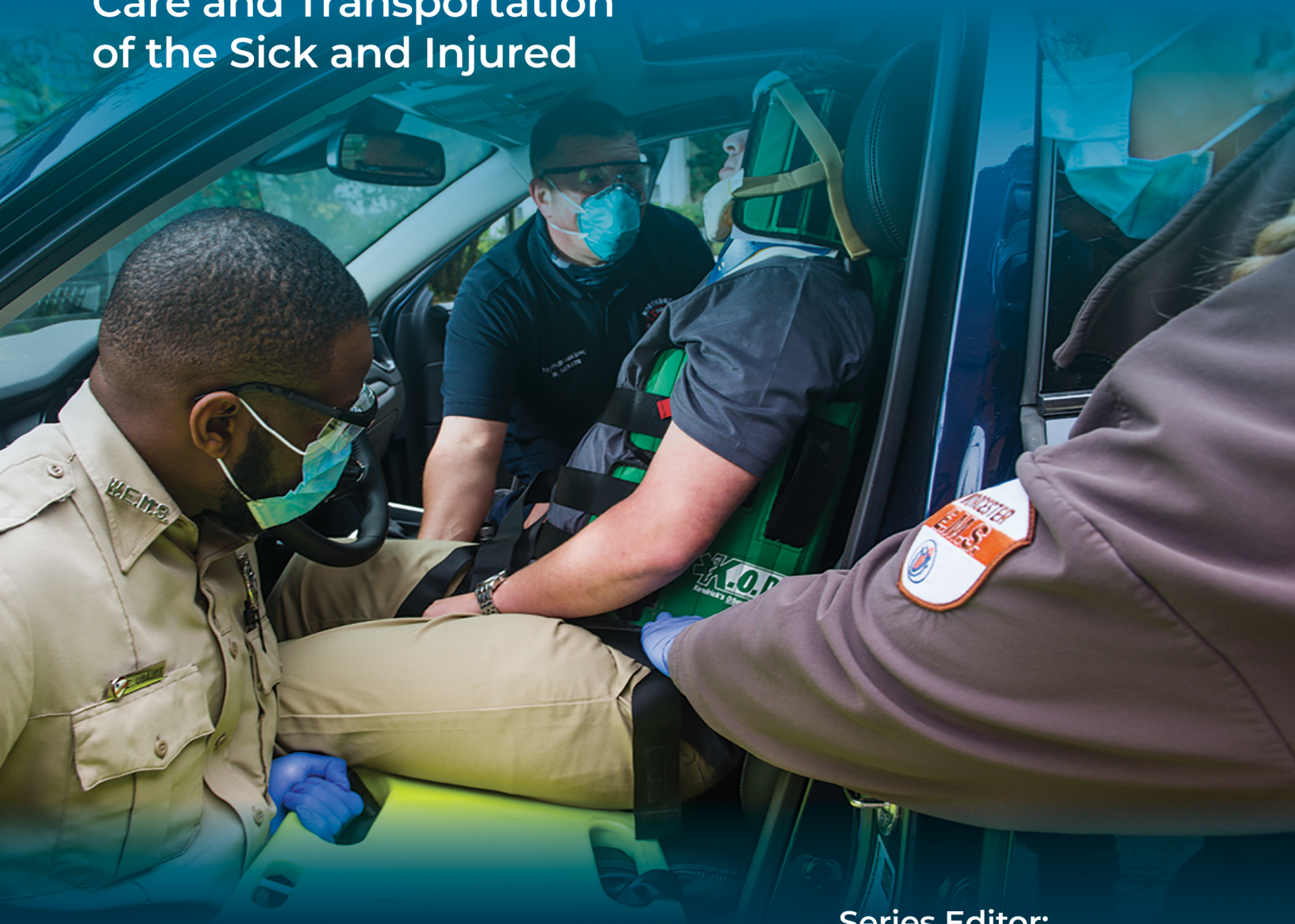


ADVANCED Emergency

Care and Transportation
of the Sick and Injured



Series Editor:
Alfonso Mejia, MD, MPH

FOURTH EDITION

ADVANCED Emergency

Care and Transportation
of the Sick and Injured

AAOS
AMERICAN ACADEMY OF ORTHOPAEDIC SURGEONS

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This textbook is intended solely as a guide to the appropriate procedures to be employed when rendering emergency care to the sick and injured. It is not intended as a statement of the standards of care required in any particular situation, because circumstances and the patient's physical condition can vary widely from one emergency to another. Nor is it intended that this textbook shall in any way advise emergency personnel concerning legal authority to perform the activities or procedures discussed. Such local determination should be made only with the aid of legal counsel. The patients described in the *You are the Provider* and *Assessment in Action* scenarios throughout the text are fictitious.

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Brief Contents

SECTION 1 Preparatory	1	15 BLS Resuscitation	803
1 EMS Systems	2	SECTION 7 Medical	853
2 Workforce Safety and Wellness	33	16 Medical Overview	854
3 Medical, Legal, and Ethical Issues	89	17 Respiratory Emergencies	881
4 Communications and Documentation	123	18 Cardiovascular Emergencies	939
5 Medical Terminology	179	19 Neurologic Emergencies	991
6 Lifting and Moving Patients	215	20 Gastrointestinal and Urologic Emergencies	1033
SECTION 2 The Human Body and Human Systems	261	21 Endocrine and Hematologic Emergencies	1067
7 The Human Body	262	22 Immunologic Emergencies	1111
8 Pathophysiology	367	23 Toxicology	1137
9 Life Span Development	429	24 Psychiatric Emergencies	1179
SECTION 3 Patient Assessment	451	25 Gynecologic Emergencies	1213
10 Patient Assessment	452	SECTION 8 Trauma	1237
SECTION 4 Airway	539	26 Trauma Overview	1238
11 Airway Management	540	27 Bleeding	1275
SECTION 5 Pharmacology	635	28 Soft-Tissue Injuries	1311
12 Principles of Pharmacology	636	29 Face and Neck Injuries	1355
13 Vascular Access and Medication Administration	687	30 Head and Spine Injuries	1395
SECTION 6 Shock and Resuscitation	765	31 Chest Injuries	1463
14 Shock	766	32 Abdominal and Genitourinary Injuries	1501
		33 Orthopaedic Injuries	1531
		34 Environmental Emergencies	1597

SECTION 9 Special Patient Populations	1655	41 Incident Management	1967
35 Obstetrics and Neonatal Care	1656	42 Terrorism Response and Disaster Management	1994
36 Pediatric Emergencies	1715	Glossary	2027
37 Geriatric Emergencies	1793	Index	2101
38 Patients With Special Challenges	1847		
SECTION 10 EMS Operations	1881		
39 Transport Operations	1882		
40 Vehicle Extrication, Special Rescue, and Hazardous Materials	1925		

Contents

Section 1 Preparatory

1

1 EMS Systems

2

Introduction	3
Course Description	3
AEMT Training: Focus and Requirements	5
Licensure Requirements	6
Overview of the EMS System	7
History of EMS	7
Levels of Training	8
Public Basic Life Support and Immediate Aid	11
Emergency Medical Responder	12
Emergency Medical Technician	12
Advanced Emergency Medical Technician	13
Paramedic	13
Components of the EMS System	13
Public Access	14
Communication Systems	14
Clinical Care	15
Human Resources	15
Medical Direction and Control	16
Legislation and Regulation	16
Integration of Health Services	17
Mobile Integrated Healthcare and Community Paramedicine	18
Evaluating Quality and Safety	18
Information Systems	19
System Finance	20
Education Systems	20
Prevention and Public Education	21
EMS Research	23
Transport Considerations and Communication	24
Transport to Specialty Centers	24
Interfacility Transports	25
Working With Hospital Staff	25
Working With Public Safety Agencies	25
Roles and Responsibilities of AEMTs	25
Professional Attributes	26

2 Workforce Safety and Wellness

33

Introduction	34
Protection From Infectious Diseases	34
Routes of Transmission	35
Risk Reduction and Prevention	37
Standard Precautions	37
Proper Hand Hygiene	39
Gloves	39
Eye Protection	42
Gowns	42

Masks, Respirators, and Barrier Devices	42
Proper Disposal of Sharps	43
Employer Responsibilities	44
Establishing an Infection Control Routine	44
Immunity	47
Immunizations	48
General Postexposure Management	49
Postexposure Prophylaxis and Treatment for Significant Exposure	50
Illness and Injury Prevention	51
Scene Safety and Personal Protection	52
Scene Hazards	53
Protective Clothing: Preventing Injury	58
Cold Weather Clothing	59
Turnout Gear	59
Gloves	60
Helmets	60
Boots	61
Eye Protection	61
Ear Protection	61
Skin Protection	61
Body Armor	62
Stress	62
Stress Management	64
Burnout	66
Compassion Fatigue	66
Peer Support and Suicide Prevention	67
Wellness	68
Nutrition	69
Exercise and Relaxation	70
Avoidance of Tobacco Use or Cessation	71
Sleep	71
Disease Prevention	72
Balancing Work, Family, and Health	72
Substance Abuse	73
Workplace Issues	74
Diversity on the Job	74
Sexual Harassment	74
Death and Dying	75
The Grieving Process	76
Working With Family Members	76
Working With the Patient	77
Dealing With the Death of a Child	79
Caring for Critically Ill and Injured Patients	80
Avoid Sad and Grim Comments	80
Orient the Patient	80
Be Honest	80
Initial Refusal of Care	81
Allow for Hope	81
Locate and Notify Family Members	81
Injured and Critically Ill Children	81
Uncertain Situations	82

3 Medical, Legal, and Ethical Issues 89

Introduction	90
Scope of Practice	90
Standards of Care	91
Standards Imposed by Local Custom	92
Standards Imposed by Law	92
Professional or Institutional Standards	93
Standards Imposed by Textbooks	94
EMS-Enabling Legislation	94
Standards Imposed by States	94
Negligence	95
Duty	96
Breach of Duty	96
Damages	97
Proximate Cause	97
Abandonment	97
Assault, Battery, Kidnapping, and False Imprisonment	98
Defamation, Libel, and Slander	99
Good Samaritan Laws and Immunity	99
Consent	100
Expressed Consent	101
Implied Consent	102
Minors and Consent	103
Involuntary Consent	104
Forcible Restraint	104
The Right to Refuse Treatment	105
Advance Directives	106
Physician Orders for Life-Sustaining Treatment	108
Ethical Principles and Moral Obligations	108
Confidentiality	109
Health Insurance Portability and Accountability Act	110
Social Media	111
Records and Reports	111
Mandatory Reporting Requirements	112
Scene of a Crime	112
The Deceased	113
Physical Signs of Death	113
Presumptive Signs of Death	113
Definitive Signs of Death	114
Coroner and Medical Examiner Cases	114
Special Situations	115
Organ Donors	115
Medical Identification Insignia	115

4 Communications and Documentation 123

Introduction	124
Therapeutic Communication	125
Age, Culture, and Personal Experience	126
Nonverbal Communication	127
Verbal Communication	129
Communicating With Specific Types of Patients	134
Transfer of Patient Care	139
Communications Systems and Equipment	141
Regulation of Radio and Telephone Communications	142
Radio Communications	142
Cell/Satellite Telephones	146
Digital Equipment	146
Other Communications Equipment	147
The EMS Communication Process	149
Notification	149

Dispatch	150
En Route Communications	151
Communicating With Medical Control and Hospitals	151
Effective Radio Communications	155
Written Communications and Documentation	156
Types of PCRs	157
Legal Issues of a PCR	158
Components of a PCR	160
Medical Terminology	162
Reporting Errors	164
Minimum Requirements and Billing	165
Documenting Refusal of Care	166
Special Reporting Situations	167
Submitting the Report	170

5 Medical Terminology 179

Introduction	180
Origins	180
Eponyms	180
Homonyms	182
Antonyms	182
Synonyms	182
Components of a Medical Term	183
Prefixes	183
Numerical Prefixes	184
Suffixes	184
Word Roots	184
Colors	185
Combining Forms and Vowels	185
Compound Words	186
Plural Endings	187
Topographic Anatomy	187
Anatomic Planes and Axes of the Body	187
Specific Areas of the Body	189
Body Cavities	190
Directional Terms	191
Movement and Positional Terms	193
Other Directional Terms	194
Prefixes Indicating Position, Direction, and Location	195
Position of the Patient	195
Abbreviations, Acronyms, and Symbols	197
Medical Abbreviations	198
Error-Prone Abbreviations	198
Symbols	198
Medical Terminology Related to Pharmacology	198
Master Tables	199

6 Lifting and Moving Patients 215

Introduction	216
Body Mechanics	217
Anatomy Review	217
Proper Lifting Technique	219
Proper Hold	219
Directions and Commands	221
Principles of Safe Reaching and Pulling	222
Moving a Patient Across a Bed	223
The Two-Person Body Drag	223
Log Rolling a Patient	224
Rolling a Wheeled Ambulance Stretcher	224
Lifting and Carrying a Patient on a Backboard or Stretcher	225
Weight and Distribution	225

Planning the Move	226
The Diamond Carry	226
The One-Handed Carrying Technique	228
Emergency Moves	228
Urgent Moves	230
Rapid Extrication Technique	231
Nonurgent Moves	235
Direct Ground Lift	236
Extremity Lift	237
Transfer Moves	237
Geriatrics	241
Bariatrics	243
Patient-Moving Equipment	243
The Wheeled Ambulance Stretcher	243
Bariatric Stretchers	245
Pneumatic and Electronic Powered Wheeled Stretchers	245
Loading the Wheeled Stretcher Into an Ambulance	246
Portable/Folding Stretchers	248
Flexible Stretchers	248
Backboards	248
Vacuum Mattresses	249
Basket Stretchers	250
Scoop Stretchers	250
Stair Chairs	250
Moving a Patient on Stairs With a Backboard	252
Neonatal Isolettes	253
Decontamination	253
Patient Positioning	253
Medical Restraints	254
Personnel Considerations	254

SECTION 2 The Human Body and Human Systems

261

7 The Human Body

262

Introduction	263
Cells	263
Cell Structure	263
Cell Membrane	263
Cytoplasm	264
Organelles	264
Nucleus	266
Life Cycle of the Cell	267
Interphase	267
Cell Division and Cytoplasmic Division	267
Differentiation	267
Cell Division and Cancer	267
Cellular Respiration	268
Glycolysis	268
Krebs Cycle	269
Electron Transport Chain	269
Cellular Transport Mechanisms	270
Diffusion	270
Filtration	270
Facilitated Diffusion	271
Osmosis	272
Body Fluid Balance	272
Organ Systems	274
The Skeletal System: Anatomy	274
Bones	274

Joints	276
The Axial Skeleton	278
The Neck	281
The Spinal Column	282
The Thorax	283
The Appendicular Skeleton	284
The Skeletal System: Physiology	289
The Musculoskeletal System	290
Skeletal Component	290
Muscular Component	291
The Respiratory System: Anatomy	293
The Upper Airway	293
The Lower Airway	295
Muscles of Breathing	297
The Respiratory System: Physiology	299
Respiration	299
Lung Volumes	304
Characteristics of Normal Breathing	305
The Circulatory System: Anatomy	305
The Heart	306
The Vascular System	312
Blood Composition	320
The Circulatory System: Physiology	322
Normal Circulation in Adults	323
Inadequate Circulation in Adults	323
The Function of Blood	324
The Lymphatic System	325
Lymphatic Vessels	325
The Nervous System: Anatomy and Physiology	326
The Central Nervous System	326
The Diencephalon	330
The Peripheral Nervous System	330
The Eye	332
The Integumentary System (Skin): Anatomy	333
The Integumentary System (Skin): Physiology	335
The Digestive System: Anatomy	336
The Abdomen	336
Mouth	337
Oropharynx	338
Esophagus	338
Stomach	338
Pancreas	338
Liver	338
Small Intestine	339
Large Intestine	339
Appendix	339
Rectum	339
The Digestive System: Physiology	339
The Endocrine System: Anatomy and Physiology	340
The Pituitary Gland and the Hypothalamus	341
The Thyroid Gland	341
The Parathyroid Glands	341
The Pancreas	341
The Adrenal Glands	342
The Reproductive Glands and Hormones	343
The Urinary System: Anatomy and Physiology	343
The Genital System: Anatomy and Physiology	344
The Male Reproductive System and Organs	344
The Female Reproductive System and Organs	345
Life Support Chain	347

8 Pathophysiology

367

Introduction	368
Adaptations in Cells and Tissues	368

Disturbances in Fluid Balance	369
Edema	370
Isotonic Fluid Deficit	371
Electrolyte Imbalances	371
Sodium	371
Potassium	371
Calcium	372
Phosphate	373
Magnesium	373
Disturbances of Acid-Base Balance	374
Types of Acid-Base Imbalance	374
Cellular Injury	378
Hypoxic Injury	379
Chemical Injury	379
Infectious Injury	379
Immunologic and Inflammatory Injury	381
Injurious Genetic Factors	382
Injurious Nutritional Imbalances	382
Injurious Physical Agents or Conditions	382
Apoptosis	382
Abnormal Cell Death	382
Hypoperfusion	383
Types of Shock	384
Central Shock	384
Peripheral Shock	386
Management of Shock	386
Multiple Organ Dysfunction Syndrome	387
The Body's Self-Defense Mechanisms	389
Anatomic Barriers	389
Immune Response	389
Inflammatory Response	396
Chronic Inflammatory Responses	400
Variances in Immunity and Inflammation	400
Hypersensitivity	400
Immune Deficiencies	404
Factors That Cause Disease	405
Controllable Versus Uncontrollable Risk Factors	405
Analysis of Disease Risk	406
Common Familial Diseases and Associated Risk Factors	406
Stress and Disease	415
General Adaptation Syndrome	416
Effects of Chronic Stress	418

