VOLUME 2 PATIENT ASSESSMENT

PARAMEDIC CARE Principles & Practice

Fifth Edition

Meets National EMS Education Standards

Bledsoe
Porter
Cherry

Paramedic Care: Principles & Practice

Fifth Edition

Volume 2

Patient Assessment

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Printer/Binder: RR Donnelley and Sons
Cover Printer: Phoenix Color
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Library of Congress Cataloging-in-Publication Data

Names: Bledsoe, Bryan E., author. | Cherry, Richard A., author. | Porter, Robert S., author.
Title: Paramedic care : principles & practice | Bryan E. Bledsoe, Richard A. Cherry, Robert S. Porter.
Description: Fifth edition. | Boston : Pearson Education, Inc., 2016- | Includes bibliographical references and index.
Identifiers: LCCN 2016009904 | ISBN 9780134569956 (pbk. : alk. paper) | ISBN 0134569954 (pbk. : alk. paper)
Subjects: | MESH: Emergencies | Emergency Medical Services | Emergency Medical Technicians
Classification: LCC RC86.7 | NLM WB 105 | DDC 616.02/5—dc23 LC record available at http://lccn.loc.gov/2016009904

Brady
is an imprint of

PEARSON

www.bradybooks.com

10 9 8 7 6 5 4 3 2 1
ISBN 10: 0-13-456995-4
ISBN 13: 978-0-13-456995-6

This text is respectfully dedicated to all EMS personnel
who have made the ultimate sacrifice. Their memory
and good deeds will forever be in our thoughts and prayers.

BEB, RAC

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Preface to Volume 2

Today's paramedics are professional health care clinicians and practitioners of emergency field medicine. The present paramedic curriculum provides both a broad-based medical education and a specific intensive training program designed to prepare paramedics to perform their traditional role as providers of emergency field medicine. The curriculum also provides a broad foundation in anatomy and physiology, patient assessment, pathophysiology of disease, and pharmacology that allows paramedics to expand their roles in the health care industry. The five-volume ***Paramedic Care: Principles & Practice*** series and, in particular, *Volume 2, Patient Assessment*, reflect these broad and specific purposes.

This volume provides paramedic students with the principles of patient assessment. The first two chapters discuss scene size-up and primary assessment. The next three chapters present the techniques of conducting a comprehensive secondary assessment, along with history and physical exam, and discuss communication techniques for doing so. The sixth chapter presents an overview of patient monitoring technologies. The final chapter discusses ways to apply the techniques learned in this volume to real patient situations.

Overview of the Chapters . . . and What's New in the 5th Edition?

CHAPTER 1 **Scene Size-Up** discusses scene size-up in the overall context of an emergency call. On arrival at the scene, paramedics must quickly determine whether the scene is safe. They must identify indications of potential hazards, determine mechanism of injury or nature of illness, identify all patients involved, determine the need for additional resources, make decisions about Standard Precautions and personal protective equipment, and communicate their findings to the dispatcher. The chapter analyzes how to take actions that ensure the safety of both the EMS team and the patients in a variety of scenarios. **New in the 5th Edition:** Emphasis on **ongoing scene safety assessment** throughout the call (not just on arrival).

CHAPTER 2 **Primary Assessment** examines how to conduct a primary assessment to identify and intervene in immediate threats to life. The first steps are identifying threats to airway, breathing, and circulation—or, in certain circumstances, circulation, airway, and breathing. The paramedic must form a general impression of the patient's condition; stabilize the cervical spine; assess baseline mental status; and assess and manage airway, breathing, and circulation. The results of the primary assessment will be used to determine the priorities of patient care and transport.

New in the 5th Edition: For significant mechanism of injury, change from recommending full immobilization to **deciding whether or not to immobilize the patient according to local protocols**. Discussion of how to use **pulse oximetry and continuous waveform capnography in evaluation of breathing adequacy**. For hemorrhage control, **updated sequence**: (1) direct pressure; and if not effective, then (2) **tourniquet** for extremity wounds or hemostatic agents for wounds to other site. **Transport triage for burns guidelines:** burns without other trauma to burn facility; burns with other trauma to trauma facility.

CHAPTER 3 **Therapeutic Communications** describes effective therapeutic communication strategies. This chapter provides techniques for decreasing the barriers to effective communication, building trust and rapport with patients, using nonverbal communication and responding to patients' nonverbal behaviors, and conducting patient interviews. Also discussed are ways to adapt these strategies to patients of all ages and cultures, and to patients with special challenges.

New in the 5th Edition: New emphasis on **eye contact** as the most powerful way to convey caring. Emphasis on **using language the patient can understand**, which may vary with the patient's age or other circumstances.

