

AAOS

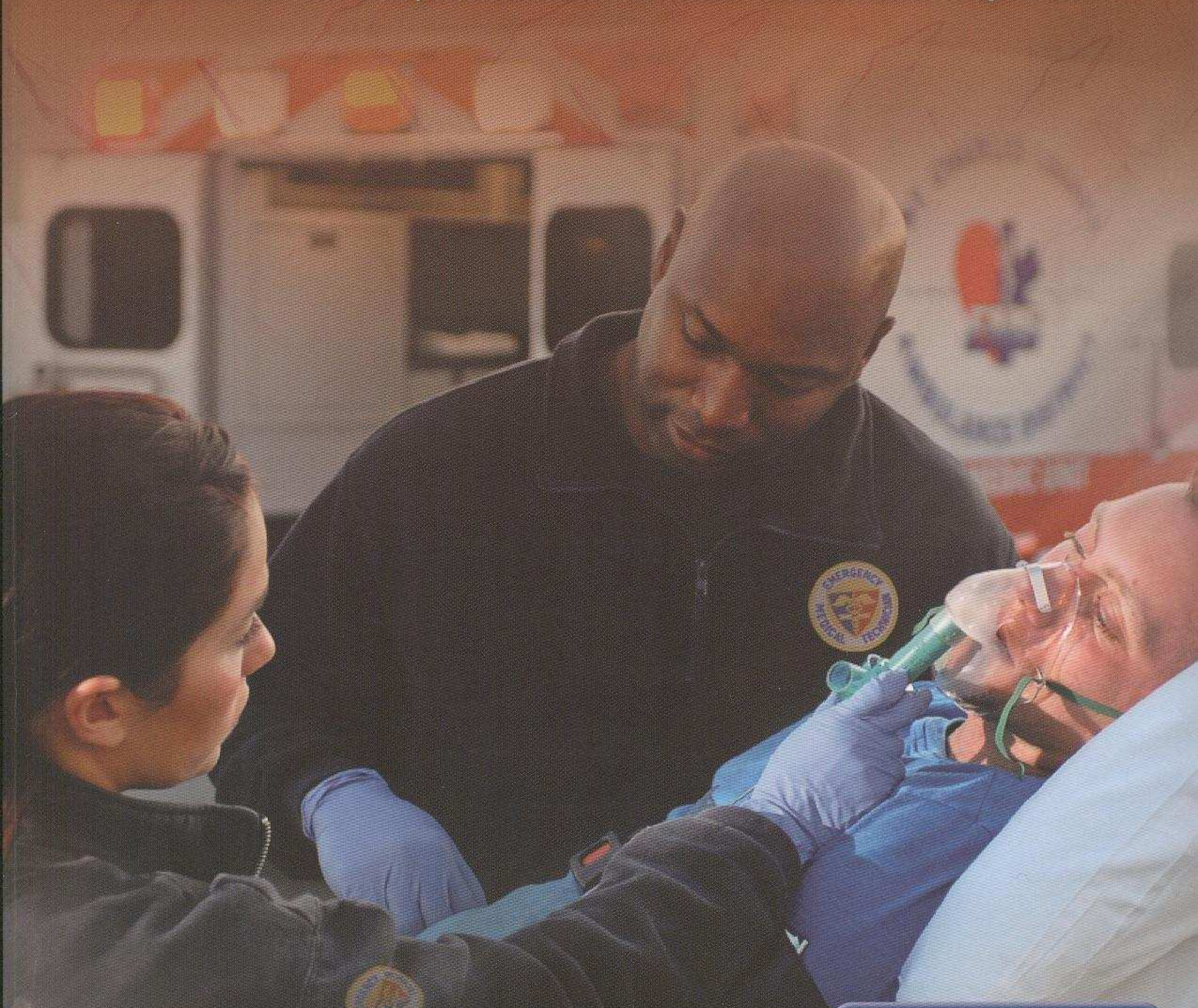
40th Anniversary
ORANGE BOOK SERIES

Tenth Edition

Y 2013
7490

Emergency

Care and Transportation of the Sick and Injured



Series Editor: Andrew N. Pollak, MD, FAAOS

INCLUDES ONLINE
ACCESS CODE

Contents

Section 1: Preparatory 2

CHAPTER 1 EMS Systems	4
Introduction	5
Course Description	5
EMT Training: Focus and Requirements	7
Licensure Requirements	8
Overview of the EMS System	8
Levels of Training	9
Components of the EMS System	14
Roles and Responsibilities of the EMT	23
Prep Kit	28
CHAPTER 2 Workforce Safety and Wellness	32
Introduction	33
Infectious Diseases	33
Routes of Transmission	33
Risk Reduction and Prevention for Infectious and Communicable Diseases	35
Establishing an Infection Control Routine	40
Immunity	43
General Postexposure Management	45
Stress Management on the Job	45
Workplace Issues	52
Emotional Aspects of Emergency Care	54
Death and Dying	55
Caring for Critically Ill and Injured Patients	58
Stressful Situations	61
Scene Safety	62
Protective Clothing: Preventing Injury	67
Violent Situations	70
Behavioral Emergencies	71
Prep Kit	75
CHAPTER 3 Medical, Legal, and Ethical Issues	78
Introduction	79
Consent	79
The Right to Refuse Treatment	82
Confidentiality	83
Advance Directives	84
Physical Signs of Death	85
Special Situations	87
Scope of Practice	87
Standards of Care	87
Duty to Act	90
Negligence	90
Abandonment	91
Assault and Battery and Kidnapping	91
Defamation	92
Good Samaritan Laws and Immunity	92
Records and Reports	93
Special Mandatory Reporting Requirements	93

Ethical Responsibilities	95
The EMT in Court	96
Prep Kit	101

CHAPTER 4 Communications and Documentation 106

Introduction	107
Therapeutic Communication	107
Written Communications and Documentation	119
Communications Systems and Equipment	127
Radio Communications	130
Prep Kit	139

CHAPTER 5 The Human Body 142

Introduction	143
Topographic Anatomy	143
The Skeletal System: Anatomy	147
The Skeletal System: Physiology	153
The Musculoskeletal System: Anatomy	153
The Musculoskeletal System: Physiology	154