9 Life Span Development 429

Introduction	430
Neonates (Birth to 1 Month) and Infants (1 Month to 1 Year)	430
Physical Changes	430
Psychosocial Changes	433
Toddlers (1 to 3 Years) and Preschoolers (3 to 6 Years)	434
Physical Changes	434
Psychosocial Changes	436
School-Age Children (6 to 12 Years)	437
Physical Changes	437
Psychosocial Changes	437
Adolescents (12 to 18 Years)	437
Physical Changes	437
Psychosocial Changes	438
Early Adults (19 to 40 Years)	439
Physical Changes	439
Psychosocial Changes	439
Middle Adults (41 to 60 Years)	440

Physical Changes	440
Psychosocial Changes	440
Older Adults (61 Years and Older)	440
Physical Changes	440
Psychosocial Changes	445

SECTION 3 Patient Assessment 451

10 Patient Assessment 452

Introduction	455
Clinical Decision Making and Critical Thinking	457
Scene Size-up	460
Ensure Scene Safety	461
Determine Mechanism of Injury/Nature of Illness	462
Take Standard Precautions	464
Determine the Number of Patients	465
Consider Additional or Specialized Resources	466
Primary Survey	468
Form a General Impression	469
Assess Level of Consciousness	470
Assess the Airway	472
Assess Breathing	474
Assess Circulation	476
Assess the Patient for Disability	481
Expose Then Cover	481
Performing a Rapid Full-Body Scan	482
Identify and Treat Life Threats	485
Determine Priority of Patient Care and Transport	485
History Taking	489
Investigate the Chief Complaint	489
Investigate the History of Present Illness (OPQRST)	491
Investigate the Past Medical History (SAMPLE History)	494
Secondary Assessment	502
Assess Vital Signs Using the Appropriate Monitoring Devices	503
Systematically Assess the Patient: Full-Body Exam	506
Systematically Assess the Patient: Focused Assessment	506
Reassessment	530
Repeat the Primary Survey	530
Reassess Vital Signs	531
Reassess the Chief Complaint	531
Recheck Interventions	531
Identify and Treat Changes in the Patient's Condition	531
Reassess the Patient	531

SECTION 4 Airway 539

11 Airway Management 540

Introduction	542
Anatomy Review	542
The Upper Airway	543
The Lower Airway	545
Physiology of Breathing	546
Ventilation	548

Oxygenation	551
Respiration	551
Neural Control	553
Chemical Stimuli	553
Pathophysiology of Respiration	554
Hypoxia	554
Ventilation-Perfusion Ratio and Mismatch	554
Factors Affecting Ventilation	555
Factors Affecting Oxygenation and Respiration	556
Acid-Base Balance	558
Patient Assessment: Airway Evaluation	559
Recognizing Adequate Breathing	559
Recognizing Inadequate Breathing	559
Assessment of Respiration	563
Opening the Airway	568
Head Tilt–Chin Lift Maneuver	569
Jaw-Thrust Maneuver	570
Tongue-Jaw Lift Maneuver	571
Maintaining the Airway	572
Suctioning	572
Suctioning Equipment	572
Techniques of Suctioning	574
Tracheobronchial Suctioning of an Intubated Patient	574
Basic Airway Adjuncts	576
Oropharyngeal Airway	576
Nasopharyngeal Airway	578
Supplemental Oxygen	580
Supplemental Oxygen Equipment	580
Operating Procedures	583
Hazards of Supplemental Oxygen	585
Oxygen-Delivery Devices	586
Nonrebreathing Mask	586
Nasal Cannulas	587
Partial Rebreathing Mask	587
Venturi Mask	587
Tracheostomy Masks	588
Oxygen Humidifiers	588
Assisted and Artificial Ventilation	589
Artificial Ventilation	589
Mouth-to-Mouth and Mouth-to-Mask Ventilation	591
The Bag-Mask Device	592
MTV Devices	597
Automatic Transport Ventilators/Resuscitators	597
Continuous Positive Airway Pressure	598
Indications for CPAP	599
Contraindications to CPAP	599
Application of CPAP	600
Complications of CPAP	600
Special Considerations	602
Gastric Distention	602
Laryngectomy, Tracheostomy, Stoma, and Tracheostomy Tubes	602
Suctioning of a Stoma	603
Ventilation of Stoma Patients	604
Tracheostomy Tubes	604
Dental Appliances	604
Facial Bleeding	606
Foreign Body Airway Obstruction	607
Recognition	607
Supraglottic Airway Devices	608
King LT Airway	608
The Laryngeal Mask Airway	610

i-gel	615
The Cobra Perilaryngeal Airway	615
Multilumen Airway Devices	618
Combitube	618
Assisting With ALS Airway Procedures	620
Assisting With Placement of Advanced Airways	620

SECTION 5 Pharmacology

635

12 Principles of Pharmacology

636

Introduction	637
Drug Terminology	638
Medication Names	639
Sources of Drug Information	639
US Regulation of Pharmaceuticals	640
Drug-Related Legislation	640
Manufacturing-Related Regulations	642
Government Agencies That Regulate Drugs	642
The Drug-Approval Process	642
Animal Studies	642
Clinical Trials	642
Drug Storage and Security of Controlled Substances	643
Special Considerations in Drug Therapy	643
Pregnant Patients	643
Pediatric Patients	644
Geriatric Patients	645
Scope of Practice	645
Methods of Drug Classification	645
Nervous System Classifications	646
Analgesics and Antagonists	649
Antianxiety, Sedative, and Hypnotic Drugs	650
Anticonvulsants	650
Stimulants	651
Depressants	651
Psychotherapeutic Drugs	651
Drugs Affecting the Cardiovascular System	651
Drugs Affecting the Respiratory System	653
Drugs Affecting the Pancreas	654
Drugs Affecting the Immunologic System	654
Vitamins and Minerals	654
Fluids and Electrolytes	654
Drug Forms	654
Solid Drugs	654
Liquid Drugs	655
Metered-Dose Inhalers	656
Topical Medications	656
Transcutaneous Medications	656
Gels	657
Gases	658
Routes of Drug Administration	658
Pharmacokinetics: Movement of Drugs Through the Body	659
Principles of Pharmacokinetics	659
Drug Absorption	660
Drug Distribution	660
Biotransformation	660
Drug Elimination	660
Pharmacodynamics	662
Mechanism of Action	662
Drug-Response Relationship	663

Factors Influencing Medication Interactions	664
Predictable Responses	664
Iatrogenic Responses	664
Unpredictable Responses	664
Reducing Medication Errors	665
Specific Medications	668

13 Vascular Access and Medication Administration 687

Introduction	689
Medication Administration	690
Medical Direction	690
The AEMT's Responsibility Associated With Drug Orders	690
Specific Medications	692
Basic Cell Physiology	692
Electrolytes	692
Body Fluid Composition	693
Fluid and Electrolyte Movement	694
Fluid Compartments	696
Fluid Balance	697
IV Fluid Composition	698
Types of IV Solutions	699
IV Techniques and Administration	700
Assembling Your Equipment	701
Choosing an IV Solution	701
Choosing an Administration Set	702
Choosing an IV Site	705
Choosing a Catheter	707
Inserting the IV Catheter	708
Drawing Blood	710
Securing the Line	710
Changing an IV Bag	710
Discontinuing the IV Line	711
Alternative IV Sites and Techniques	715
Troubleshooting IV Therapy	716
Possible Complications of IV Therapy	716
Pediatric IV Therapy Considerations	720
Geriatric IV Therapy Considerations	720
Intraosseous Infusion	721
IO Sites	722
Equipment for IO Infusion	723
Performing IO Infusion	725
Potential Complications of IO Infusion	728
Contraindications to IO Infusion	728
Mathematical Principles Used in Pharmacology	728
Mathematical Principles Used in Pharmacology	729
Calculating Drip Rates	732
Calculating Medication Doses	733
Pediatric Doses	735
Steps for Administering by Specific Routes	735
Administering Enteral Medications	735
Administering Parenteral Medications	736

The Role of the Nervous System	768
Regulation of Blood Flow	769
Respiration and Oxygenation	770
Pathophysiology	770
Compensation for Decreased Perfusion	772
Shock-Related Events at the Capillary and Microcirculatory Levels	774
Multiple-Organ Dysfunction Syndrome	776
Respiratory Impairment	776
Causes of Shock	777
Types of Shock	777
Hypovolemic Shock	777
Cardiogenic Shock	779
Obstructive Shock	780
Distributive Shock	780
The Progression of Shock	785
Compensated Shock	786
Decompensated Shock	786
Irreversible Shock	787
Patient Assessment	787
Scene Size-up	787
Primary Survey	788
History Taking	789
Secondary Assessment	789
Reassessment	789
Emergency Medical Care for Shock	790
IV Therapy	791
Special Considerations in Fluid Resuscitation	793
Assessment and Management of Specific Types of Shock	794
Treating Hypovolemic Shock	794
Treating Cardiogenic Shock	794
Treating Obstructive Shock	795
Treating Septic Shock	795
Treating Neurogenic Shock	796
Treating Anaphylactic Shock	796
Treating Psychogenic Shock	797

15 BLS Resuscitation 803

Introduction	805
Elements of BLS	805
The Components of CPR	807
Assessing the Need for BLS	809
Basic Principles of BLS	810
Automated External Defibrillation	810
AED Use in Children	811
Special AED Situations	811
Positioning the Patient	812
Check for Breathing and a Pulse	812
Provide External Chest Compressions	813
Proper Hand Position and Compression Technique	813
Opening the Airway and Providing Artificial Ventilation	816
Opening the Airway in Adults	816
Recovery Position	817
Breathing	818
Provide Artificial Ventilations	818
One-Rescuer Adult CPR	820
Two-Rescuer Adult CPR	821
Switching Positions	822
Crew Resource Management	822
Code Team Member Roles	823
Code Team Leader Roles	824

SECTION 6 Shock and Resuscitation 765

14 Shock 766

Introduction	767
Physiology of Perfusion	767
Cardiac Output	768

ROSC and Postresuscitation Support	824
Devices and Techniques to Assist Circulation	825
Active Compression-Decompression CPR	826
Impedance Threshold Device	826
Mechanical Piston Device	827
Load-Distributing Band CPR or Vest CPR	827
Infant and Child CPR	828
Determining Responsiveness	828
Check for Breathing and a Pulse	830
Airway	831
Provide Rescue Breathing	833
Interrupting CPR	834
When Not to Start CPR	835
When to Stop CPR	837
Foreign Body Airway Obstruction in Adults	838
Recognizing Foreign Body Airway Obstruction	838
Removing a Foreign Body Airway Obstruction in an Adult	839
Foreign Body Airway Obstruction in Infants and Children	841
Removing a Foreign Body Airway Obstruction in a Child	842
Removing a Foreign Body Airway Obstruction in Infants	842
Special Resuscitation Circumstances	844
Opioid Overdose	844
Cardiac Arrest in Pregnancy	845
Grief Support for Family Members and Loved Ones	845
Education and Training for the AEMT	846
Education and Training for the Public	847

SECTION 7 Medical

853

16 Medical Overview 854

Introduction	855
Types of Medical Emergencies	855
Patient Assessment	856
Scene Size-up	857
Primary Survey	857
History Taking	858
Secondary Assessment	859
Reassessment	859
Management: Transport and Destination	859
Scene Time	860
Type of Transport	860
Destination Selection	861
Infectious Diseases	862
General Assessment Principles	862
General Management Principles	862
Epidemic and Pandemic Considerations	863
Common or Serious Communicable Diseases	863
Human Immunodeficiency Virus Infection	863
Influenza	865
Hepatitis	865
Herpes Simplex	868
Syphilis	868
Meningitis	868
Tuberculosis	868
Pertussis	870
Methicillin-Resistant <i>Staphylococcus aureus</i>	870

New and Emerging Diseases	870
Global Health Issues	871
Middle East Respiratory Syndrome Coronavirus	871
Coronavirus Disease 2019 (COVID-19)	871
Ebola	873
Zika Virus	873
Travel Medicine	874
Conclusion	874

17 Respiratory Emergencies 881

Introduction	882
Anatomy and Physiology Review	882
Anatomy Review	882
Physiology Review	885
Pathophysiology	887
Gas Exchange Interface	887
Carbon Dioxide Retention and Hypoxic Drive	889
Hypoventilation	890
Hyperventilation	891
Causes of Dyspnea	891
Upper or Lower Airway Infection	892
Acute Pulmonary Edema	895
Chronic Obstructive Pulmonary Disease	896
Asthma	898
Anaphylactic Reactions	898
Spontaneous Pneumothorax	899
Pleural Effusion	899
Pulmonary Embolism	900
Obstruction of the Airway	901
Environmental/Industrial Exposure	901
Cystic Fibrosis	902
Age-Related Conditions	902
Patient Assessment	906
Scene Size-up	906
Primary Survey	906
History Taking	909
Secondary Assessment	912
Reassessment	915
Emergency Medical Care	915
Perform Standard Interventions	915
Decrease the Work of Breathing	915
Provide Supplemental Oxygen	916
Administer a Bronchodilator	916
Consider Fluid Balance	922
Support or Assist Ventilation	922
Assessment and Management of Specific Conditions	923
Upper or Lower Airway Diseases	923
Acute Pulmonary Edema	924
Aspiration	924
Chronic Obstructive Pulmonary Disease	924
Asthma	925
Anaphylactic Reactions	926
Spontaneous Pneumothorax	926
Pleural Effusion	927
Pulmonary Embolism	927
Hyperventilation	927
Obstruction of the Airway	927
Environmental/Industrial Exposure	927
Age-Related Assessment and Management	928
Tracheostomy Dysfunction	929
Epidemic and Pandemic Considerations	929
COVID-19	930

18 Cardiovascular Emergencies**939**

Introduction	940
Anatomy and Physiology Review	941
Anatomy Review	941
Physiology Review	945
Pathophysiology	946
Atherosclerosis	947
Acute Coronary Syndrome	948
Pulmonary Edema	956
Hypertensive Emergencies	956
Patient Assessment	957
Scene Size-up	957
Primary Survey	957
History Taking	958
Secondary Assessment	961
Reassessment	962
Emergency Medical Care for Chest Pain or Discomfort	963
Administering Nitroglycerin	964
Heart Surgeries and Cardiac Assistive Devices	965
Automatic Implantable Cardiac Defibrillators	967
External Defibrillator Vest	968
Left Ventricular Assist Devices	968
Cardiac Arrest	969
Automated External Defibrillation	969
Emergency Medical Care for Cardiac Arrest	972
Cardiopulmonary Resuscitation	972
Preparation for Defibrillation	974
Performing Defibrillation	974
Patient Care After AED Shocks	977
Cardiac Arrest During Transport	978
Management of Return of Spontaneous Circulation	978
Cardiac Monitoring	979

19 Neurologic Emergencies**991**

Introduction	992
Anatomy and Physiology Review	993
Neurons and Impulse Transmission	994
Pathophysiology	995
Stroke	997
Conditions That May Mimic Stroke	1002
Seizures	1003
Altered Mental Status	1007
Syncope	1009
Headache	1009
Patient Assessment	1009
Scene Size-up	1010
Primary Survey	1011
History Taking	1014
Secondary Assessment	1015
Reassessment	1020
Emergency Medical Care	1020
Stroke	1021
Transient Ischemic Attack	1023
Seizures	1023
Syncope	1025
Headache	1026

20 Gastrointestinal and Urologic Emergencies**1033**

Introduction	1034
Anatomy and Physiology Review	1034
The Gastrointestinal System	1034
Additional Abdominal Organs	1036

The Genital System	1036
The Urinary System	1036
Pathophysiology	1037
Causes of Acute Abdomen	1039
Gastrointestinal Hemorrhage	1040
Nonhemorrhagic Conditions	1043
Chronic Inflammatory Conditions	1044
Ulcerative Colitis	1044
Irritable Bowel Syndrome	1045
Crohn Disease	1046
Pathophysiology of the Urinary System	1046
Pathophysiology of the Renal System	1047
Kidney Stones	1047
Kidney Disease	1047
End-Stage Renal Disease	1048
Pathophysiology of Female Reproductive Organs	1048
Pathophysiology of the Male Genital Tract	1048
Epididymitis and Orchitis	1048
Priapism	1049
Benign Prostate Hypertrophy	1049
Testicular Masses	1049
Testicular Torsion	1049
Pathophysiology of Other Organ Systems	1049
Patient Assessment	1050
Scene Size-up	1050
Primary Survey	1050
History Taking	1053
Secondary Assessment	1054
Reassessment	1056
Emergency Medical Care	1056
Renal Dialysis	1057
Disequilibrium Syndrome	1059
Air Embolism	1060