CHAPTER 4 **History Taking** discusses the components of the patient history. These components include

preliminary data, the chief complaint, the present problem, the past medical history, family and social history, and the review of body systems. This constitutes a comprehensive history and is not meant to be used in its entirety in emergency field situations. Elements of the comprehensive history will be used, as appropriate, in the field.

CHAPTER 5 Secondary Assessment presents the techniques of conducting a comprehensive physical exam. Like the history, the comprehensive physical exam taught in this volume is not intended for all situations. With time and clinical experience, you will learn which components of the history and physical exam are appropriate to assess and manage each particular patient and situation. Topics in this chapter include applying the techniques of inspection, palpation, percussion, and auscultation and assessing the skin, the head, the neck, the chest (along with the respiratory and cardiovascular systems), the abdomen and digestive system, the extremities and musculoskeletal system, and the peripheral vascular system, as well as conducting a comprehensive neurologic exam. Included in each section is a review of the anatomy and physiology relevant to those areas of the exam.

CHAPTER 6 Patient Monitoring Technology covers the latest in high-tech methods for obtaining patient information. The chapter discusses continuous and 12-lead ECG monitoring, pulse and CO-oximetry, capnography, methemoglobin and total hemoglobin monitoring, glucometry, basic blood chemistries, and portable ultrasound.

New in the 5th Edition: New section on **Point of Care (POC) Testing**—performing basic blood chemistry analysis in the field with the use of portable analyzers. Completely revised and updated section on the use of **ultrasound technology** in the field to assist in assessing such factors as **internal abdominal bleeding, abdominal aortic aneurysm, impaired cardiac function, possible pneumothorax, heart failure, distinguishing cardiac from non-cardiac shock, confirming endotracheal tube placement,and obstetric factors such as early pregnancy, ectopic pregnancy, and fetal conditions**.

CHAPTER 7 Patient Assessment in the field offers a practical approach to conducting problem-oriented history and physical exams. It deals with ways to use your new skills to assess patients in the field. With time and clinical experience, you will learn which components are appropriate for different situations. Topics include scene safety, the primary assessment, the secondary assessment (for the responsive medical patient, the unresponsive medical patient, the trauma patient with significant mechanism of injury, and the trauma patient with an isolated injury), the detailed physical exam, and the reassessment**.**

Acknowledgments

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We wish to acknowledge the remarkable talents of the following people who contributed to this five volume series. Individually, they worked with extraordinary commitment. Together, they form a team of highly dedicated professionals who have upheld the highest standards of EMS instruction.

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Michael F. O'Keefe (Volume 1, Chapter 5)

Wes Ogilvie, MPA, JD, LP (Volume 1, Chapter 7)

Kevin McGinnis, MPS, EMT-P (Volume 1, Chapter 9)

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David Nelson, MD, FAAP, FAAEM (Volume 5, Chapter 4)

Mike Abernethy, MD, FAAEM (Volume 5, Chapter 10)

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Dale M. Carrison, DO, FACEP, FACOEP (Volume 5, Chapter 14)

Dan Limmer, AS, NRP (Volume 5, Chapter 14)

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The reviewers of *Paramedic Care: Principles & Practice, Fourth Edition, Volume 2* have provided many excellent suggestions and ideas for improving the text. The quality of the reviews has been outstanding, and the reviews have been a major aid in the preparation and revision of the manuscript. The assistance provided by these EMS experts is deeply appreciated.

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We also wish to express appreciation to the following EMS professionals who -reviewed the third edition of Paramedic Care: Principles & Practice. Their suggestions and perspectives helped to make this program a successful teaching tool.

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Photo Acknowledgments

All photographs not credited adjacent to the photograph or in the photo credit section below were photographed on assignment for Brady/Prentice Hall/Pearson Education.

Organizations

We wish to thank the following organizations for their valuable assistance in creating the photo program for this edition:

Bound Tree University
Dublin, OH. www.boundtreeuniversity.com

Canandaigua Emergency Squad
Canandaigua, NY

Flower Mound Fire Department
Flower Mound, TX

Children's Hospital St. Louis/BJC Health Care
St. Louis, MO

Christian Hospital/BJC Health Care
St. Charles, MO

Tyco Health Care/Nellcor Puritan Bennet
Pleasanton, CA

Wolfe Tory Medical
Salt Lake City, UT

Winter Park Fire-Rescue
Winter Park, FL

Chief James E. White
Deputy Chief Patrick McCabe

City of Winter Park, FL
Kenneth W. Bradley, Mayor

Technical Advisors

Thanks to the following people for providing technical support during the photo shoots in Winter Park, FL, for this edition:

Andrew Isaacs, EMS Captain
Tod Meadors, EMS Captain
Dr. Tod Husty, Medical Director
Richard Rodriguez, EMS Captain
Jeff Spinelli, Engineer-Paramedic

Models

Thanks to the following people from the Flower Mound Fire Department, Flower Mound, Texas, and from Winter Park Fire-Rescue, Winter Park, Florida, who provided locations and/or portrayed patients and EMS providers in our photographs.