The Respiratory System: Anatomy	155
The Respiratory System: Physiology	158
The Circulatory System: Anatomy	163
The Circulatory System: Physiology	170
The Nervous System: Anatomy and Physiology	173
The Integumentary System (Skin): Anatomy	177
The Integumentary System (Skin): Physiology	178
The Digestive System: Anatomy	179
The Digestive System: Physiology	182
The Endocrine System: Anatomy and Physiology	183
The Urinary System: Anatomy and Physiology	184
The Genital System: Anatomy and Physiology	185
Life Support Chain	186
Pathophysiology	188
Prep Kit	193

CHAPTER 6 Life Span Development 200

Introduction	201
Infants	201
Toddlers and Preschoolers	205
School-Age Children	206
Adolescents (Teenagers)	206
Early Adults	208
Middle Adults	208
Late Adults	209
Prep Kit	216

Section 2: Pharmacology 218

CHAPTER 7 Principles of Pharmacology 220

Introduction	221
How Medications Work	221
Medication Forms	224

General Steps in Administering Medication	227
Medication Administration and the EMT	228
Medications Used by EMTs	229
Patient Medications	239
Prep Kit	244

Section 3: Patient Assessment 248

CHAPTER 8 Patient Assessment	250
Introduction	253
Scene Size-up	255
Primary Assessment	261
History Taking	280
Secondary Assessment	289
Reassessment	306
Prep Kit	311

Section 4: Airway 316

CHAPTER 9 Airway Management	318
Introduction	319
Anatomy of the Respiratory System	319
Physiology of Breathing	323
Pathophysiology of Respiration	329
Patient Assessment	331
Opening the Airway	335
Basic Airway Adjuncts	338
Suctioning	343
Maintaining the Airway	346
Supplemental Oxygen	346
Oxygen-Delivery Equipment	351
Assisted and Artificial Ventilation	353
Continuous Positive Airway Pressure	361
Special Considerations	365
Foreign Body Airway Obstruction	366
Prep Kit	372

Section 5: Shock and Resuscitation 378

CHAPTER 10 Shock	380
Introduction	381
Pathophysiology	381
Causes of Shock	384
Types of Shock	385
The Progression of Shock	389
Patient Assessment for Shock	390
Emergency Medical Care for Shock	393
Prep Kit	409
CHAPTER 11 BLS Resuscitation	412
Introduction	413
Elements of BLS	413