21 Endocrine and Hematologic Emergencies**1067**

Introduction	1068
Anatomy and Physiology Review:	
The Endocrine System	1068
Pituitary Gland	1069
Thyroid Gland	1070
Pancreas	1070
The Role of Glucose and Insulin	1070
Pathophysiology of the Endocrine System	1071
Hypothyroidism and Hyperthyroidism	1072
Diabetes Mellitus	1072
Type 1 Diabetes Mellitus	1075
Type 2 Diabetes Mellitus	1076
Prediabetes	1077
Gestational Diabetes	1078
Hypoglycemia	1079
Hyperglycemia and Diabetic Ketoacidosis	1081
Hyperosmolar Hyperglycemic Nonketotic Syndrome	1084
Patient Assessment of Endocrine Emergencies	1085
Scene Size-up	1086
Primary Survey	1086
History Taking	1087
Secondary Assessment	1088
Reassessment	1088
Emergency Medical Care of Endocrine Emergencies	1089
General Management	1089
Management of Hypoglycemia	1089
Management of Hyperglycemia and DKA	1092
Management of HHNS	1092

Hematologic Emergencies	1093	Sedatives and Hypnotics	1159
Anatomy and Physiology Review: Hematology	1093	Cardiac Medications	1160
Blood and Plasma	1093	Other Medications	1161
Blood-Forming Organs and RBC Production	1094	Organophosphates	1163
Blood Classifications	1095	Carbon Monoxide	1164
Pathophysiology of Hematologic Emergencies	1095	Metals	1165
Sickle Cell Disease	1095	Miscellaneous Substances	1166
Anemia	1097	Food Poisoning	1169
Clotting Disorders	1098	Poisonous Plants	1169
Disseminated Intravascular Coagulation	1099		
Patient Assessment of Hematologic Emergencies	1099	24 Psychiatric Emergencies	1179
Scene Size-up	1099	Introduction	1180
Primary Survey	1099	Myth and Reality	1180
History Taking	1100	Defining Behavioral Emergencies	1180
Secondary Assessment	1101	The Magnitude of Mental Health Problems	1182
Reassessment	1101	Pathophysiology of Abnormal Behavior	1182
Emergency Medical Care of Hematologic Emergencies	1101	Organic Causes of Behavioral Emergencies	1182
Management of Specific Conditions	1102	Functional Disorders	1184
		Psychiatric Signs and Symptoms	1185
22 Immunologic Emergencies	1111	Patient Assessment	1186
Introduction	1112	Scene Size-up	1186
Anatomy and Physiology Review	1112	Primary Survey	1186
Anatomy Review	1112	History Taking	1190
Physiology Review	1114	Secondary Assessment	1191
Pathophysiology	1116	Reassessment	1192
Allergic Reactions Versus Anaphylaxis	1116	Emergency Medical Care	1193
Pathophysiologic Response	1117	Assessment and Management of Specific Emergencies	1194
Clinical Symptoms of Anaphylaxis	1118	Acute Psychosis	1194
Patient Assessment	1121	Suicide	1196
Scene Size-up	1121	Agitated Delirium	1197
Primary Survey	1121	Mood Disorders	1198
History Taking	1122	Neurotic Disorders	1200
Secondary Assessment	1123	Medicolegal Considerations	1202
Reassessment	1123	Consent	1203
Emergency Medical Care	1124	Limited Legal Authority	1203
Assessment and Management of Insect Stings	1128	Restraint	1203
Patient Education	1130	Posttraumatic Stress Disorder and Returning Combat Veterans	1205
		Signs and Symptoms of PTSD	1205
23 Toxicology	1137	Caring for the Combat Veteran	1206
Introduction	1138	25 Gynecologic Emergencies	1213
Types of Toxicologic Emergencies	1138	Introduction	1214
Poison Centers	1139	Anatomy and Physiology Review	1214
Pathophysiology: Routes of Absorption	1139	Anatomy Review	1214
Poisoning by Ingestion	1139	Physiology Review	1215
Poisoning by Inhalation	1140	Pathophysiology	1216
Poisoning by Injection	1141	Pelvic Inflammatory Disease	1216
Poisoning by Absorption	1142	Sexually Transmitted Infections	1217
Understanding and Using Toxidromes	1143	Vaginal Yeast Infections	1219
Overview of Substance Abuse	1143	Ruptured Ovarian Cyst	1219
Patient Assessment	1146	Ectopic Pregnancy	1219
Scene Size-up	1146	Vaginal Bleeding	1220
Primary Survey	1147	Endometritis	1220
History Taking	1148	Endometriosis	1221
Secondary Assessment	1149	Postpartum Eclampsia	1221
Reassessment	1150	Sexual Assault	1222
Emergency Medical Care	1150	Patient Assessment	1222
Pathophysiology, Assessment, and Management of Specific Poisons	1151	Scene Size-up	1222
Alcohol	1151	Primary Survey	1222
Opioids	1153	History Taking	1222
Stimulants	1155	Secondary Assessment	1225
Marijuana and Cannabis Compounds	1157	Reassessment	1226
Hallucinogens	1158	Emergency Medical Care	1226

Assessment and Management of Specific Emergencies	1227
Pelvic Inflammatory Disease	1227
Ruptured Ovarian Cyst	1227
Ectopic Pregnancy	1227
Vaginal Bleeding	1228
Sexual Assault	1228
Sexual Practices and Vaginal Foreign Bodies	1230

SECTION 8 Trauma 1237

26 Trauma Overview 1238

Introduction	1239
Energy and Trauma	1239
Mechanism of Injury Profiles	1242
Blunt and Penetrating Trauma	1242
Blunt Trauma	1243
Penetrating Trauma	1256
Blast Injuries	1258
Categories of Blast Injuries	1258
Tissues at Risk	1260
Multisystem Trauma	1261
Golden Principles of Prehospital Trauma Care	1261
Patient Assessment	1262
Injuries to the Head	1263
Injuries to the Neck and Throat	1263
Injuries to the Chest	1263
Injuries to the Abdomen	1264
Management: Transport and Destination	1264
Trauma Lethal Triad	1264
Scene Time	1265
Type of Transport	1265
Destination Selection	1266

27 Bleeding 1275

Introduction	1276
Physiology and Perfusion	1276
The Cardiac Cycle	1278
Pathophysiology	1279
External Hemorrhaging	1279
Internal Hemorrhaging	1280
The Importance of Bleeding	1282
Physiologic Response to Hemorrhaging	1282
Patient Assessment	1286
Scene Size-up	1286
Primary Survey	1287
History Taking	1288
Secondary Assessment	1289
Reassessment	1290
Emergency Medical Care	1292
External Hemorrhaging	1292
Hemorrhaging From the Nose, Ears, and Mouth	1301
Internal Hemorrhaging	1302
Management of Hemorrhagic Shock	1304

28 Soft-Tissue Injuries 1311

Introduction	1312
Anatomy and Physiology Review	1312
Skin Structure and Function	1312
Skin Tension Lines	1314
Pathophysiology of Closed and Open Injuries	1314
Closed Injuries	1314
Open Injuries	1316
Pathophysiology of Wound Healing	1319

Assessment of Closed and Open Injuries	1320
Scene Size-up	1320
Primary Survey	1321
History Taking	1321
Secondary Assessment	1322
Reassessment	1322
Emergency Medical Care of Closed and Open Injuries	1323
Closed Injuries	1323
Open Injuries	1323
Dressing and Bandaging	1324
Management of Specific Wounds	1325
Burns	1329
Pathophysiology	1329
Hypovolemic Shock	1330
Complications of Burns	1330
Burn Zone	1330
Burn Depth	1331
Burn Severity	1333
Burn Extent	1333
Assessment of Burns	1334
Scene Size-up	1334
Primary Survey	1335
History Taking	1336
Secondary Assessment	1336
Reassessment	1337
Emergency Medical Care of Burns	1339
Specific Burns and Injuries	1341

29 Face and Neck Injuries 1355

Introduction	1356
Anatomy and Physiology Review	1357
Bones and Landmarks	1357
The Eye	1358
The Ear	1359
Pathophysiology	1359
Soft-Tissue Injuries	1360
Facial Fractures	1361
Dental Injuries	1364
Patient Assessment	1364
Scene Size-up	1364
Primary Survey	1364
History Taking	1366
Secondary Assessment	1367
Reassessment	1368
Emergency Medical Care	1369
Assessment and Management of Specific Injuries	1370
Soft-Tissue Injuries	1370
Injuries of the Eyes	1371
Injuries of the Nose	1381
Injuries of the Ear	1382
Facial Fractures	1383
Oral and Dental Injuries	1384
Injuries of the Neck	1385
Laryngeal Injuries	1386
Muscular Injuries	1388
Injury Prevention	1388

30 Head and Spine Injuries 1395

Introduction	1397
Anatomy and Physiology Review	1397
The Scalp	1398
The Skull	1398
The Spine	1399
The Central Nervous System	1400
The Peripheral Nervous System	1403

Pathophysiology	1405	The Genitourinary System	1504
Head Injuries	1405	Pathophysiology	1505
Diffuse Brain Injuries	1413	General Pathophysiologic Concerns	1505
Spine Injuries	1415	Closed Abdominal Injuries	1506
Spinal Cord Injuries	1417	Open Abdominal Injuries	1508
Patient Assessment	1419	Injuries to Specific Structures	1509
Scene Size-up	1419	Patient Assessment	1514
Primary Survey	1420	Scene Size-up	1514
History Taking	1424	Primary Survey	1514
Secondary Assessment	1424	History Taking	1515
Reassessment	1427	Secondary Assessment	1516
Emergency Medical Care of TBI	1428	Reassessment	1519
Scalp Lacerations	1429	Assessment and Management of Specific Injuries	1519
Emergency Medical Care of Spinal Injuries	1430	Closed/Blunt Abdominal Injuries	1520
Immobilization of the Cervical Spine	1430	Open/Penetrating Abdominal Injuries	1521
Cervical Collars	1430	Abdominal Evisceration	1523
Preparation for Transport	1432	Kidneys	1524
Supine Patients	1433	Urinary Bladder	1524
Seated Patients	1441	External Male Genitalia	1525
Patients Wearing Helmets	1448	Female Genitalia	1526
Preferred Method	1449		
Alternate Method	1451		
Nontraumatic Spinal Conditions	1452		
31 Chest Injuries	1463	33 Orthopaedic Injuries	1531
Introduction	1464	Introduction	1532
Anatomy and Physiology Review	1464	Anatomy and Physiology Review	1532
Anatomy Review	1464	Muscles	1533
Physiology Review	1466	The Skeleton	1535
Pathophysiology	1468	Bone Classifications	1537
Signs and Symptoms of Chest Injury	1470	Typical Long Bone Architecture	1538
Patient Assessment	1471	Tendons, Ligaments, and Cartilage	1538
Scene Size-up	1471	Age-Associated Changes	1538
Primary Survey	1472	Pathophysiology	1539
History Taking	1474	Mechanism of Injury	1540
Secondary Assessment	1475	Fractures	1541
Reassessment	1477	Dislocations	1544
Emergency Medical Care	1477	Sprains	1545
Pathophysiology, Assessment, and Management		Strains	1545
of Specific Emergencies	1478	Achilles Tendon Rupture	1545
Rib Fractures	1478	Amputations	1546
Flail Chest	1479	Patient Assessment	1546
Sternal Fracture	1480	Scene Size-up	1546
Clavicle Fracture	1480	Primary Survey	1548
Commotio Cordis	1481	History Taking	1549
Simple Pneumothorax	1481	Secondary Assessment	1550
Open Pneumothorax	1483	Reassessment	1554
Tension Pneumothorax	1484	Emergency Medical Care	1554
Hemothorax	1486	Volume Deficit Due to Musculoskeletal Injuries	1555
Pulmonary Contusion	1487	Cold and Heat Application	1556
Cardiac Tamponade	1488	Splinting	1557
Myocardial Contusion	1490	Buddy Splinting	1565
Myocardial Rupture	1490	Transportation	1566
Traumatic Aortic Disruption	1490	Pathophysiology, Assessment, and Management	
Penetrating Wounds of the Great Vessels	1491	of Complications of Musculoskeletal Injuries	1567
Diaphragmatic Injury	1492	Peripheral Nerve and Vascular Injuries	1567
Esophageal Injury	1492	Compartment Syndrome	1568
Tracheobronchial Injury	1492	Crush Syndrome	1569
Traumatic Asphyxia	1493	Thromboembolic Disease	1569
		Pathophysiology, Assessment, and Management	
		of Specific Injuries	1570
32 Abdominal and Genitourinary Injuries	1501	Injuries of the Clavicle and Scapula	1570
Introduction	1502	Dislocation of the Shoulder	1572
Anatomy and Physiology Review	1502	Fracture of the Humerus	1574
Abdominal Quadrants	1502	Elbow Injuries	1574
Hollow and Solid Organs	1503	Fractures of the Forearm	1576
		Injuries of the Wrist and Hand	1577
		Fractures of the Pelvis	1577
		Dislocation of the Hip	1581

Fractures of the Proximal Femur	1582
Femoral Shaft Fractures	1584
Knee Injuries	1584
Injuries of the Tibia and Fibula	1586
Ankle Injuries	1587
Foot Injuries	1588
Amputations	1589
Sprains and Strains	1589

34 Environmental Emergencies 1597

Introduction	1599
Factors Affecting Exposure	1599
Cold Exposure	1600
Pathophysiology	1602
Assessment of Cold Injuries	1606
Scene Size-up	1606
Primary Survey	1607
History Taking	1608
Secondary Assessment	1608
Reassessment	1608
Emergency Medical Care for Cold Emergencies	1609
Withholding and Cessation of Resuscitative Efforts	1611
Emergency Medical Care of Local Cold Injuries	1612
Cold Exposure and You	1613
Heat Exposure	1613
Pathophysiology	1613
Assessment of Heat Injuries	1616
Scene Size-up	1616
Primary Survey	1616
History Taking	1617
Secondary Assessment	1617
Reassessment	1618
Emergency Medical Care for Heat Emergencies	1618
Heat Cramps	1618
Heat Exhaustion	1618
Heatstroke	1620
Water Emergencies	1621
Drowning	1621
Diving Emergencies	1622
General Pathophysiology: Physical Principles of Pressure Effects	1622
Water Rescue	1628
Spinal Injuries in Submersion Incidents	1629
Recovery Techniques	1631
Assessment of Drowning and Diving Emergencies	1631
Scene Size-up	1631
Primary Survey	1632
History Taking	1633
Secondary Assessment	1633
Reassessment	1634
Emergency Care for Drowning or Diving Emergencies	1634
Submerged Vehicle Incidents	1634
Other Water Hazards	1635
Prevention	1635
High Altitude	1635
Lightning Injuries	1636
Emergency Medical Care for Lightning Injuries	1638
Bites and Envenomations	1639
Spider Bites	1639
Hymenoptera Stings	1641

Snakebites	1641
Scorpion Stings	1646
Tick Bites	1646
Injuries From Marine Animals	1647

SECTION 9 Special Patient Populations 1655

35 Obstetrics and Neonatal Care 1656

Introduction	1658
Anatomy and Physiology Review: The Female Reproductive System	1658
Gestation	1659
Normal Maternal Changes of Pregnancy	1661
Pathophysiology During Pregnancy	1663
Abortion	1663
Ectopic Pregnancy	1664
Third-Trimester Bleeding	1664
Bleeding and the Placenta	1665
Hypertensive Disorders	1666
Effects of Substance Abuse	1667
Isoimmunization (Rh Sensitization)	1667
Gestational Diabetes	1667
Hyperemesis Gravidarum	1668
Premature Rupture of Membranes	1668
Effects of Physical Abuse	1668
Special Considerations for Trauma and Pregnancy	1668
Assessment and Treatment of the Pregnant Trauma Patient	1670
Maternal Cardiac Arrest	1671
Cultural Value Considerations	1671
Teenage Pregnancy	1671
Patient Assessment	1672
Scene Size-up	1672
Primary Survey	1672
History Taking	1673
Secondary Assessment	1675
Reassessment	1676
Assessment and Management of Nondelivery Emergencies	1676
Spontaneous Abortion	1676
Third-Trimester Bleeding	1677
Ectopic Pregnancy	1678
Preeclampsia	1678
Supine Hypotensive Syndrome	1678
Gestational Diabetes	1678
Normal Childbirth	1679
Stages of Labor	1679
Preparing for Delivery	1679
Delivering the Newborn	1681
Apgar Scoring	1684
Cutting the Umbilical Cord	1684
Delivery of the Placenta	1684
Postpartum Care	1685
Complications of Labor	1686
Preterm Labor	1686
Postterm Pregnancy	1687
Fetal Distress	1687
Uterine Rupture	1688
High-Risk Pregnancy Conditions	1688
Meconium Staining	1688
Multiple Gestation	1688
Cephalopelvic Disproportion	1689

Intrauterine Fetal Death	1689
Amniotic Fluid Embolism	1689
Complications of Delivery	1689
Breech Presentation	1689
Limb Presentation	1690
Shoulder Dystocia	1691
Nuchal Cord	1691
Prolapsed Umbilical Cord	1691
Postpartum Complications	1692
Excessive Bleeding	1692
Uterine Inversion	1692
Pulmonary Embolism	1693
Spina Bifida	1693
Neonatal Resuscitation	1693
Physiology	1693
Pathophysiology	1695
Neonatal Assessment and Initial Steps	1695
Algorithm for Neonatal Resuscitation	1697
Airway Management	1699
Circulation	1701
Pathophysiology, Assessment, and Management of Specific Conditions	1703
Apnea	1703
Bradycardia	1703
Hypoglycemia	1704
Hypovolemia	1705

