.1.5	Fallout	114
		5.1.1.6	Combined Effects	114
5.2	Respo	nse to Nu	clear Explosion	116
	5.2.1	Time of	Exposure	116
	5.2.2	Shielding	g	118
	5.2.3	Distance	-	
5.3	Summ	nary		
Refer	ences			

Chapter 6 Preparing for a Nuclear, Chemical, or Biological Attack

6.1	Emergency Preparedness Plan	124
6.2	Emergency Preparedness Training	126
6.3	Emergency Preparedness Practice Drills	127
6.4	Alarm Systems	128
6.5	Air Purification Systems	129
6.6	Water Purification Systems	133
6.7	Personal Protective Equipment	135
6.8	First Aid Kits	139
6.9	Communication Devices	140
6.10	Emergency Lighting	140
6.11	Emergency Food Supplies	140
6.12	Screening Instruments	141
6.13	Summary	143
Refer	rence	144

Chapter 7 Guidance for Emergency Responders

7.1	Priorit	izing Injuries	
7.2	Assess	sing Patients for Contamination	
7.3	Persor	nel Decontamination Procedures	147
	7.3.1	Radiation Decontamination Procedure	
	7.3.2	Chemical Agent Decontamination Method I	
	7.3.3	Chemical Agent Decontamination Method II	149
7.4	Expos	ure Guidance for Emergency Responders	
7.5	Traini	ng For Emergency Responders	
Refer	rences		

Chapter 8 Summary of Recommendations

8.1	Minimizing Exposure to Radiation (Dirty Bomb) and Warfare Agents .	153
8.2	Minimizing Exposure to Radiation from Nuclear Explosion	154
8.3	Preparing for a Nuclear, Chemical, or Biological Attack	154

	8.3.1	Emergency Preparedness	154
	8.3.2	Alarm Systems	155
	8.3.3	Air Purification Systems	155
	8.3.4	Water Purification Systems	156
	8.3.5	Personal Protective Equipment	156
	8.3.6	First Aid Kits	156
	8.3.7	Communication Devices	157
	8.3.8	Eergency Lighting	157
	8.3.9	Emergency Food Supplies	158
	8.3.10	Screening Instruments	158
8.4	Guidar	ce for Emergency Responders	158
Bibli	ography	,	161
Inde	c		167

Dedication

This book is dedicated to the emergency responders who lost their lives in the September 11, 2001 terrorist attack, as well as their families.
It is also dedicated to my father, Francis J. Byrnes, who taught me to enjoy and appreciate the fields of science and engineering, and provided me with guidance and encouragement throughout my professional career.

MEB

Abbreviations and Acronyms

AC Hydrogen cyanide (blood agent) **ALARA** As low as reasonably achievable **BAL** British Anti-Lewisite CIA Central Intelligence Organization **CK** Cyanogen chloride (blood agent) **CX** Phosgene oxime **DFSH** Duratek Federal Services Hanford **DFSNW** Duratek Federal Services Northwest **DNA** Deoxyribonucleic acid **DNT** Dinitotoluene ECD Electron capture detector **ED** Ethyldichloroarsine (arsenical blister agent) EGDN Ethylene glycol dinitrate FH Fluor Hanford **FID** Flame ionization detector g Gram GA Tabun (nerve agent) **GB** Sarin (nerve agent) GC Gas chromatography **GD** Soman (nerve agent) HAZMAT Hazardous materials HD Distilled mustard **HEPA** High efficiency particulate arrestor HL Mustard-lewisite mixture HMX Cyclotetramethylenetetranitramine HN-1 2,2-Dichlorotriethylamine (nitrogen mustard agent 1) HN-2 2,2-Dichloro-N-methyldiethylamine (nitrogen mustard agent 2) HN-3 2,2,2-Trichlorotriethylamine (nitrogen mustard agent 3) **HNS** Hexanitrostilbene **HPLC** High-performance liquid chromatography HT Distilled mustard combined with bis(2-chloroethyl sulfide) monoxide **IDLH** Immediately dangerous to life or health kg Kilogram L Lewisite (arsenical blister agent) lb Pound LMNR Lead mononitoresorcinate LNT Linear no threshold **KDNBF** Potassium dinitrobenzofurozan KGB Komitet Gosudarstvennio Bezopaznosti