The System Components of CPR	414
Automated External Defibrillation	415
Assessing the Need for BLS	416
Positioning the Patient	417
Assessing ABCs	417
One-Rescuer Adult CPR	424
Two-Rescuer Adult CPR	425
Infant and Child CPR	430
Interrupting CPR	436
When Not to Start BLS	436
When to Stop BLS	437
Foreign Body Airway Obstruction in Adults	437
Foreign Body Obstruction in Infants and Children	441
Prep Kit	448

Section 6: Medical 450

CHAPTER 12 Medical Overview	452
Introduction	453
Patient Assessment	453
Management: Transport and Destination	459
Infectious Diseases	460
Common or Serious Communicable Diseases	461
Conclusion	467
Prep Kit	471
CHAPTER 13 Respiratory Emergencies	474
Introduction	475
Anatomy of the Respiratory System	475
Physiology of Respiration	476
Pathophysiology	476
Causes of Dyspnea	479
Patient Assessment	491
Emergency Medical Care	500
Treatment of Specific Conditions	505
Epidemic and Pandemic Considerations	507
Age-Related Assessment and Management	508
Prep Kit	520
CHAPTER 14 Cardiovascular Emergencies	524
Introduction	525
Anatomy and Physiology	525
Pathophysiology	531
Patient Assessment	538
Heart Surgeries and Pacemakers	543
Cardiac Arrest	545
Emergency Medical Care for Cardiac Arrest	550
Prep Kit	562
CHAPTER 15 Neurologic Emergencies	566
Introduction	567
Anatomy and Physiology	567
Pathophysiology	568
Headache	568
Stroke	570
Seizures	573
Altered Mental Status	576

Patient Assessment	578	Agitated Delirium	709
Emergency Medical Care	585	Medicolegal Considerations	710
Prep Kit	594	Restraint	712
CHAPTER 16 Gastrointestinal and Urologic		The Potentially Violent Patient	713
Emergencies	598	Prep Kit	721
Introduction	599	CHAPTER 21 Gynecologic Emergencies	724
Anatomy and Physiology	599	Introduction	725
Pathophysiology	601	Anatomy and Physiology	725
Patient Assessment	607	Pathophysiology	726
Emergency Medical Care	612	Patient Assessment	728
Kidney Dialysis	612	Emergency Medical Care	731
Prep Kit	618	Assessment and Management of Specific Conditions	732
CHAPTER 17 Endocrine and Hematologic		Prep Kit	741
Emergencies	620		
Introduction	621	Section 7: Trauma	744
Anatomy and Physiology	621	CHAPTER 22 Trauma Overview	746
Pathophysiology	621	Introduction	747
Patient Assessment of Diabetes	626	Energy and Trauma	747
Emergency Medical Care for Diabetic Emergencies	630	Mechanism of Injury Profiles	749
Problems Associated With Diabetes	632	Blunt and Penetrating Trauma	749
Hematologic Emergencies	633	Blunt Trauma	750
Anatomy and Physiology	633	Penetrating Trauma	758
Pathophysiology	633	Blast Injuries	760
Patient Assessment of Hematologic Disorders	635	Multisystem Trauma	762
Emergency Medical Care for Hematologic Disorders	636	Patient Assessment	762
Prep Kit	643	Management: Transport and Destination	764
CHAPTER 18 Immunologic Emergencies	646	Prep Kit	774
Introduction	647	CHAPTER 23 Bleeding	776
Anatomy and Physiology	647	Introduction	777
Pathophysiology	647	Anatomy and Physiology of the Cardiovascular	
Insect Stings	648	System	777
Patient Assessment of an		Pathophysiology and Perfusion	780
Immunologic Emergency	649	External Bleeding	781
Emergency Medical Care of		Internal Bleeding	783
Immunologic Emergencies	654	Patient Assessment for External and Internal	
Prep Kit	665	Bleeding	784
CHAPTER 19 Toxicology	668	Emergency Medical Care for External Bleeding	788
Introduction	669	Emergency Medical Care for Internal Bleeding	794
Identifying the Patient and the Poison	669	Prep Kit	802
How Poisons Get Into the Body	670	CHAPTER 24 Soft-Tissue Injuries	804
Patient Assessment	676	Introduction	805
Emergency Medical Care	678	The Anatomy and Physiology of the Skin	805
Specific Poisons	679	Pathophysiology	806
Food Poisoning	686	Closed and Open Injuries	808
Plant Poisoning	687	Patient Assessment of Closed and Open Injuries	811
Prep Kit	697	Emergency Medical Care for Closed Injuries	817
CHAPTER 20 Psychiatric Emergencies	700	Emergency Medical Care for Open Injuries	817
Introduction	701	Burns	822
Myth and Reality	701	Patient Assessment of Burns	831
Defining a Behavioral Crisis	702	Emergency Medical Care for Burns	834
The Magnitude of Mental Health Problems	702	Dressing and Bandaging	836
Pathology	703	Prep Kit	847
Safe Approach to a Behavioral Crisis	703	CHAPTER 25 Face and Neck Injuries	850
Patient Assessment	704	Introduction	851
Acute Psychosis	708	Anatomy and Physiology	851
Suicide	708		