36 Pediatric Emergencies 1715

Introduction	1717
Communication With the Patient and the Family	1718
Growth and Development	1718
The Infant	1718
The Toddler	1720
The Preschool-Age Child	1721
The School-Age Child	1722
The Adolescent	1722
Anatomy, Physiology, and Pathophysiology	1723
The Respiratory System	1723
Cardiovascular System	1725
The Nervous System	1725
Musculoskeletal System	1726
The Gastrointestinal System	1726
The Integumentary System	1726
Metabolic Differences	1726
Pediatric Assessment	1727
Scene Size-up	1727
Primary Survey	1728
History Taking	1736
Secondary Assessment	1737
Reassessment	1739
Pediatric Emergency Medications	1740
Assessment and Management of Respiratory Emergencies	1741
Upper Airway Emergencies	1743
Lower Airway Emergencies	1747
General Assessment and Management of Respiratory Emergencies	1749
Assessment and Management of Circulation Emergencies	1755
Shock	1756
Bleeding Disorders	1757
Intravenous Access	1757
Intraosseous Access	1759
Fluid Resuscitation	1760

Assessment and Management of Neurologic Emergencies	1762
Altered Mental Status	1763
Seizures	1763
Meningitis	1764
Assessment and Management of Gastrointestinal Emergencies	1766
Assessment and Management of Toxicologic Emergencies	1766
Assessment and Management of Dehydration Emergencies	1767
Assessment and Management of Fever Emergencies	1768
Assessment and Management of Hypoglycemia Emergencies	1769
Assessment and Management of Hyperglycemia Emergencies	1770
Assessment and Management of Drowning Emergencies	1771
Pediatric Trauma Emergencies and Management	1771
Psychological Differences	1771
Physical Differences	1772
Injury Patterns	1772
Injuries to Specific Body Systems	1772
Injuries of the Extremities	1776
Burns	1776
Fluid Management	1777
Pain Management	1778
Disaster Management	1778
Child Abuse and Neglect	1779
Signs of Abuse	1779
Symptoms and Other Indicators of Abuse	1780
Sexual Abuse	1781
Death of a Child	1781
Sudden Infant Death Syndrome	1782
Brief Resolved Unexplained Event	1784

37 Geriatric Emergencies 1793

Introduction	1794
General Considerations	1795
The Economic Impact of Aging	1795
Independent and Dependent Living	1796
Advance Directives and End-of-Life Care	1796
Communicating With Older Patients and Spouses	1797
Response to Nursing and Skilled Care Facilities	1798
Leading Causes of Death	1799
Anatomy, Physiology, and Pathophysiology	1799
Changes in the Respiratory System	1800
Changes in the Cardiovascular System	1801
Changes in the Nervous System	1802
Changes in the Musculoskeletal System	1806
Changes in the GI System	1806
Changes in the Renal System	1807
Changes in the Endocrine System	1808
Changes in the Immune System	1809
Changes in the Integumentary System	1809
Homeostatic and Other Changes	1810
Toxicology	1811
Assessment of Geriatric Medical Emergencies	1811
Scene Size-up	1811
Primary Survey	1812
History Taking	1813
Secondary Assessment	1817
Reassessment	1818

Emergency Medical Care	1818
Fluid Resuscitation in Geriatric Patients	1819
Assessment and Management of Respiratory	
Emergencies	1819
Shortness of Breath	1819
Asthma	1820
Pneumonia	1820
Pulmonary Embolism	1820
Assessment and Management of Cardiovascular	
Emergencies	1821
Syncope	1821
Chest Pain	1821
Myocardial Infarction	1822
Heart Failure	1822
Dysrhythmias	1823
Hypertension	1823
Aneurysms	1823
Traumatic Aortic Disruption	1824
Assessment and Management of Neurologic	
and Endocrine Emergencies	1824
Delirium	1824
Stroke	1824
Transient Ischemic Attack	1825
Neuropathy	1825
Altered Mental Status	1825
Diabetic Disorders	1826
Thyroid Disorders	1827
Assessment and Management of GI Emergencies	1828
Abdominal Pain	1828
GI Bleeding	1829
Nausea, Vomiting, and Diarrhea	1830
Bowel Obstruction	1830
Biliary Diseases	1830
Peptic Ulcer Disease	1830
Assessment and Management of Renal	
Emergencies	1831
Urinary Tract Infections	1831
Renal Failure	1831
Assessment and Management of Toxicologic	
Emergencies	1831
Drug and Alcohol Abuse	1832
Geriatric Trauma Emergencies and Management	1832
Pathophysiology of Trauma	1833
Assessment of Geriatric Trauma	1835
Scene Size-up	1835
Primary Survey	1835
History Taking	1836
Secondary Assessment	1836
Reassessment	1837
Elder Abuse and Neglect	1838
Signs of Physical Abuse	1839
Assessment and Management of Elder Abuse	1839

38 Patients With Special Challenges 1847

Introduction	1848
Developmental Disability	1849
Autism Spectrum Disorder	1849
Down Syndrome	1850
Patient Interaction	1851
Sensory Disabilities	1853
Visual Impairment	1853
Hearing Impairment	1854
Physical Disabilities	1856
Cerebral Palsy	1856

Cystic Fibrosis	1857
Multiple Sclerosis	1857
Muscular Dystrophy	1858
Spina Bifida	1858
Paralysis	1859
Bariatric Patients	1860
Clinical Concerns for the Patient With Obesity	1861
Interaction With Patients With Obesity	1861
Interaction With Patients With Morbid Obesity	1862
Patients With Medical Technology Assistance	1862
Tracheostomy Tubes	1862
Home Oxygen	1864
Mechanical Ventilators	1866
Apnea Monitors	1867
Internal Cardiac Pacemakers	1867
Left Ventricular Assist Devices	1868
External Defibrillator Vest	1868
Intra-Aortic Balloon Pumps	1869
Central Venous Catheters	1869
Gastrostomy Tubes	1870
Shunts	1870
Vagus Nerve Stimulators	1871
Colostomies, Ileostomies, and Urostomies	1871
Patient Assessment Guidelines	1872
Home Care	1872
Hospice Care and Terminally Ill Patients	1873
Poverty and Homelessness	1874

SECTION 10 EMS Operations 1881

39 Transport Operations 1882

Introduction	1883
Emergency Vehicle Design	1884
Phases of an Ambulance Call	1885
Preparation for the Call	1886
Dispatch	1895
En Route to the Scene	1895
Arrival at the Scene	1896
Transfer of the Patient to the Ambulance	1899
En Route to the Receiving Facility (Transport)	1899
Arrival at the Receiving Facility (Delivery)	1900
En Route to the Station	1900
Postrun	1901
Defensive Ambulance Driving Techniques	1902
Driver Characteristics	1902
Safe Driving Practices	1903
Air Medical Operations	1913
Advantages of Using Air Ambulances	1914
Disadvantages of Using Air Ambulances	1914
Medical Evacuation Operations	1915
Establishing a Landing Zone	1916
Landing Zone Safety and Patient Transfer	1917
Communicating With Other Agencies	1919
Special Considerations	1919

40 Vehicle Extrication, Special Rescue, and Hazardous Materials 1925

Introduction	1926
Safety	1926
Fundamentals of Extrication	1927
Preparation	1927
En Route to the Scene	1928

Arrival and Scene Size-up	1928	Rehabilitation Supervisor	1977
Hazard Control	1929	Extrication and Special Rescue	1977
Support Operations	1932	Morgue Supervisor	1977
Gaining Access	1933	Mass-Casualty Incidents	1977
Simple Access	1934	Triage	1978
Emergency Care	1934	Triage Categories	1979
Removal of the Patient	1935	Triage Tags	1981
Transfer of the Patient	1936	START Triage	1981
Termination	1937	JumpSTART Triage for Pediatric Patients	1982
Specialized Rescue Situations	1937	Special Considerations in Triage	1983
Tactical Emergency Medical Support	1938	Destination Decisions	1983
Search and Rescue	1940	Disaster Management	1984
Trench Rescue	1940		
Structure Fires	1941		
Introduction to Hazardous Materials	1941		
Recognizing a Hazardous Material	1942	42 Terrorism Response and Disaster Management	1994
Occupancy and Location	1943	Introduction	1995
Senses	1943	What Is Terrorism?	1995
Containers	1944	Individual Terrorists and Active Shooter Events	1996
Transportation and Facility Markings	1947	Weapons of Mass Destruction	1998
Reference Materials	1949	Chemical Terrorism/Warfare	1998
Identification of Hazardous Materials	1954	Biologic Terrorism/Warfare	1999
Hazmat Scene Operations	1955	Radiologic/Nuclear Terrorism	1999
Establishing Control Zones	1956	Recognizing a Terrorist Event (Indicators)	1999
Personal Protective Equipment Level	1958	Response Actions	2000
Caring for Patients at a Hazmat Incident	1959	Chemical Agents	2002
		Vesicants (Blister Agents)	2002
		Respiratory Agents (Choking Agents)	2003
		Nerve Agents	2004
		Metabolic Agents (Cyanides)	2007
41 Incident Management	1967	Biologic Agents	2008
Introduction	1968	Viruses	2009
National Incident Management System	1968	Bacteria	2012
Incident Command System	1969	Neurotoxins	2013
Incident Command System Roles and Responsibilities	1970	Roles of the AEMT During a Biologic Event	2015
Communications and Information Management	1972	Radiologic/Nuclear Devices	2016
Mobilization and Deployment	1972	What Is Radiation?	2016
EMS Response Within the Incident Command System	1973	Sources of Radiologic Material	2016
Preparedness	1973	Radiologic Dispersal Devices	2016
Scene Size-up	1973	Nuclear Energy	2017
Establishing Command	1974	Nuclear Weapons	2017
Communications	1975	Symptomatology	2018
Medical Incident Command	1975	Medical Management	2019
Triage Supervisor	1976	Protective Measures	2019
Treatment Supervisor	1976	Incendiary and Explosive Devices	2019
Transportation Supervisor	1976	Mechanisms of Injury	2019
Staging Supervisor	1976		
Physicians on Scene	1976	Glossary	2027
		Index	2101

Skill Drills

Skill Drill 2-1	Handwashing	40	Skill Drill 11-1	Positioning an Unresponsive Patient	569
Skill Drill 2-2	Proper Glove Removal Technique	41	Skill Drill 11-2	Suctioning a Patient's Airway	575
Skill Drill 2-3	Preventing a Potential Exposure	46	Skill Drill 11-3	Inserting an Oral Airway Into an Adult	577
Skill Drill 6-1	Performing the Power Lift	220	Skill Drill 11-4	Inserting an Oral Airway With a 90° Rotation	577
Skill Drill 6-2	Performing a Two-Person Body Drag	223	Skill Drill 11-5	Inserting a Nasal Airway	579
Skill Drill 6-3	Performing the Diamond Carry	227	Skill Drill 11-6	Placing an Oxygen Cylinder Into Service	584
Skill Drill 6-4	Performing the One-Handed Carry	229	Skill Drill 11-7	Mouth-to-Mask Ventilation	592
Skill Drill 6-5	One-Person Technique for Removing an Unresponsive Patient From a Vehicle	231	Skill Drill 11-8	Using CPAP	600
Skill Drill 6-6	Performing the Rapid Extrication Technique	233	Skill Drill 11-9	Suctioning of a Stoma	603
Skill Drill 6-7	The Direct Ground Lift	236	Skill Drill 11-10	Ventilating Through a Stoma Using a Resuscitation Mask	605
Skill Drill 6-8	Extremity Lift	237	Skill Drill 11-11	Ventilating a Stoma With a Bag-Mask Device	606
Skill Drill 6-9	Direct Carry	238	Skill Drill 11-12	Inserting a King LT Airway	610
Skill Drill 6-10	Draw Sheet Method	239	Skill Drill 11-13	LMA Insertion	613
Skill Drill 6-11	Using a Scoop Stretcher	240	Skill Drill 11-14	Inserting an i-gel Supraglottic Airway	616
Skill Drill 6-12	Lifting a Patient From the Ground	241	Skill Drill 13-1	Spiking the Bag	704
Skill Drill 6-13	Moving a Patient From a Chair to a Stair Chair	242	Skill Drill 13-2	Obtaining Vascular Access	711
Skill Drill 6-14	Loading a Stretcher Into an Ambulance	247	Skill Drill 13-3	Gaining IO Access With an EZ-IO Device	726
Skill Drill 6-15	Using a Stair Chair	251	Skill Drill 13-4	Drawing Medication From an Ampule	738
Skill Drill 6-16	Carrying a Patient on Stairs	252	Skill Drill 13-5	Drawing Medication From a Vial	740
Skill Drill 10-1	Performing a Rapid Full-Body Scan	483	Skill Drill 13-6	Administering Medication via the Subcutaneous Route	742
Skill Drill 10-2	Assessing Blood Glucose Level	507	Skill Drill 13-7	Administering Medication via the IM Route	745
Skill Drill 10-3	Performing the Full-Body Exam	508	Skill Drill 13-8	Administering Medication via the Sublingual Route	746
Skill Drill 10-4	Obtaining Blood Pressure by Auscultation	520			
Skill Drill 10-5	Obtaining Blood Pressure by Palpation	521			

Skill Drill 13-9	Administering Medication via the Intranasal Route	747	Skill Drill 30-1	Performing Manual In-Line Stabilization	1431
Skill Drill 13-10	Assisting a Patient With a Metered-Dose Inhaler	750	Skill Drill 30-2	Application of a Cervical Collar	1432
Skill Drill 13-11	Administering a Medication via a Small-Volume Nebulizer	752	Skill Drill 30-3	Performing SMR of a Supine Adult Patient	1436
Skill Drill 13-12	Administering Medication via the IV Bolus Route	753	Skill Drill 30-4	Using a Scoop Stretcher	1440
Skill Drill 13-13	Administering Medication via the IO Route	754	Skill Drill 30-5	Placing a Patient on a Full-Body Vacuum Mattress	1442
Skill Drill 15-1	Performing Chest Compressions	814	Skill Drill 30-6	Performing Immobilization of a Seated Adult Patient	1445
Skill Drill 15-2	Performing One-Rescuer Adult CPR	820	Skill Drill 30-7	Removing a Helmet	1449
Skill Drill 15-3	Performing Two-Rescuer Adult CPR	821	Skill Drill 33-1	Assessing Neurovascular Status	1552
Skill Drill 15-4	Performing Infant Chest Compressions	831	Skill Drill 33-2	Caring for Musculoskeletal Injuries	1556
Skill Drill 15-5	Performing CPR on a Child	832	Skill Drill 33-3	Applying a Hare Traction Splint	1560
Skill Drill 15-6	Removing a Foreign Body Airway Obstruction in an Unresponsive Child	843	Skill Drill 33-4	Applying a Sager Traction Splint	1562
Skill Drill 18-1	Administering Nitroglycerin	965	Skill Drill 33-5	Applying a Rigid Splint	1564
Skill Drill 18-2	AED and CPR	975	Skill Drill 33-6	Applying a Vacuum Splint	1566
Skill Drill 18-3	Performing Cardiac Monitoring	980	Skill Drill 33-7	Splinting the Hand and Wrist	1578
Skill Drill 22-1	Using an EpiPen Auto-injector	1127	Skill Drill 34-1	Treating for Heat Exhaustion	1619
Skill Drill 27-1	Managing External Hemorrhage	1293	Skill Drill 34-2	Stabilizing a Suspected Spinal Injury in the Water	1630
Skill Drill 27-2	Packing a Wound	1295	Skill Drill 35-1	Delivering a Newborn	1682
Skill Drill 27-3	Applying a Commercial Tourniquet (Combat Application Tourniquet)	1297	Skill Drill 36-1	Positioning the Airway in a Pediatric Patient	1732
Skill Drill 27-4	Managing Internal Hemorrhage	1303	Skill Drill 36-2	Inserting an Oropharyngeal Airway in a Pediatric Patient	1750
Skill Drill 28-1	Stabilizing an Impaled Object	1328	Skill Drill 36-3	Inserting a Nasopharyngeal Airway in a Pediatric Patient	1751
Skill Drill 28-2	Caring for Burns	1340	Skill Drill 36-4	One-Person Bag-Mask Device Ventilation on a Pediatric Patient	1755
Skill Drill 29-1	Removing a Foreign Object From Under the Upper Eyelid	1373	Skill Drill 36-5	Pediatric IO Access and Infusion	1761
Skill Drill 29-2	Stabilizing a Foreign Object Impaled in the Eye	1374	Skill Drill 36-6	Immobilizing a Pediatric Patient	1773
Skill Drill 29-3	Controlling Bleeding From a Neck Injury	1387	Skill Drill 36-7	Immobilizing a Patient Found in a Car Seat	1774
			Skill Drill 38-1	Suctioning and Cleaning a Tracheostomy Tube	1864

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COVID-19 Disclaimer

At the time of this edition's development, we find ourselves in the middle of a 100-year event: the COVID-19 pandemic. Although we are perhaps more mindful than ever of the importance of personal protective equipment (PPE) in our profession, readers will still notice some variability throughout this textbook with regard to the types of PPE worn by EMS providers and others as they care for patients. They may also question the inclusion of skills and techniques that are discouraged in the context of COVID-19. There are several explanations for these inconsistencies.

Prior to 2020, the level of PPE commonly worn by all providers during patient encounters typically included gloves. Eye protection was added during situations in which the risk of a splash was high or when there was significant risk of aerosolization of material that could potentially come in contact with the eyes. For example, eye protection was typically worn while caring for patients who were bleeding significantly, when performing airway-related procedures, and during maternity calls. It was added on calls when there was a perceived high risk of being splashed with a potentially contaminated body fluid. In the COVID-19 era and beyond, however, use of eye protection has become more common.

In addition, masks are now standard equipment for all interpersonal encounters, not just patient

encounters. At various times throughout the pandemic, masks have been required in public places, such as grocery stores. Simple face masks or cloth masks decrease the risk of infection for the person wearing the mask and decrease the risk associated with viral shedding that is a known consequence of infection, even in asymptomatic hosts. In other words, people without symptoms can still be infected with the virus and thus transmit it to others. Asking everyone to wear a mask in public can make the environment safer.

Furthermore, it is recommended that providers caring for COVID-19 patients or those who have overt symptoms such as fever or cough wear a higher level of protection, such as an N95 respirator. There is variability in that recommendation also, as many agencies are using N95 respirators for all patient encounters, given the increased level of protection afforded and the pervasiveness in the population of asymptomatic individuals who could transmit the disease.

We have tried throughout the text to apply the best current knowledge and practices available. However, that science is developing rapidly, as is clinical practice. Some information in this textbook relating to PPE recommendations may become outdated in the coming years. We will attempt to make supplemental material available that reflects the most updated knowledge.



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Preparatory

- 1 EMS Systems
- 2 Workforce Safety and Wellness
- 3 Medical, Legal, and Ethical Issues
- 4 Communications and Documentation
- 5 Medical Terminology
- 6 Lifting and Moving Patients

SECTION

1

Chapter 1

EMS Systems



NATIONAL EMS EDUCATION STANDARD COMPETENCIES

Preparatory

Applies fundamental knowledge of the EMS system, safety/well-being of the AEMT, medical/legal and ethical issues to the provision of emergency care.

EMS Systems

- EMS systems (p 3)
- History of EMS (pp 7–8)
- Roles/responsibilities/professionalism of EMS personnel (p 8)
- Quality improvement (p 18)
- Patient safety (pp 18–19)

Research

- Impact of research on emergency medical responder (EMR) care (p 12)
- Data collection (pp 13–15)
- Evidence-based decision making (p 24)

Public Health

Uses simple knowledge of the principles of the role of EMS during public health emergencies.

KNOWLEDGE OBJECTIVES

1. Define emergency medical services (EMS). (p 3)
2. Discuss the four levels of EMS training and licensure. (p 4)
3. Describe licensure criteria for advanced emergency medical technicians (AEMTs). (pp 6–7)
4. Describe how the Americans with Disabilities Act (ADA) applies to employment as an AEMT. (p 7)
5. Discuss the history of the development of the EMS system. (pp 7–8)
6. Describe the levels of EMS training in terms of skill sets needed for each of the following: emergency medical responder (EMR), emergency medical technician (EMT), AEMT, and paramedic. (pp 8–11)
7. Discuss the possible presence of other responders at a scene with EMR training, some knowledge of first aid, or merely good intentions, and their need for direction. (pp 12–13)
8. Describe the components of the EMS system. (pp 13–16)
9. Describe how medical direction of an EMS system works and your role in the process. (pp 16–17)
10. Describe the goals of Mobile Integrated Healthcare (MIH) and community paramedicine. (p 18)
11. Discuss the purpose of the EMS continuous quality improvement (CQI) process. (p 18)
12. Describe ways to limit or eliminate human error and improve patient safety. (pp 18–19)
13. Characterize the EMS system's role in prevention and public education in the community. (pp 21–22)
14. Discuss the signs of human trafficking that you may encounter during an emergency response. (p 23)

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15. Describe situations in which transport to a specialty center is warranted. (pp 24–25)
16. Describe your roles and responsibilities as an AEMT. (pp 25–26)

17. Describe the attributes you are expected to possess. (p 26)
18. Discuss the impact of the Health Insurance Portability and Accountability Act (HIPAA) on patient privacy. (p 27)

SKILLS OBJECTIVES

There are no skills objectives for this chapter.

Introduction

This textbook is designed to serve as the text and primary resource for the advanced emergency medical technician (AEMT) course. This chapter describes the content and objectives of the AEMT course. It discusses what is expected of you during the course and what other requirements you need to meet to be licensed or certified as an AEMT in most states.

Emergency medical services (EMS) is a multidisciplinary system of professionals and agencies working together to provide prehospital emergency care to sick and injured people. This chapter overviews the different types of providers and the different levels of care that compose this system. It also discusses administration, medical direction, quality control, and regulation of EMS systems. The chapter concludes with a detailed discussion of the roles and responsibilities of AEMTs as health care professionals.

Course Description

As an AEMT, you will be a critical part of the EMS system and will play a significant role in your patients' lives (**FIGURE 1-1**). Although not every call for care will involve a life-threatening emergency, the compassion, professionalism, and skill you bring will have a tremendous positive impact on each patient you encounter.

Each emergency medical service is part of a local or regional EMS system that provides the prehospital and hospital components required for the delivery of proper emergency medical care. The standards for prehospital emergency care and the people who provide it are governed by the laws in each state and are typically regulated by a state office of EMS.

The people who provide emergency medical care in the field are trained and, except for licensed



FIGURE 1-1 As an AEMT, you will be part of a larger team that responds to a variety of calls and provides a wide range of prehospital emergency care.

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physicians, must be either certified EMS personnel or state-licensed. A **certification** exam is used to ensure all health care providers have at least the same basic level of knowledge and skill. These exams are typically conducted or regulated by a state or military agency or by the National Registry of Emergency Medical Technicians (NREMT). The NREMT is a nongovernmental, not-for-profit organization whose mission is to provide a valid, uniform process to assess the knowledge, skills, and abilities (KSAs) for competent EMS practice. Almost all states require NREMT certification for candidates to be eligible for a license to practice. After you pass this exam, you are eligible to apply for state licensure.

Licensure is the process by which states ensure applicant competency in an examination setting. This allows states to manage who can function as a health care provider. The ways in which these terms are used may vary by state. For the purpose of this textbook, the term *licensure* will be used.

Obtaining licensure in a state does not grant an AEMT an unrestricted right to practice. The

Words of Wisdom

Although not all states use the NREMT testing process, EMS certification exams may be informed by the NREMT's EMS Practice Analysis. Approximately every 5 years, the NREMT surveys EMS providers of all levels from across the United States to understand the current real-world practice of prehospital emergency care and to help create a blueprint for valid certification exams. In 2019, the Practice Analysis also pulled data from the National EMS Information System (NEMSIS) to get a real picture of the types of calls and interventions EMS personnel in the United States encounter in actual practice. In effect, the Practice Analysis attempts to answer the question, "What is most important for EMS providers to know and be able to do to deliver safe and effective care?" From this information, the current Practice Analysis determines the certification test plan for each level of EMS provider. The test plan lays out an approximate percentage of questions on each topic that students will encounter on NREMT certification exams.

next phase of becoming a health care provider is **credentialing**. Credentialing is the verification process of a health care provider's qualifications. Credentialing may be a local or regional process, and it is typically directed and overseen by a physician medical director. In some cases, AEMTs may be specifically credentialed to perform either fewer or additional techniques in their area or to work in certain types of care systems.

In most states, providers are categorized into four different training and licensure levels:

emergency medical responder (EMR), **emergency medical technician (EMT)**, **advanced emergency medical technician (AEMT)**, and **paramedic**.

TABLE 1-1 shows some of the responsibilities and requirements of these roles. The **National EMS Scope of Practice Model** describes the four levels of EMS practice. The National EMS Education Standards outline the knowledge and competencies that should be taught to students in each of these four levels of EMS practice. This education incorporates all the KSAs needed to become a competent entry-level AEMT. For any role in emergency services and health care, education must continue throughout the provider's career.

Words of Wisdom

In some states, AEMT is the introductory level and may not require prerequisites.

Although the specific training and licensure requirements vary from one state to another, almost every state's requirements follow or exceed the guidelines recommended in the current National Highway Traffic Safety Administration (NHTSA) EMS Education Standards. In the United States, NHTSA is the federal administrative source for education standards and related documents.

This textbook covers the practice and skills identified in the 2021 *National EMS Education Standards*. It also covers the information required for AEMTs to perform the skills outlined in the 2019 National EMS Scope of Practice Model.

TABLE 1-1 EMS Responsibilities and Requirements

Training/Licensure Level	Responsibilities and Requirements ^a
Emergency medical responder (EMR)	First medically trained professional to arrive on scene; provides initial care before the ambulance arrives; assists more-advanced responders
Emergency medical technician (EMT)	Trained in basic life support (BLS) , including the use of automated external defibrillators and airway adjuncts; assists with administering certain medications
Advanced emergency medical technician (AEMT)	Advanced training in specific aspects of advanced life support (ALS) (eg, intravenous [IV] therapy); administers certain emergency medications and certain types of advanced airway management
Paramedic	Trained in ALS, endotracheal intubation, emergency pharmacology, cardiac monitoring, and other advanced assessment and emergency medical treatment skills

a: Responsibilities and requirements vary by state.

Words of Wisdom

Individual states have the option to allow providers to perform certain skills outside of the National EMS Scope of Practice.

In addition to the required core content, this text includes additional information to help you understand and apply the material and skills included in the AEMT course.

Words of Wisdom

Study Tips for Using This Text

Complete each assignment diligently and carefully.

Read the textbook like a textbook, not like a blog, magazine, or novel.

Read each chapter several times, and underline key points. Take notes!

Note the chapter's objectives so you can effectively measure your knowledge.

Ask your instructor to clarify any questions you have.

Take additional notes when the assigned material is expanded on in class.

Use supporting materials (eg, assessments, animations, videos, and workbooks) to enhance your learning experience.

Remember: The only dumb question is the one you fail to ask.

AEMT Training: Focus and Requirements

As an AEMT, some of the patients you treat will have life-threatening conditions, whereas others require only supportive care. The skills needed to safely deliver this care are found within this textbook. Some

of the main subjects that will be discussed include the following:

- **Scene size-up.** During scene size-up, you must gain a big-picture perspective of the call, determine if it is safe to proceed, determine whether additional resources are needed, and identify the initial approach to mitigate the emergency scene. EMS operates in a wide variety of environments that can create situations where EMS personnel can be injured. A primary role of any EMS provider is to ensure personal safety.
- **Patient assessment.** Patient assessment is the foundation of any EMS call. You must determine what is wrong with the patient. Patients can have many complaints, and you will learn to determine which complaints are life threatening.
- **Treatment.** As an AEMT, ensure the patient is oxygenated, administer certain medications, and administer IV therapy if needed. Control bleeding and assist patients during childbirth. In addition to hands-on skills, you will learn how to manage patients who are in emotional crisis and to calm patients and relieve some of their anxieties.
- **Packaging.** In EMS, packaging refers to the act of preparing a patient for movement as a unit by means of a backboard or similar stabilization device. Most patients need to be transported to a facility. This could mean a hospital, clinic, or other medical care facility. You will learn how to transport patients with a wide variety of illnesses and injuries.
- **EMS as a career.** Many of you are taking this course because you want to help people. To ensure all EMS providers have a long, healthy career, it is important for you to learn how to take care of yourself. We will discuss job stressors and successful ways to cope with stress.

YOU are the Provider

Part 1

You were just hired as an AEMT and report to your first day on the job with the local ambulance service. As you begin your orientation, the EMS director asks you two initial questions:

1. What is emergency medical services (EMS)?
2. Why was the National Registry of Emergency Medical Technicians (NREMT) established?

Words of Wisdom

The Star of Life

The NHTSA recognized the need for a symbol that would represent EMS as a critical public service and created the *Star of Life*. NHTSA holds priority rights to the use of this registered certification mark.



Adapted from the personal Medical Identification Symbol of the American Medical Association, each bar on the Star of Life represents an EMS function:

1. Detection
2. Reporting
3. Response
4. On-scene care
5. Care in transit
6. Transfer to definitive care

The serpent and staff in the symbol portray the staff of Asclepius, an ancient Greek god of medicine. Overall, the staff represents medicine and healing, with the skin-shedding serpent being indicative of renewal.

The Star of Life has become synonymous with emergency medical care around the globe. This symbol can be seen as a means of identification on ambulances; emergency medical equipment; patches or apparel worn by EMS providers; and materials such as books, pamphlets, manuals, reports, and publications that either have a direct application to EMS or were generated by an EMS organization. It also appears on road maps and highway signs indicating the location of or access to qualified emergency medical care.

Adapted from US National Highway Traffic Safety Administration. <http://www.ems.gov>.

- Successful completion of a background check and drug screening
- Valid driver's license
- Successful completion of a recognized health care provider's basic life support (BLS)/cardio-pulmonary resuscitation (CPR) course
- Successful completion of a state-recognized AEMT course
- Successful completion of a state-recognized written certification examination
- Successful completion of a state-recognized practical certification examination
- Demonstration that you can meet the psychological and physical criteria necessary to perform safely and properly all the tasks and functions described in the defined role of an AEMT
- Compliance with other state, local, and employer provisions

The state-recognized written and practical examination may be the NREMT Exam based on the individual state. The NREMT was established in 1970 to certify and register EMS professionals through a valid and uniform process that assesses their knowledge and skills to ensure competent practice. The NREMT requires recertification every 2 years to ensure continued competence. Because most states now recognize NREMT certification, it is easy for an AEMT to move to another state and continue to work without attending another course and taking another certification exam for that area. If you move to a different state, you may be allowed to apply for reciprocity rather than starting your

Licensure Requirements

To be recognized and to function as an AEMT, you must meet certain requirements. The specific requirements differ from state to state. Ask your instructor or learning institute, or contact your state EMS official to find out about the requirements in your state. Generally, the criteria to be licensed and employed as an AEMT will include the following:

- High school diploma or equivalent
- Proof of immunization against certain communicable diseases

Words of Wisdom

In 2020, the NREMT launched the National EMS-ID number system. An EMS-ID is a 12-digit identification number issued at no charge to all EMS professionals, from EMR to paramedic, and to students entering the profession. The number is automatically generated by the National Registry when a person creates an account. For EMS providers with an existing account, an EMS-ID is retroactively created. Unlike the number issued by the National Registry (NR Number) when an individual becomes certified, EMS-IDs do not change as the person's certification level changes. Thus, the various certification numbers professionals may obtain in their career are all tied back to the single EMS-ID.

training all over or taking the new state's certification exam. **Reciprocity** is the recognition by one state of another state's licensure, allowing a health care professional from another state to practice in the new state.

The **Americans With Disabilities Act (ADA)** of 1990 protects people who have a disability from being denied access to programs and services that are provided by state or local governments and prohibits employers from failing to provide full and equal employment to people with disabilities. In addition, Title I of the ADA protects those with disabilities seeking gainful employment under many circumstances. Employers with 15 or more employees are required to adjust processes so a candidate with a disability can be considered for the position and, when possible, to modify the work environment or how the job is normally performed.¹ This allows many people who can perform the functional job skills the opportunity to pursue a career in EMS. To obtain further information about the Americans with Disabilities Act and employment as an AEMT, contact your state EMS office.

One of the primary responsibilities of each state is to ensure the safety of its residents. As such, states have requirements prohibiting people with certain legal infractions from becoming EMS providers. The specific legal exclusions vary from state to state. States may exclude from certification persons with a history of a health problem that could make their performance of AEMT tasks dangerous to themselves or others. Contact your state EMS official for more information.

Overview of the EMS System

History of EMS

As an AEMT, you will join a long tradition of people who have provided emergency medical care to their fellow human beings. Early efforts to systematize prehospital care include the field treatments and transport innovated during the Civil War. Civilian ambulatory services soon followed. With the use of motor vehicles in warfare, volunteer ambulance squads were organized and went overseas to provide care for the wounded in World War I. In World War II, the military trained special corpsmen to provide care in the field and bring the casualties to aid stations staffed by nurses and physicians. In the Korean conflict, the care system evolved to the field medic and rapid helicopter evacuation to nearby

Mobile Army Surgical Hospital units, where immediate surgical intervention was provided. Many advances in the immediate care of trauma patients resulted from the casualty experiences in the Korean and Vietnam conflicts. More recent military engagements, such as conflicts in the Middle East, and responses to terrorism continue to influence EMS practices.

Unfortunately, emergency medical care of people injured and ill at home or elsewhere outside a hospital had not progressed to a similar level. As late as the early 1970s, emergency ambulance service and care across the United States varied widely. In some places, care was provided by well-trained, advanced first aid squads that had well-equipped, modern ambulances. In a few urban areas, it was provided by hospital-based ambulance services that were staffed with interns and early forms of prehospital care providers. In many places, the only emergency medical care and ambulance service was provided by the local funeral home using a hearse that could be converted to carry a cot and serve as an ambulance. In other places, the police or fire department used a station wagon that carried a cot and a first aid kit. In most cases, both were staffed by a driver and an attendant who had some first aid training. In the few areas where a commercial ambulance was available to transport ill and injured people, it was usually similarly staffed and served primarily to transport the patient to the hospital.