Common Complaints and the Leading Causes of Death in Elderly People	1216
Special Considerations in Assessing a Geriatric Medical Patient	1217
The GEMS Diamond	1221
Changes in the Body	1223
Changes in the Respiratory System	1223
Changes in the Cardiovascular System	1225
Changes in the Nervous System	1228
Changes in the Gastrointestinal System	1231
Changes in the Renal System	1232
Changes in the Endocrine System	1233
Changes in the Immune System	1234
Changes in the Musculoskeletal System	1234
Changes in Skin	1234
Toxicology	1235
Psychiatric Emergencies	1235
Trauma and Geriatric Patients	1236
Special Considerations in Assessing Geriatric Trauma Patients	1238
Falls and Trauma	1240
Environmental Injury	1241
Response to Nursing and Skilled Care Facilities	1241
Advance Directives	1242
Elder Abuse and Neglect	1243
Prep Kit	1256
CHAPTER 34 Patients With Special Challenges	1260
Introduction	1261
Developmental Disability	1261
Sensory Disabilities	1264
Physical Disabilities	1266
Bariatric Patients	1268
Patients With Medical Technology Assistance	1269
Patient Assessment Guidelines	1273
Home Care	1273
Hospice Care and Terminally Ill Patients	1274
Poverty and Homelessness	1275
Prep Kit	1279
Section 9: EMS Operations 1282	
CHAPTER 35 Lifting and Moving Patients	1284
Introduction	1285
Moving and Positioning the Patient	1285
Body Mechanics	1286
Weight and Distribution	1290
Directions and Commands	1295
Principles of Safe Reaching and Pulling	1296
General Considerations	1299
Emergency Moves	1300
Urgent Moves	1300
Nonurgent Moves	1306
Geriatrics	1311
Bariatrics	1312
Patient-Moving Equipment	1313
Medical Restraints	1321
Personnel Considerations	1322
Prep Kit	1326
CHAPTER 36 Transport Operations	1328
Introduction	1329
Emergency Vehicle Design	1329
Phases of an Ambulance Call	1330
Defensive Ambulance Driving Techniques	1344
Air Medical Operations	1351
Prep Kit	1363
CHAPTER 37 Vehicle Extrication and Special Rescue	1366
Introduction	1367
Safety	1367
Vehicle Safety Systems	1367
Fundamentals of Extrication	1368
Specialized Rescue Situations	1376
Prep Kit	1384
CHAPTER 38 Incident Management	1386
Introduction	1387
National Incident Management System	1387
Incident Command System	1388
EMS Response Within the Incident Command System	1391
Medical Incident Command	1393
Mass-Casualty Incidents	1394
Triage	1396
Disaster Management	1400
Introduction to Hazardous Materials	1400
Recognizing a Hazardous Material	1401
Prep Kit	1421
CHAPTER 39 Terrorism Response and Disaster Management	1426
Introduction	1427
What Is Terrorism?	1427
Weapons of Mass Destruction	1428
EMT Response to Terrorism	1429
Chemical Agents	1432
Biologic Agents	1439
Radiologic/Nuclear Devices	1445
Incendiary and Explosive Devices	1447
Prep Kit	1454
Section 10: ALS Techniques 1460	
CHAPTER 40 ALS Assist	1462
Introduction	1463
Advanced Airway Techniques	1463
Anatomy and Physiology of the Airway	1463
Basic Airway Management	1465
Endotracheal Intubation	1465
Multilumen Airways	1476
Single Lumen Airway	1477

Gastric Tubes	1477
Continuous Positive Airway Pressure	1478
Intravenous Therapy	1479
Cardiac Monitoring	1490
Prep Kit	1502