Words of Wisdom

As an AEMT, you will continue a long tradition of people who have provided emergency medical care to their fellow human beings. The AEMT is an important contributor to the overall health care community and ultimately helps reduce mortality and morbidity.

Many communities had no formal provision for prehospital emergency care or transportation. Injured people were given first aid by police or fire personnel at the scene and were transported to the hospital in a police or fire officer's car. Customarily, patients with an acute illness were transported to the hospital by a relative or neighbor and were met by their family physician or an on-call hospital physician who assessed them and then summoned any specialists and operating room staff who were

needed. Except in large urban centers, most hospitals did not have the staffed emergency departments (EDs) that we are accustomed to today.

EMS as we know it today had its origins in 1966 with the publication of *Accidental Death and Disability: The Neglected Disease of Modern Society*. This report, known more commonly as The White Paper, prepared jointly by the Committees on Trauma and Shock of the National Academy of Sciences/National Research Council, revealed to the public and Congress the serious inadequacy of prehospital emergency care and transportation in many areas.

As a result, Congress mandated that two federal agencies address these issues. The NHTSA of the Department of Transportation (DOT), through the Highway Safety Act of 1966, and the Department of Health, Education, and Welfare (now known as the Department of Health and Human Services), through the Emergency Medical Services Development Act of 1973, created funding sources and programs to develop improved systems of prehospital emergency care.² They also required states to focus on EMS personnel training and the legislation and regulation of EMS personnel levels.

In the early 1970s, the DOT developed and published the first National Standard Curriculum to serve as the guideline for the training of EMTs.³ To support the EMT course, the American Academy of Orthopaedic Surgeons prepared and published the first EMT textbook—*Emergency Care and Transportation of the Sick and Injured*—in 1971. This textbook is the AEMT adaptation of that publication. Through the 1970s, following the recommended guidelines, each state developed the necessary legislation, and the EMS system was developed throughout the United States. During this same period, emergency medicine became a recognized emergency medical specialty, and fully staffed EDs became the accepted standard of care.

In the late 1970s, the DOT developed a recommended National Standard Curriculum for the training of paramedics and identified a part of the course to serve as training for AEMTs.

During the 1980s, many areas enhanced the EMS National Standard Curriculum by adding providers with higher levels of training who could provide key components of advanced life support (ALS) care. The availability of paramedics and ALS-level care on calls that require or benefit from advanced care has grown steadily in recent years.

In addition, with the evolution in training and technology, EMTs and AEMTs can now perform several important advanced skills in the field that were formerly reserved for paramedics.

This growth and sophistication of the EMS system did not come without drawbacks. As each state sought to create a system that would meet the needs of its citizens, the roles and responsibilities of EMS providers began to vary from state to state. For example, in some states, EMTs were allowed to administer medications; in other states they were not.

In the 1990s, NHTSA began an examination of EMS from a national perspective. With the counsel of EMS providers, physicians, fire chiefs, nurses, state administrators, educators, and other interested professionals, NHTSA created the *EMS Agenda for the Future*. This important document creates a plan to standardize the levels of EMS education and EMS providers in an effort to ensure a more seamless delivery of EMS care across the United States. In 2019, NHTSA revised this document and published *EMS Agenda 2050*. This revision places greater emphasis on patient-centered care in hopes of better attending to the patient's perspective and meeting the needs of patients' loved ones, communities, and the clinicians who provide care.

The skills you learn and the scope of practice that AEMTs now enjoy are part of this national movement toward an EMS system that meets the needs of an ever-changing health care industry and meets those needs through a safe and efficient method.

Levels of Training

As discussed earlier, licensure of AEMTs is a state function, subject to the laws and regulations of the state in which the AEMT practices. Each state is granted the ability to control the functions of its licensed providers. For this reason, there remains some variation from state to state on the scope of AEMT practice, as well as training and recertification requirements. Here is how the system is supposed to work from the federal level down to the local level.

At the federal level, NHTSA brought in experts from around the United States to create the National EMS Scope of Practice Model. This document provides overarching guidelines for the minimum skills each level of EMS providers should be able to perform. **TABLE 1-2** shows the guidelines from

that model. Some items in the table are flagged, and corresponding notes are provided to show areas where current practice has evolved. For example, certain skills listed in the table are no longer

practiced or have been aligned with a different skill level. Because licensure is a state function, at the state level laws are enacted to regulate how EMS providers will operate and are then executed by the

TABLE 1-2 The Interpretive Guidelines: National EMS Scope of Practice Model

An EMT also provides the skills listed in the EMR level.

An AEMT also provides the skills listed in the EMR and EMT levels.

A paramedic also provides the skills listed in the EMR, EMT, and AEMT levels.

EMR	EMT	AEMT	Paramedic
Airway and Breathing Minimum Psychomotor Skill Set			
Oral airway	Humidifiers	Supraglottic airway	BPAP/CPAP
Bag-mask device	Partial rebreathing mask		Needle chest decompression
Sellick maneuver ^a	Venturi mask		Chest tube monitoring
Head tilt–chin lift	Manually triggered ventilators		Percutaneous cricothyrotomy
Jaw-thrust maneuver	Automatic transport ventilators		ETCO ₂ /capnography
Modified chin lift	Oral and nasal airways		NG/OG tube
Obstruction, manual			Nasal and oral endotracheal intubation
Oxygen therapy			Airway obstruction removal by direct laryngoscopy
Nasal cannula			Positive end-expiratory pressure
Nonrebreathing mask			
Upper airway suctioning			
Assessment Minimum Psychomotor Skill Set			
Manual BP	Pulse oximetry	Blood glucose monitoring ^b	ECG interpretation
	Manual and automatic BP		Interpretive 12-lead
			Blood chemistry analysis
Pharmacologic Intervention Minimum Psychomotor Skill Set			
Medication Administration Routes	Assisted Medications		
Unit dose auto-injector for self or peer care (MARK 1)^c	Assisting a patient in administering their own prescribed medications, including auto-injector	- Peripheral IV insertion - IV fluid infusion - Pediatric IO insertion	- Central line monitoring - IO insertion - Venous blood sampling

(continues)

TABLE 1-2 The Interpretive Guidelines: National EMS Scope of Practice Model (*continued*)

EMR	EMT	AEMT	Paramedic
	Medication Administration Routes • Buccal • Oral	Medication Administration Routes • Aerosolized • Subcutaneous • IM • Nebulized • SL • IN • IV push for D₅₀ and narcotic antagonist only	Medication Administration Routes • Endotracheal • IV (push and infusion) • NG • Rectal • IO • Topical • Accessing implanted central IV port
	Medications to Be Administered • Physician-approved over-the-counter medications (oral glucose, aspirin for chest pain or suspected ischemic origin)	Medications to Be Administered • SL nitroglycerin for chest pain of suspected ischemic origin • Subcutaneous^d and IM epinephrine for anaphylaxis • Glucagon and IV D₅₀ for hypoglycemia • Inhaled beta agonist for dyspnea and wheezing • Narcotic antagonist • Nitrous oxide for pain relief	Medications to Be Administered • Physician-approved medications • Maintenance of blood administration • Initiation of thrombolytics
Emergency Trauma Care Minimum Psychomotor Skill Set			
Manual cervical stabilization	Spinal motion restriction		Morgan lens
Manual extremity stabilization	Seated spinal motion restriction		
Eye irrigation	Long backboard		
Direct pressure	Extremity splinting		
Hemorrhage control	Traction splinting		
Emergency moves for endangered patients	Mechanical patient restraint		
	Tourniquet ^e		
	MAST/PASG ^f		
	Cervical collar		
	Rapid extrication		

EMR	EMT	AEMT	Paramedic
Medical/Cardiac Care Minimum Psychomotor Skill Set			
CPR	Mechanical CPR		Cardioversion
AED	Assisted complicated delivery of an infant		Carotid massage
Assisted normal delivery of an infant			Manual defibrillation
			TC pacing

Abbreviations: AED, automated external defibrillator; AEMT, advanced emergency medical technician; BPAP, bilevel positive airway pressure; BP, blood pressure; CPAP, continuous positive airway pressure; CPR, cardiopulmonary resuscitation; D₅₀, 50% dextrose; ECG, electrocardiogram; EMR, emergency medical responder; EMT, emergency medical technician; ETCO₂, end-tidal carbon dioxide; IM, intramuscular; IN, intranasal; IO, intraosseous; IV, intravenous; MAST, military antishock trousers; NG, nasogastric; OG, orogastric; PASG, pneumatic antishock garments; SL, sublingual; TC, transcutaneous

Note: The 2019 National EMS Scope of Practice Model serves as a foundation for states to build their own model. It is intended to illustrate the operation of each level of EMS provider and the progression from one level to another. It is not inclusive of every skill a state may allow.

^aThe Sellick maneuver is no longer recommended.

^bBlood glucose monitoring is now considered an EMT-level skill.

^cMark 1 has been replaced by the DuoDote and the Antidote Treatment Nerve Agent Auto-Injector (ATNAA).

^dSubcutaneous epinephrine administration is typically considered a paramedic-level skill now.

^eTourniquet use has evolved to be practiced by all providers, including the EMR level.

^fMAST/PASG has very specific indications, including stabilizing bilateral femur fractures or pelvic fractures. See Chapter 27, Bleeding, for further information.

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state-level EMS administrative offices that control licensure. Finally, the local medical director decides the day-to-day limits of EMS personnel. For example, the medications that will be carried on an ambulance or where patients are transported are the day-to-day operational concerns about which the medical director will have direct input.

The national guidelines are intended to create more consistent delivery of EMS across the United States. A medical director can allow an AEMT to perform a skill only if the state has already approved performance of that skill. The medical director can limit the scope of practice but cannot expand it beyond state law. Expanding the scope of practice requires state approval.

The EMT, AEMT, and paramedic education standards and instructional guidelines can be downloaded from www.ems.gov. In addition, the NREMT is a nongovernmental agency that provides national standardized testing for EMS certification in much of the United States. Many states use the

National Registry standards to certify their AEMTs and grant licensing reciprocity to NREMT-certified AEMTs. However, it is important to remember EMS is regulated entirely by the state in which you are licensed.

Public Basic Life Support and Immediate Aid

With the development of EMS and increased awareness of the need for immediate emergency medical care, millions of laypeople have been trained in BLS/CPR. In addition to CPR, many people have taken short basic first aid courses that include control of bleeding and other simple skills that may be required to provide immediate essential care. These courses are designed to train people so that people in the workplace, such as teachers, coaches, babysitters, and others, can provide the necessary critical care in the minutes before AEMTs or other responders arrive at the scene.

One of the most dramatic recent developments in prehospital emergency care is the use of an **automated external defibrillator (AED)**. These remarkable devices, some no larger than a cell phone, detect treatable life-threatening cardiac dysrhythmias (ventricular fibrillation and ventricular tachycardia) and deliver the appropriate electrical shock to the patient. Designed to be used by an untrained layperson, they are now included at every level of prehospital emergency training.

Emergency Medical Responder

Because the presence of a person who is trained and able to initiate BLS and other urgent care cannot be ensured, the EMS system includes immediate care by EMRs, such as law enforcement officers, firefighters, park rangers, ski patrollers, or other organized rescuers who often arrive at the scene before the ambulance and providers (**FIGURE 1-2**). EMR training provides these people with the skills necessary to initiate immediate care and then assist



FIGURE 1-2 Emergency medical responders, such as law enforcement officers, are trained to provide immediate basic life support until providers arrive on the scene.

Courtesy of Captain David Jackson, Saginaw Township Fire Department.

other EMS providers on their arrival. The course focuses on providing immediate BLS and urgent care with limited equipment. It also familiarizes students with the additional procedures, equipment, and packaging techniques that other EMS providers may use and with which the EMR may be called on to assist.

Emergency Medical Technician

The EMT course requires a minimum of 150 hours of instruction and provides the essential knowledge and skills required to provide basic emergency medical care in the field. The course serves as the foundation on which additional knowledge and skills are built in AEMT training. On arrival at the scene, you and the other providers who have responded with the ambulance should assume responsibility for the assessment and care of the patient, followed by proper packaging and transport of the patient to the ED if appropriate.

Street Smarts

In addition to professional EMRs, AEMTs often encounter a variety of people on the scene eager to help. You will encounter Good Samaritans trained in first aid and CPR, physicians and nurses, and other well-meaning people with or without prior training and experience. If identified and used properly, these people can provide valuable assistance when you are short-handed. At other times, they can interfere with operations and even create problems or a danger to themselves or others. It will be your task in your initial scene size-up to identify the various people on the scene and orchestrate well-meaning attempts to assist.

YOU are the Provider

Part 2

The director continues to explain that the service uses the National EMS Scope of Practice Model as the framework for what its providers can do in the field. He also mentions that the local 9-1-1 center hires only dispatchers who have completed the Emergency Medical Dispatch (EMD) course.

3. What is the National EMS Scope of Practice Model?
4. How does the EMD system work?



FIGURE 1-3 AEMTs have EMT training and various advanced skills such as performing intravenous therapy.

© Jones & Bartlett Learning. Courtesy of MIEMSS.

Advanced Emergency Medical Technician

The AEMT course and training are designed to add knowledge and skills in specific aspects of ALS to providers who have been trained and have experience in providing emergency medical care as EMTs. Additional skills above the EMT level include IV therapy, use of advanced airway adjuncts, and the knowledge and skills necessary for the administration of a limited number of medications (**FIGURE 1-3**). The AEMT course is a minimum of 200 hours beyond EMT requirements. The purpose of this level of EMS provider is to deliver an expanded range of skills beyond the EMT. In some parts of the United States, the availability of paramedics is limited. AEMTs help to fill the gap by providing limited ALS care to regions where paramedics are not available.

Paramedic

The paramedic has completed an extensive course of training that substantially increases knowledge and mastery of basic skills and covers a wide range of ALS skills. This curriculum ranges approximately 800 to 1,100 hours beyond EMT requirements, usually equally divided between classroom and internship training. Increasingly, this training is offered within the context of an associate or bachelor's degree college program.

Components of the EMS System

EMS Agenda 2050 is a multidisciplinary, national review of all aspects of EMS delivery. The goal is

TABLE 1-3 EMS Agenda 2050 Components of an EMS System

A People-Centered EMS System

1. Comprehensive, quality, convenient care
2. Evidence-based clinical care
3. Efficient, well-rounded care
4. Preventive care
5. Comprehensive and easily accessible patient records

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to develop a more cohesive and consistent system across the country. The document features five key aspects of a people-centered EMS system, as outlined in **TABLE 1-3**.

The vision of EMS Agenda 2050 is that a people-centered EMS system is one in which people receive comprehensive, quality care in the most comfortable and convenient place. This care is based on sound research focused on producing the right outcomes. In this people-centered system, patients who need it will receive transport that is safe and efficient (not necessarily at a high rate of speed or with lights and siren). Care in a people-centered system will focus not only on life-saving interventions, but also on reducing physical, emotional, and psychological suffering. Such EMS systems will be an integrated part of a larger health care system focused on proactively preventing injuries and illnesses rather than reactively responding to treat them. EMS clinicians will have access to and be able to contribute to a patient's comprehensive medical record, allowing not only improvements of treatment for individual patients, but also updates in prevention, diagnosis, and treatments as our understanding and technology advance.

The EMS Agenda 2050 guiding principles include an EMS system with the following characteristics:

- Inherently safe and effective, so the entire system from start to finish is designed to minimize exposure to injury, infections, illness, or stress
- Integrated and seamless, where EMS is fully integrated with all other aspects of health care and is engaged with other emergency services

and within the communities in which they operate

- Reliable and prepared, ensuring EMS care is delivered consistently and compassionately and is guided by sound research at all times, by all EMS providers, at all levels, or from all agencies
- Socially equitable, so that access to care and the quality of care are not determined by a patient's age, socioeconomic status, gender, ethnicity, or where they live
- Sustainable and efficient, meaning systems must be fiscally responsible, providing value to the community with a minimum of waste and a maximum of accountability
- Adaptable and innovative, evolving to meet the changing needs of the people whom they serve by continuously evaluating new tools and techniques, education programs, and system designs

Public Access

Easy access to help in an emergency is essential. In most of the United States, an emergency communications center that dispatches fire, police, rescue, and EMS units can be reached by dialing 9-1-1. At the communications center, trained dispatchers obtain the necessary information from the caller and, following dispatch protocols, dispatch the ambulance crew and other equipment and responders who might be needed. This communications center is called a **public safety access point**, or sometimes public safety answering point.

In an enhanced 9-1-1 system, the address of the caller is displayed on a screen. The address remains on the screen until the dispatcher releases it so that if the caller is unable to speak or hangs up, the caller's location remains displayed. Most emergency communications centers also include special equipment that allows people with speech or hearing disabilities to communicate with the dispatcher via a keyboard and printed messages. In some areas, rather than 9-1-1, a different special published emergency number may be used to call for EMS. Social media may play an evolving role in allowing laypeople trained in CPR to be alerted of a cardiac arrest in their area. Training the public in how to summon an EMS unit is an important part of the public education responsibility of each EMS service.

Enhanced 9-1-1 systems for cell phones are now available that identify not only the cellular phone number from which an emergency call is being placed, but also the exact geographic coordinates of the phone at the time the call is made. Such systems use GPS (global positioning system) technology. Because cell phones capable of transmitting a GPS signal and a system capable of receiving that signal are both required, the technology will require additional time and resources to implement.

A system called **emergency medical dispatch (EMD)** was developed to assist dispatchers in providing callers with vital instructions to help them manage medical emergencies until EMS crews arrive. Dispatchers are trained and provided with scripts to help them relay relevant instructions to callers. The system helps dispatchers select appropriately resourced units to respond to a request for assistance. It is the dispatcher's duty to relay all relevant and available information to the responding crews in a timely manner. Keep in mind, however, current technology does not allow the dispatcher to see what is actually occurring at the scene and that it is not uncommon for you to find the reality of the call quite different from the dispatch information. The dispatchers can relay only the information provided to them by the caller.

Communication Systems

With the information provided by the caller, the dispatcher will select the appropriate parts of the emergency system that need to be activated. According to the National Fire Protection Association, 45% of fire departments nationwide provide BLS care and 17% of fire departments provide ALS care. Nationwide, 38% of fire departments do not provide emergency medical services.⁴

In most municipalities, EMS is a part of the fire department. In others, it is a part of the police department or is an independent public or private safety service. In some areas, a contractor may provide BLS or ALS service, whereas in other areas, a hospital-based program, possibly covering several towns, may provide the ambulance services.

New technologies are constantly being developed that can assist responders in locating their patients. As previously described, cellular telephones can be linked to GPS units to display their location. Responding units can transmit their

position to dispatch, and dispatch can transmit the location of a call to a moving digital map in the unit, complete with turn-by-turn directions. Medical databases can be queried and patient information can be directly downloaded to your computer or uploaded from your laptop to the database. The pace of technological developments in communications makes the latest device soon obsolete, so constant training and education are required to keep your knowledge up-to-date.

Being active in your community will keep you abreast of the best local resources. When you are developing a potential care plan, ask yourself, “Does the receiving facility have the resources needed for this patient?” When you are active in your community, you will know the answer. If the answer is no, the next question, “Is there an appropriate facility within a reasonable distance?” will also be a part of your community knowledge. And of course, remember, your patients have the ultimate decision regarding where they go, as long as they are in stable condition, alert, and oriented.

Clinical Care

As an AEMT, you will use a wide range of emergency equipment. During the AEMT course, you will learn how to use a variety of the appliances and devices that you may need to use on a call. Clinical care describes the various pieces of equipment and scope of practice for using that equipment. You will learn when the use of the equipment or practice is indicated and when it is contraindicated because it will not be of benefit or may cause harm. Although the use of different models and brands of a given device will follow the same generic principles and methods, some variations and peculiarities exist from one model to another. When you join a service, check each key piece of equipment before going on duty to ensure it is in its assigned place, it

works properly, and you are familiar with the specific model carried on your ambulance.

Each AEMT may be called on to drive the ambulance. Therefore, you must familiarize yourself with the roads in your **primary service area (PSA)** or sector. The PSA is the main area in which an EMS agency operates. Before you go on duty, check all the medical equipment and supplies and the communications equipment that the ambulance carries, and ensure that the ambulance is fully fueled, that it has sufficient oil and other key fluids, and that the tires are in good condition and inflated properly. You should test each of the driver's controls and each built-in unit and control in the patient compartment. If you have not driven the specific ambulance before, it is a good idea to take it out and become familiar with it before you respond to a call. Maintenance and safe driving of the ambulance are discussed in detail in Chapter 39, *Transport Operations*.

Human Resources

This component of EMS examines the profession. Human resources deals with the people within EMS systems. Who delivers the care? How are these people compensated for their time and energy? How do other members of the medical community interact and participate within the EMS world? These are some of the questions discussed within the component of human resources. The overarching concept is to encourage the creation of EMS systems that provide an environment where talented people want to work and can turn their passion into a rewarding career.

EMS Agenda 2050 encourages the creation of systems that help to protect the well-being of EMS providers. It also encourages systems to develop career ladders, allowing talented EMS providers ways to use their talent for many years.

Several objectives need to be accomplished to help make a career in EMS a lasting one. As discussed, efforts are being made to ensure EMS providers can relocate from one state to another more seamlessly. From a global point of view, one of the core functions of a state is to provide for and protect its citizens. This obligation has led to the creation of EMS levels that are unique to a specific state. Though effective for any one state, these idiosyncratic EMS levels complicate movement from

Words of Wisdom

An *indication* is a reason for performing an action or giving a medication. A *contraindication* is a reason not to. For example, a fall is an indication for cervical spine immobilization, and hypersensitivity to a medication is a contraindication to giving that medication.

one state to another. One of the functions of the National EMS Scope of Practice Model is to create stable foundations on which each level of EMS provider is grounded. The net effect is to encourage a more consistent definition of “what is an EMT” so providers can serve more freely throughout the United States.

National Registry certification often facilitates licensure in other states. The Interstate Commission for EMS Personnel Practice aims to increase the ability of EMS providers to practice in other states through the Recognition of EMS Personnel Licensure Interstate CompAct (REPLICA). REPLICA is not a form of EMS licensure reciprocity. It simply extends a privilege for EMS personnel from member states to practice on a short-term or intermittent basis under approved circumstances in other member states.

Medical Direction and Control

Each EMS system has a physician **medical director** who authorizes the providers in the service to provide medical care in the field. The appropriate care for each injury, condition, or illness that you will encounter in the field is determined by the medical director and is described in a set of written standing orders and protocols. Protocols are described in a comprehensive guide delineating the scope of practice for AEMTs. Standing orders are part of protocols and designate what an AEMT is required to do for a specific complaint or condition. Providers are not required to consult medical control before implementing standing orders.

The medical director is the ongoing working liaison among the medical community, hospitals, and the AEMTs in the service. If treatment problems arise or different procedures should be considered, these are referred to the medical director for decision and action. To ensure that proper training standards are met, the medical director determines and approves the continuing education and training that are required of each AEMT in the service and approves any obtained elsewhere.

Medical control is off-line (indirect) or online (direct), as authorized by the medical director. Online medical control consists of direction given over the phone or radio directly from the medical director or designated physician. The medical direction can be communicated by the physician's designee;



FIGURE 1-4 Online or direct medical control is provided by a physician.

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it does not have to be communicated personally by the physician. Off-line medical control consists of standing orders, training, and supervision authorized by the medical director. You must know and follow the protocols developed by your medical director.

The service's protocols will identify an EMS physician who can be reached by radio or telephone for medical control during a call (**FIGURE 1-4**). This is a type of direct online medical control. On some calls, once the squad has initiated any immediate urgent care and given its radio report, the online medical control physician may confirm or modify the proposed treatment plan or may prescribe additional special orders that you are to follow for that patient. The point at which you should give your radio report or obtain online medical direction will vary based on the patient's condition. For example, once the patient has been assessed and you believe that the patient needs a treatment that requires medical control's permission, you would contact medical control.

Legislation and Regulation

Although each EMS system, medical director, and training program has vast latitude, their training, protocols, and practices must conform to the EMS legislation, rules, regulations, and guidelines adopted by each state. Medical directors, along with EMS supervisors and others, develop protocols for individual service areas based on the training levels of the EMS providers in that area. The state

EMS office is responsible for authorizing, auditing, and regulating all EMS systems, training institutions, courses, instructors, and providers within the state. In most states, the state EMS office obtains input from an advisory committee made up of representatives of the services, service medical directors, medical associations, hospitals, training programs, instructors' associations, EMT associations, and the public in that state.

EMS is usually administered by a senior EMS official. Daily operational and overall direction of the service is provided by an appointed chief executive officer and several other officers who serve under this person. When the EMS unit is a part of a fire or police department, the department chief will usually delegate the responsibility for directing EMS to an assistant chief or other officer whose sole responsibility is to manage the EMS activities of the department. To provide clear guidelines, most services have written standard operating procedures and policies. When you join a service, you will be expected to learn and follow its protocols.

The chief executive of the service is in charge of the necessary administrative tasks (such as scheduling, personnel, budgets, purchasing, and vehicle maintenance) and the daily operations of the ambulances and crews. Except for medical matters, this person operates as the chief (similar to a fire chief or police chief) of EMS for the service and the PSA that it covers.

Integration of Health Services

EMS does not work in a vacuum. EMS personnel travel to people's homes and to incident locations. Once on scene, they deliver care and transport the patient to a care facility. Integration of health

services means the prehospital care you administer is coordinated with the care administered at the hospital. When you deliver a patient to the ED, you are simply transferring that patient to another care provider. The excellent care that you began should be continued in the ED. This component helps to decrease errors, to increase efficiencies, and, most of all, to ensure the patient receives comprehensive continuity of care.

Words of Wisdom

Accurate, comprehensive documentation is a must for the integration of health services to work effectively. Each component of the system must know what care the previous component provided (eg, medications given) to offer optimal care for the patient. Failure to document a medication that was provided could result in a repeat dosage by the next provider, resulting in an overdose to the patient.

Some EMS systems have collaborated with local hospitals to improve patient outcomes associated with time-sensitive treatment like heart attacks, trauma, and stroke. This is accomplished through special training in the EMS system and certain hospital departments. For example, when paramedics determine a patient is having a heart attack, they alert the ED. The personnel in the ED notify the cardiac catheterization team, or you may be directed to transport the patient to a cardiac specialty center. As a result, the key personnel are ready to begin critical treatments as soon as the patient arrives at the hospital. Similar activities take place for stroke and trauma patients.

YOU are the Provider

Part 3

Midway through your first day of orientation, you are introduced to the medical director. He explains to you his roles and responsibilities as medical director of the service. He further tells you specific rules and regulations that you, as an AEMT, must follow on every call to maintain your certification.

5. What dictates the skills that you, as an AEMT, may perform in the course of your duties?
6. What are the two types of medical control?

Mobile Integrated Healthcare and Community Paramedicine

Mobile Integrated Healthcare (MIH) is a system of delivering health care that utilizes the prehospital spectrum. It has evolved as a result of the Patient Protection and Affordable Care Act (more commonly known as the Affordable Care Act), with the goal to facilitate improved access to health care at an affordable price. In the MIH model, health care is provided within the community, rather than at a physician's office or hospital. An integrated team of health care professionals, including EMS providers, delivers health care services in the community and connects patients with other valuable resources such as social services. An advantage of this model is that it offers access to care to patients who live in communities with limited medical resources and leads to better service for those who are homebound or disabled.

This new branch of health care is causing the evolution of additional training levels for EMS providers. One training aspect is **community paramedicine**, in which experienced paramedics receive advanced training to equip them to provide services within a community. In addition to the patient care services a paramedic would typically provide, services provided by community paramedics may include performing health evaluations, monitoring chronic illnesses or conditions, obtaining laboratory samples, administering immunizations, and serving as a patient advocate.

Street Smarts

Community paramedicine and MIH teams may be the best example of the team concept of continuum of care. In the MIH model, health care is provided within the community rather than at a physician's office or hospital. The success of MIH programs have shown that EMS providers, working as a unified team with in-hospital and other community health care providers, can improve patient outcomes, increase patient satisfaction, and reduce health care costs.

Evaluating Quality and Safety

The medical director is responsible for maintaining **quality control** to ensure all staff members who are involved in caring for patients meet appropriate

medical care standards on each call. To provide the necessary quality control, the medical director and other involved staff review patient care reports (PCRs), audit administrative records, and survey patients.

Continuous quality improvement (CQI), which may also be known as quality assurance (QA), is a dynamic, circular system of continuous internal and external reviews and audits of all aspects of an EMS call. To provide CQI, periodic run review meetings are held in which all staff involved in patient care review the run reports and discuss any areas of care that seem to need change or improvement. Positive feedback is also discussed. If a problem seems to be repeated by a specific AEMT or crew, the medical director will discuss the details with the providers involved and, if necessary, assign remedial training or some other educational activity. The medical director also ensures the appropriate continuing education and training are available.

Information and skills in emergency medical care change constantly. You will need refresher training or continuing education as new modalities of care, equipment, and understanding of critical illnesses and trauma develop. In addition, when you have not performed a particular procedure for some time, skill decay may occur. Therefore, your medical director might establish a CQI process to correct the deficit. For example, an ED physician noted that despite their assessments, many AEMTs were missing a high number of closed long bone fractures, resulting in inadequate prehospital care. A subsequent audit of calls led to a review and retraining session for assessment and care of fractures. This same process can apply to CPR or any other type of skill that you do not use often. You may also choose to follow up on specific patients delivered to the hospital. By doing so, you have the opportunity to critique your prehospital care and, in turn, improve any weak areas. As an AEMT, you have an ongoing commitment to ensure your skills and knowledge are current.

Another function of the evaluation process is to determine ways to limit or eliminate human error and improve patient safety. During the delivery of EMS, as with any occupation, there are times when errors can occur. Communicating with other AEMTs or transferring the patient to the ED presents circumstances where errors can happen. Driving to the scene can be hazardous. A patient can be dropped during lifting and moving. Remember,

errors can occur at any point during the call that can result in harm to the patient, public, and you.

It is important that you strive to eliminate errors as much as possible. Understanding the circumstances of the errors helps to minimize them. There are three main sources of errors. Errors can occur as a result of a *rules-based failure*, a *knowledge-based failure*, or a *skills-based failure* (or any combination of these). For example, does an AEMT have the legal right to administer the particular medication needed by the patient? If not, a rules-based failure has occurred if an AEMT assists with the administration. Does an AEMT know all pertinent information about the medication being administered? If not, a breakdown at this point, such as the administration of the wrong medication, would be referred to as a knowledge-based failure. Finally, is the equipment operating and being used properly? If not, a skills-based error has occurred. Any error can come from multiple sources.

Agencies need to have clear protocols, which are detailed plans that describe how certain patient issues, such as chest pain or shortness of breath, are to be managed. These protocols need to be understood by all AEMTs within the service. Limiting errors requires the efforts of both the EMS agency and EMS personnel.

The environment can also contribute to errors. Are there ways to limit distractions and minimize interruptions? Can you find what you need in a timely manner? Sometimes the solution is as easy as ensuring flashlights are available on all ambulances or ensuring all medications and equipment are properly labeled and organized.

When you are about to perform a skill, ask yourself, “Why am I doing this?” Consider the reason for your actions, and allow yourself time to reflect and make an informed decision. If you have considered what to do and cannot come up with a solution, ask for help. Talk with your partner, contact medical control, or call your EMS supervisor.

Another way to help limit medical errors is to use checklists, reference material, and “cheat sheets.” Have a copy of your protocol book with you. Emergency physicians have many reference materials available to them. Physicians recognize they cannot memorize everything, so referencing a book or a reliable Internet resource helps ensure the use of accurate information. Apps are also available for reference.

Use downtime to refresh the skills used less often. Use decision-making aids, such as algorithms, and reflect on what has been done as an informal critique for future improvement of performance. Finally, after a troublesome call, sit down and talk. Talk with your partner and/or your supervisor. Discussing the events that just happened provides an excellent avenue for learning. Your discussions can help lead to changes in protocol, how equipment is stocked, or even the purchase of new equipment.

Street Smarts

Short routine debriefings with your partner after each run can identify problems before they build up. Questions to consider might include the following:

- What did we do?
- Were there any equipment problems?
- What went well?
- What could have gone better?

Information Systems

EMS is not dissimilar to any other profession in today's world. Without computers, the job would be much more difficult. An information system allows EMS providers to efficiently document the emergency medical care that has been delivered. Once that information is stored electronically, it can be used to improve care. For example, how many times has a department seen patients with chest pain? What is the average on-scene time for major trauma patients? How many AED runs has the department had? These questions and many more can be answered using the information gathered from computerized medical records.

This information is used for a variety of purposes. It is used to construct educational sessions for the department. Data from ambulance activity logs are used to justify hiring more personnel. Examining the types of patients and their frequency can provide the foundation for the purchase of new equipment and guide continuing education sessions. This information can also be combined with other database resources, such as from a hospital, to determine patient outcome. Departments from around the United States are sending information

to Washington, DC, so a national snapshot of EMS activities can be obtained. Information gathered by NEMSIS can be found at www.nemsis.org.⁵ This information will be used to better plan for the needs of EMS systems today and in the future.

System Finance

All EMS departments need a funding system that allows them to continue to provide care; however, the type of system needed depends on many variables. There are several types of EMS departments in the United States. The *Journal of Emergency Medical Services* reports annually on how EMS is delivered in the 200 largest cities within the United States. The 2013 survey included more participation from the 15 largest cities, so the results may vary from previous years. **TABLE 1-4** provides the breakdown of types of EMS services within the United States for the year 2013.

These departments may have paid or volunteer personnel, or a mix of both. Financial resources are available for EMS departments through taxation, fee for service, paid subscription, donations, federal/state/local grants, fund-raisers, or combinations of same. Which financial system is used depends on the needs and makeup of each EMS department.