APPENDIX: Medical Terminology	1506
GLOSSARY	1513
INDEX	1539
CREDITS	1565

Skill Drills

Skill Drill 2-1 Handwashing	37	Skill Drill 18-1 Using an EpiPen Auto-injector	656
Skill Drill 2-2 Proper Glove Removal Technique	38	Skill Drill 18-2 Using a Twinject Auto-injector	658
Skill Drill 2-3 Managing a Potential Exposure Situation	42	Skill Drill 23-1 Controlling External Bleeding	789
Skill Drill 7-1 Oral Medication Administration	233	Skill Drill 23-2 Applying a Commercial Tourniquet	791
Skill Drill 8-1 Rapid Scan	276	Skill Drill 23-3 Controlling Epistaxis	794
Skill Drill 8-2 Performing the Full-Body Scan	292	Skill Drill 23-4 Controlling Internal Bleeding	796
Skill Drill 8-3 Obtaining Blood Pressure by Auscultation	299	Skill Drill 24-1 Controlling Bleeding From an Open Soft-Tissue Injury	818
Skill Drill 9-1 Performing Pulse Oximetry	335	Skill Drill 24-2 Stabilizing an Impaled Object	820
Skill Drill 9-2 Positioning the Unconscious Patient	336	Skill Drill 24-3 Caring for Burns	834
Skill Drill 9-3 Inserting an Oral Airway	339	Skill Drill 25-1 Removing a Foreign Object From Under the Upper Eyelid	862
Skill Drill 9-4 Inserting an Oral Airway With a 90° Rotation	341	Skill Drill 25-2 Stabilizing a Foreign Object Impaled in the Eye	863
Skill Drill 9-5 Inserting a Nasal Airway	342	Skill Drill 25-3 Controlling Bleeding From a Neck Injury	874
Skill Drill 9-6 Suctioning a Patient's Airway	345	Skill Drill 26-1 Performing Manual In-Line Stabilization	908
Skill Drill 9-7 Placing an Oxygen Cylinder Into Service	350	Skill Drill 26-2 Immobilizing a Patient to a Long Backboard	910
Skill Drill 9-8 Performing Mouth-to-Mask Ventilation	357	Skill Drill 26-3 Immobilizing a Patient Found in a Sitting Position	912
Skill Drill 9-9 Using the CPAP	364	Skill Drill 26-4 Immobilizing a Patient Found in a Standing Position	915
Skill Drill 10-1 Treating Shock	394	Skill Drill 26-5 Application of a Cervical Collar	917
Skill Drill 11-1 Positioning the Patient	418	Skill Drill 26-6 Removing a Helmet	922
Skill Drill 11-2 Performing Chest Compressions	424	Skill Drill 29-1 Assessing Neurovascular Status	1016
Skill Drill 11-3 Performing One-Rescuer Adult CPR	426	Skill Drill 29-2 Caring for Musculoskeletal Injuries	1019
Skill Drill 11-4 Performing Two-Rescuer Adult CPR	428	Skill Drill 29-3 Applying a Rigid Splint	1022
Skill Drill 11-5 Performing Infant Chest Compressions	434	Skill Drill 29-4 Applying a Zippered Air Splint	1023
Skill Drill 11-6 Performing CPR on a Child	435	Skill Drill 29-5 Applying an Unzippered Air Splint	1024
Skill Drill 11-7 Removing a Foreign Body Airway Obstruction in an Unconscious Child	443	Skill Drill 29-6 Applying a Vacuum Splint	1025
Skill Drill 13-1 Assisting a Patient With a Metered-Dose Inhaler	503	Skill Drill 29-7 Applying a Hare Traction Splint	1026
Skill Drill 13-2 Assisting a Patient With a Small-Volume Nebulizer	504	Skill Drill 29-8 Applying a Sager Traction Splint	1029
Skill Drill 14-1 Administration of Nitroglycerin	544	Skill Drill 29-9 Applying a Pneumatic Antishock Garment (PASG)	1032
Skill Drill 14-2 AED and CPR	552	Skill Drill 29-10 Splinting the Hand and Wrist	1039
Skill Drill 17-1 Administering Glucose	631	Skill Drill 30-1 Treating for Heat Exhaustion	1074

Skill Drill 30-2 Stabilizing a Suspected Spinal Injury in the Water 1078

Skill Drill 31-1 Delivering the Infant 1121

Skill Drill 32-1 Positioning the Airway in a Pediatric Patient 1161

Skill Drill 32-2 Inserting an Oropharyngeal Airway in a Pediatric Patient 1174

Skill Drill 32-3 Inserting a Nasopharyngeal Airway in a Pediatric Patient 1175

Skill Drill 32-4 One-Rescuer Bag-Mask Device Ventilation on a Pediatric Patient 1179

Skill Drill 32-5 Immobilizing a Patient 1188

Skill Drill 32-6 Immobilizing a Patient in a Car Seat 1190

Skill Drill 32-7 Immobilizing a Patient Out of a Car Seat 1191

Skill Drill 35-1 Performing the Power Lift 1288

Skill Drill 35-2 Performing the Diamond Carry 1291

Skill Drill 35-3 Performing the One-Handed Carrying Technique 1292

Skill Drill 35-4 Carrying a Patient on Stairs 1294

Skill Drill 35-5 Using a Stair Chair 1297

Skill Drill 35-6 Performing the Rapid Extrication Technique 1304

Skill Drill 35-7 The Direct Ground Lift 1307

Skill Drill 35-8 Extremity Lift 1308

Skill Drill 35-9 Direct Carry 1309

Skill Drill 35-10 Using a Scoop Stretcher 1311

Skill Drill 35-11 Loading a Stretcher into an Ambulance 1317

Skill Drill 40-1 Performing the Sellick Maneuver 1470

Skill Drill 40-2 Performing Orotracheal Intubation 1472

Skill Drill 40-3 Spiking the Bag 1482

Skill Drill 40-4 Starting an IV 1484

Brief Contents

Section 1: Preparatory 2

CHAPTER 1 EMS Systems	4
CHAPTER 2 Workforce Safety and Wellness	32
CHAPTER 3 Medical, Legal, and Ethical Issues	78
CHAPTER 4 Communications and Documentation	106
CHAPTER 5 The Human Body	142
CHAPTER 6 Life Span Development	200

Section 2: Pharmacology 218

CHAPTER 7 Principles of Pharmacology	220
---	-----

Section 3: Patient Assessment 248

CHAPTER 8 Patient Assessment	250
---	-----

Section 4: Airway 316

CHAPTER 9 Airway Management	318
--	-----

Section 5: Shock and Resuscitation 378

CHAPTER 10 Shock	380
CHAPTER 11 BLS Resuscitation	412

Section 6: Medical 450

CHAPTER 12 Medical Overview	452
CHAPTER 13 Respiratory Emergencies	474
CHAPTER 14 Cardiovascular Emergencies	524
CHAPTER 15 Neurologic Emergencies	566
CHAPTER 16 Gastrointestinal and Urologic Emergencies	598
CHAPTER 17 Endocrine and Hematologic Emergencies	620
CHAPTER 18 Immunologic Emergencies	646
CHAPTER 19 Toxicology	668
CHAPTER 20 Psychiatric Emergencies	700
CHAPTER 21 Gynecologic Emergencies	724

Section 7: Trauma 744

CHAPTER 22 Trauma Overview	746
CHAPTER 23 Bleeding	776
CHAPTER 24 Soft-Tissue Injuries	804
CHAPTER 25 Face and Neck Injuries	850
CHAPTER 26 Head and Spine Injuries	886
CHAPTER 27 Chest Injuries	934
CHAPTER 28 Abdominal and Genitourinary Injuries	966
CHAPTER 29 Orthopaedic Injuries	1000
CHAPTER 30 Environmental Emergencies	1060

Section 8: Special Patient Populations 1104

CHAPTER 31 Obstetrics and Neonatal Care	1106
CHAPTER 32 Pediatric Emergencies	1146
CHAPTER 33 Geriatric Emergencies	1214
CHAPTER 34 Patients With Special Challenges	1260

Section 9: EMS Operations 1282

CHAPTER 35 Lifting and Moving Patients	1284
CHAPTER 36 Transport Operations	1330
CHAPTER 37 Vehicle Extrication and Special Rescue	1366
CHAPTER 38 Incident Management	1386
CHAPTER 39 Terrorism Response and Disaster Management	1426

Section 10: ALS Techniques 1460

CHAPTER 40 ALS Assist	1462
APPENDIX: Medical Terminology	1506
GLOSSARY	1513
INDEX	1539
CREDITS	1565