How are AEMTs involved with the financial side of EMS? You may be asked to gather insurance information from patients, secure signatures on certain documents such as HIPAA (Health Insurance Portability and Accountability Act; discussed later in the chapter) notifications, or obtain written permission from patients to bill their health insurance companies. These steps are important to the health care process. When you do not provide needed

Street Smarts

Proper documentation by the EMS provider can substantially affect an agency's ability to process medical insurance claims, provide eligibility for financial grants for training or equipment, and provide evidence of competent practices.

information, the patient may be billed, rather than the insurance company.

As the health care system in the United States evolves, billing is changing at every level. In 2020, the Centers for Medicare and Medicaid Services (CMS) implemented a pilot program in a small group of EMS agencies, known as Emergency Triage, Treat, and Transport (ET3). Rather than an EMS system getting paid only for transportation to an ED, ET3 strives to reimburse EMS systems for providing the right patient with the right care at the right time. This program allows transport to EDs for patients who need that level of care, but also sets up a payment model for patient transport to alternative destinations, such as urgent care centers or doctors' offices, or on-scene treatment with no transport.

Education Systems

Your training will be conducted by many knowledgeable EMS educators. In most states, the instructors who are responsible for coordinating and teaching the AEMT course and continuing education courses are approved and licensed by the state EMS office or agency. Most EMS training programs must adhere to national standards established by the accrediting organizations CoAEMSP (Committee on Accreditation of Educational Programs for the Emergency Medical Services Professions) and CAAHEP (Commission on Accreditation of Allied Health Education Programs). To be licensed in some states, an instructor must have extensive emergency medical and educational training and teach for a designated period while being observed and supervised by an experienced instructor. ALS-level instructors and directors must hold a 4-year degree.

Generally, ALS training is provided either in a college/university, adult career center, or hospital setting. In most states, educational programs that provide ALS training must be approved by the state and have their own medical director. In these

TABLE 1-4 Types of EMS Services That Transport Patients in the 200 Largest Cities Within the United States

Organization Type	Percentage of Service Provided
EMS	28.1%
Fire department	44.9%
Hospital/private/volunteer	27.0%

Abbreviation: EMS, emergency medical services

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courses, many of the lectures and small group sessions are presented by the medical director or other physicians, nurses, and EMS instructors. In clinical sessions, in which supervised practice is obtained in the ED or other in-hospital settings, students are supervised directly by physicians and nurses.

The quality of care you provide depends on your ability and the quality of your training. Therefore, your instructor and the many others who develop and participate in your training program are key members of the emergency care team.

When you no longer have the structured learning environment that is provided in your initial training course, you must assume responsibility for directing your own study and learning. As an AEMT, you are required to attend a certain number of hours of continuing education approved for AEMTs each year to maintain, update, and expand your knowledge and skills. In many services, the required hours are provided by the training officer and medical director. In addition, most EMS education programs and hospitals offer a number of regular continuing education opportunities in each region. You may also attend state and national EMS conferences to help you stay current about local, state, and national issues affecting EMS. Because there are many levels of licensing, you should ensure the continuing education you receive is approved for AEMTs. Whether you take advantage of these opportunities depends on you. You may decide to remain an AEMT or you may want to achieve a higher level of training and certification, but whatever you choose, the key to being a good AEMT and providing high-quality care is your commitment to continual learning and increasing your knowledge and skills.

AEMTs possess special knowledge and skills that are directed to the care of patients in emergency situations. The authority that is delegated to you to care for patients is a very special one. Maintaining

your knowledge and skills is a substantial responsibility. Knowledge and skills that are learned in any profession weaken when they are not used on a continual basis. Consider the steps involved in CPR, for example. If you have not used these skills since your original training, it is unlikely you will perform CPR proficiently. Frequent continuing education, refresher courses, and computer-based or manikin-based self-education exercises are measures you can take to maintain your skills and knowledge.

Prevention and Public Education

Prevention and public education are often closely associated with each other. They are components of the EMS system where the focus is on public health. **Public health** examines the health needs of entire populations with the goal of preventing health problems and works to prevent illness and injury by being proactive. Significant accomplishments of the public health systems include vaccination programs, helmet and seat belts laws, tobacco use laws, prenatal screenings, and the formation of the Food and Drug Administration.

Health care in the United States is currently in a state of flux. The high-tech, on-demand style of care that is prevalent has two major drawbacks. One, it is very expensive. In the United States, more than 17.14% of the gross domestic product is accounted for by health care.⁶ Two, it may not deliver a better product. The Centers for Disease Control and Prevention (CDC) reports people born in the United States have an average life expectancy of almost 79 years.⁷ There are 35 other countries in which people are living longer.

EMS can work with public health agencies on both primary and secondary prevention strategies. **Primary prevention** focuses on strategies that will

YOU are the Provider

Part 4

The final speaker for your first day of orientation is the service's QA/CQI officer. He explains to you the required format for documenting your calls, as well as what can be expected of him.

7. What is the purpose of a QA/CQI meeting?
8. How can a QA/CQI review make you a better provider?

Words of Wisdom

A good example of public health at work is the common product, salt. The next time you buy salt, look at the contents. In the United States, most salt is sold with the additive iodine. It was discovered years ago that certain thyroid diseases, such as goiter (abnormally large thyroid gland), are caused by a decrease in iodine levels within people's diets. The solution was to add this important element into a commonly used food source. Today, goiter is rare within the United States.

prevent an event from ever happening. For example, in the early 1900s, polio was a devastating disease causing death and disability for thousands of Americans. It was discovered that a vaccine could be developed to prevent the disease. In the span of one generation, the disease was virtually eliminated. Vaccinations are a good example of primary prevention within public health.

In June 2009, the World Health Organization (WHO) declared the swine flu (H1N1) virus to be at pandemic levels, which meant the virus had spread throughout the world. The CDC estimated that between April 2009 and April 2010, there were approximately 60.8 million cases and 12,469 deaths in the United States.⁸ By August 2010, the WHO declared an end to the pandemic. More recently, coronavirus disease 2019 (COVID-19), first identified in China in 2019, rapidly spread as a pandemic, with the first documented case in the United States on January 20, 2020.⁹ EMS providers were forced into many unconventional roles due to the rapid spread of the virus and inadequate number of providers. As vaccination proceeds and expands beyond hospital settings where the first COVID-19 vaccinations occurred, EMS providers may be called on to assist in the administration of the vaccine.

Other examples of primary prevention include ensuring people know the dangers of drinking and driving, and the harmful effects of using tobacco and other drugs. There are several ways you can contribute to primary prevention strategies. Become involved in programs that educate the community. Small actions can lead to big differences.

In a **secondary prevention** strategy, the event has already happened. The question then becomes, how can we decrease the effects of the event?

Helmets and seat belts do not prevent the accident from happening, yet they prevent serious injuries from occurring as a result of the accident. The next time you drive down a major roadway, take note of the construction of the guardrails. There have been significant changes in guardrail construction over the years as more information has become available on what happens during a vehicle collision.

You may also be involved in the surveillance of illnesses and injuries. The PCRs that are generated by EMS personnel can be used to determine if a serious, widespread condition exists. For example, EMS is in a perfect position to provide statistical information to the local government about collisions. Injury surveillance data can be used to determine ways to improve a dangerous intersection, to prevent crashes from ever happening, or to limit the severity of injuries to drivers.

As discussed, you can help educate the public. People may not understand why an incident has happened. A parent allows her 15-month-old child to play outside with other children unsupervised. The child falls and cuts her hand. EMS arrives and determines the cause of the injury is obvious. You can work professionally, respectfully, and kindly with the parents to help educate them on how to prevent this injury from occurring in the future.

The public may not understand the education that EMS providers have and what services they can provide. You can go to local schools and teach children to call 9-1-1 when there is a medical emergency. EMS personnel can work with local health care institutions to inform local residents when to call for an ambulance and when other transportation methods are more appropriate. Efforts to use social media to alert the public of a cardiac arrest are also developing. Consider advocating for social-media-directed or mobile phone dispatch systems that encourage laypeople trained in CPR to respond to episodes of cardiac arrest that occur close to them.

Teaching people how to perform CPR, how to help a choking victim, and even how to assist in the delivery of a baby are all aspects of public education. Educating the public on the benefits of compression-only CPR is another example. One of the important effects of public education is an increase in public respect for EMS. When people understand what it means to work on an ambulance and provide care to the sick and injured, they are more likely to consider EMS a vital part of the

Words of Wisdom

Human Trafficking

Human trafficking is a type of modern-day slavery. Through the use of force, fraud, and/or coercion, perpetrators establish control over other human beings and exploit them for profit. The number of victims of human trafficking is unknown due to its underground nature. According to the International Labor Organization, it is estimated that 40.3 million people were victims of modern slavery in 2016 and there is an average of 5.4 victims of human trafficking for every 1,000 people in the world.¹⁰

Trafficking exists in multiple forms, including child and forced labor, child soldiers, and the commercial sexual exploitation of children. Those individuals most at risk of exploitation include individuals from low socioeconomic backgrounds and marginalized communities, immigrants, members of minority cultures (such as the LGBTQ community), children in foster care, individuals who are homeless or have run away from home, individuals with disabilities, and victims of natural disasters. Although members of virtually any demographic group could be included on this list, women and children top the list.

Though some victims are sold into slavery, and others are forcibly kidnapped, the most common scenario involves traffickers who take advantage of an individual's vulnerability, including offers of a better life, romance, or drugs. Physical force is often used in establishing dominance, along with threats of violence against family members or loved ones. Victims are frequently exposed to harsh physical conditions, starvation, health risks, rape, and substance abuse. The severity of the treatment may also lead to various mental health issues, including posttraumatic stress disorder.

Trafficked persons are often reluctant to report or seek help for numerous reasons, including the following:

- They do not recognize the situation they are in.
- They have no idea where or how to seek help.

- They have a bond with their trafficker and thus a sense of obligation to "help" the person.
- They or their families are in debt to the trafficker (often from the purchase of drugs).
- They are fearful of deportation.
- They are addicted to drugs.
- They feel they or their families will be harmed if they seek help.
- They are unfamiliar with their surroundings (especially when held in a country other than their own) and do not know whom to trust.
- They are fearful of law enforcement.
- They are earning much-needed money to send to their families.

Contrary to popular belief, human trafficking often occurs in plain sight. While there are many indicators that a person may be the victim of trafficking, the following is a brief list of signs you may encounter when responding to a routine EMS call:

- The patient shows signs of physical abuse or injury.
- The patient is accompanied everywhere by a person who speaks for the patient or will not allow the patient to speak when addressed directly.
- The patient appears fearful or under the control of another person.
- The patient has ongoing health issues that have not been addressed.
- The patient is unfamiliar with the neighborhood in which the scene is located.
- The patient appears to be traveling with a minimal or inappropriate amount of luggage or belongings.
- The patient has a lack of identification documents or does not have control over personal identification documents.
- The patient is a juvenile engaged in a commercial sex act.

You should report any such red flags to the National Human Trafficking Hotline at 1-888-373-7888. Follow local protocols for further reporting of suspicious situations.

public health care system. This change in attitude can be powerful and lead to increased EMS funding and greater respect for EMS as a profession.

EMS Research

Traditional medical practice is based on medical knowledge, intuition, and judgment. In the early years of EMS, many standards relating to

professionalism, protocols, training, and equipment were developed from EMS providers' direct experience. Now, ongoing EMS research provides a scientific basis for standards, in a way similar to research in any other health care profession.

In the early days of EMS, it was believed major trauma patients needed to be stabilized on the scene before they were transported. Paramedics would start IV lines and use advanced airways.

There was no foundation to support this behavior; it was just assumed that this care needed to be done. After compiling substantial prehospital EMS research, it was determined major trauma patients needed to be transported to an operating room more than they needed IV fluids. This is the power of EMS research.

Virtually all aspects of health care today use **evidence-based medicine (EBM)**. EBM is focused on procedures that have proven useful in improving patient outcomes and on individual patient characteristics and values. Although not every aspect of EMS has enough research to be truly evidence-based, many EMS systems and states now consult the *National Model EMS Clinical Guidelines* from the National Association of State EMS Officials. These treatment guidelines are based on a review of current research and expert consensus. All aspects of the AEMT role are currently being researched, not only within the academic community, but increasingly within the practitioner community, as every AEMT has something to contribute to improving the role.

EMS research may be performed by EMS providers or other people who are studying a particular branch of medicine. AEMTs will be involved in research typically through gathering data. You may be part of a study to determine how much oxygen should be given to patients with shortness of breath. You may be involved in a study to track the time it takes to transport serious trauma patients to the ED. Your job is to ensure all information about patients is recorded carefully. The information gathered is analyzed by others to answer these questions, and the results are shared with the rest of the EMS community to improve patient care practices. Traditional medical practice is based on such research.

Research can also be conducted at each EMS facility. EMS personnel can examine patient care records to determine where the department can improve. This information can be used to generate educational sessions for AEMTs or can be used to plan public education/public prevention strategies. High-quality patient care should focus on procedures useful in improving patient outcomes through sound research. It is important for EMS providers to stay current on the latest advances in health care. In the past, the American Heart Association (AHA), in concert with the International Liaison Committee on Resuscitation (ILCOR), revised the

Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiac Care every 5 years. As of 2015, it was determined a 5-year cycle is insufficient to keep pace with the rapidly evolving research in resuscitation science, so it is planned for the guidelines to be updated on a more regular basis. The ILCOR guidelines are an excellent example of evidence-based medical decision making in progress. These changes occur because more information is known.

One word of caution: When reading new research results, make sure you understand what the results mean. Research information can be powerful, but it is often powerful within a very limited setting. A manufacturer of a defibrillator boasts its new machine will terminate ventricular fibrillation on the first shock 95% of the time. On the basis of this information, you may immediately want to buy this new product. Terminating ventricular fibrillation is certainly a positive result, but does this defibrillator save more lives than other defibrillators? In this example, the manufacturer is reporting that the defibrillator can terminate ventricular fibrillation, not that the defibrillator can save more lives. People who do not examine the research will often make hasty conclusions.

Be skeptical when reading research. Ask questions and conduct your own research. Conclusions that seem too good to be true are usually not true.

Street Smarts

Remember, each patient is unique and has different needs. An algorithm, or treatment plan, should be altered to meet the needs of each individual patient as opposed to using an “across-the-board” approach.

Transport Considerations and Communication

Transport to Specialty Centers

In addition to hospital EDs, many EMS systems include specialty centers that focus on specific types of care (such as trauma, burns, poisoning, or psychiatric conditions) or specific types of patients (for example, children). Specialty centers require in-house staffs of surgeons and other specialists; other facilities must page operating teams, surgeons, or other specialists from outside the hospital. Typically, only a few hospitals in a region are designated as specialty centers. Transport time to a specialty center

may be slightly longer than the time to an ED, but patients will receive definitive care more quickly at a specialty center. You must know the location of the centers in your area and when, according to your protocol, you must transport the patient directly to one. Sometimes, air medical transport will be necessary. Local, regional, and state protocols will guide your decision in these instances.

Interfacility Transports

Many EMS systems provide interfacility transportation for nonambulatory patients or patients with acute and chronic medical conditions requiring medical monitoring (**FIGURE 1-5**). This transportation may include transferring patients to and from hospitals, skilled nursing facilities, board and care homes, or even their own residence.

During ambulance transportation, the health and well-being of the patient is the responsibility of AEMTs. You should obtain the patient's medical history, chief complaint, and latest vital signs and provide ongoing patient assessment. In certain circumstances, depending on local protocols, a nurse, physician, respiratory therapist, or medical team will accompany the patient, especially when the patient requires care that extends beyond the scope of practice of AEMTs.

Working With Hospital Staff

You should become familiar with the hospital by observing hospital equipment and how it is used, the functions of staff members, and the policies and procedures in all emergency areas of the hospital. You will also learn about advances in emergency

medical care and how to interact with hospital personnel. This experience helps you understand how your care influences a patient's recovery and will emphasize the importance and benefits of proper prehospital care. It will also show you the consequences of delayed care, inadequate care, or poor judgment.

Physicians are not likely to be in the field with you to provide personal, on-the-spot instructions. However, you may consult with appropriate medical staff by using the radio through established medical control procedures.

A physician or nurse may serve as an instructor for medical subjects in your training program. Through these experiences, you will become more comfortable using medical terms, interpreting patient signs and symptoms, and developing patient management skills. The best patient care occurs when all emergency care providers have close rapport. This rapport allows you and hospital staff the opportunity to discuss mutual problems and to benefit from each other's experiences.

Working With Public Safety Agencies

Some public safety workers have EMS training. As an AEMT, you must become familiar with all the roles and responsibilities of these workers. Personnel from certain agencies are better prepared than you are to perform certain functions. For example, employees of a utility company are better equipped to control downed power lines. Law enforcement personnel are better able to handle violent scenes and traffic control. Recognize that each person has special training and a job to do at the scene. Remember, the best, most efficient patient care is achieved through cooperation among agencies.

Roles and Responsibilities of AEMTs

You will be one of the first health care professionals to assess and treat the patient; as such, you have certain roles and responsibilities (**TABLE 1-5**). Often, patient outcomes are determined by the care that you provide in the field and your identification of patients who need prompt transport. You are responsible for all aspects of EMS, from the preparation of the equipment, to the delivery of care, to providing a good example for others within the community.



FIGURE 1-5 As an AEMT, part of your job may be transporting patients from one facility to another.

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