FAO/Paramedic Wade Woody
FF/Paramedic Tim Mackling

FF/Paramedic Matthew Daniel
FF/Paramedic Jon Rea
FF/Paramedic Waylon Palmer
FF/EMT Jesse Palmer
Captain/EMT Billy McWhorter
Linda Kirk, Director, Winter Park Towers, Winter Park, FL
Andrew Isaacs
Richard Rodriguez
Tod Meadors
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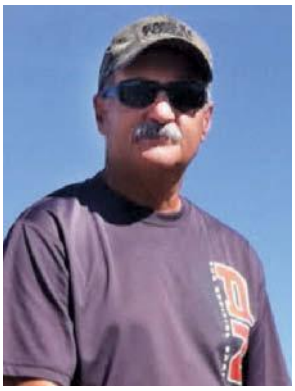

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Mr. Cherry has authored several books for Brady. Most notable are *Paramedic Care: Principles & Practice, Essentials of Paramedic Care, Intermediate Emergency Care: Principles & Practice,* and *EMT Teaching: A Common Sense Approach.* He has made presentations at many state, national, and international EMS conferences on a variety of teaching topics. He and his wife, Sue, run a summer horse-riding camp for children with special needs on their property in West Monroe, New York. He also plays guitar in a Christian band.

A GUIDE TO KEY FEATURES

Emphasizing Principles

Chapter 1

Introduction to Paramedicine

Bryan Bledsoe, DO, FACEP, FAAEM

STANDARD

Preparatory (EMS Systems)

COMPETENCY

Integrates comprehensive knowledge of EMS systems, the safety and well-being of the paramedic, and medical–legal and ethical issues, which is intended to improve the health of EMS personnel, patients, and the community.

Learning Objectives

Terminal Performance Objective: After reading this chapter your should be able to discuss the characteristics of the profession of paramedicine.

Enabling Objectives: To accomplish the terminal performance objective, you should be able to:

1. Define key terms introduced in this chapter.
2. Compare and contrast the four nationally recognized levels of EMS providers in the United States.
3. Describe the requirements that must be met for EMS professionals to function at the paramedic level.
4. Discuss the traditional and emerging roles of the paramedic in health care, public health, and public safety.
5. List and describe the various health care settings paramedics may practice in with an expanded scope of practice.

KEY TERMS

Advanced Emergency Medical Technician (AEMT), p. 3
community paramedicine, p. 4
critical care transport, p. 7
Emergency Medical Responder (EMR), p. 3
Emergency Medical Services (EMS) system, p. 2
Emergency Medical Technician (EMT), p. 3
mobile integrated health care, p. 4
National Emergency Medical Services Education Standards: Paramedic Instructional Guidelines, p. 5
Paramedic, p. 3
paramedicine, p. 4

LEARNING OBJECTIVES

Terminal Performance Objectives and a separate set of Enabling Objectives are provided for each chapter.

KEY TERMS

Page numbers identify where each key term first appears, boldfaced, in the chapter.

more rapid are the pulse and respiratory rates.

3.0 and 3.5 kg. Because of the excretion of extracellular

As newborns make the transition from fetal to pulmonary circulation in the first few days of life, several important

Table 11-1 Normal Vital Signs

	Pulse (Beats per Minute)	Respiration (Breaths per Minute)	Blood Pressure (Average mmHg)	Temperature	
Infancy:					
At birth:	100–180	30–60	60–90 systolic	98–100°F	36.7–37.8°C
At 1 year:	100–160	30–60	87–105 systolic	98–100°F	36.7–37.8°C
Toddler (12 to 36 months)	80–110	24–40	95–105 systolic	96.8–99.6°F	36.0–37.5°C
Preschool age (3 to 5 years)	70–110	22–34	95–110 systolic	96.8–99.6°F	36.0–37.5°C
School-age (6 to 12 years)	65–110	18–30	97–112 systolic	98.6°F	37°C
Adolescence (13 to 18 years)	60–90	12–26	112–128 systolic	98.6°F	37°C
Early adulthood (19 to 40 years)	60–100	12–20	120/80	98.6°F	37°C
Middle adulthood (41 to 60 years)	60–100	12–20	120/80	98.6°F	37°C
Late adulthood (61 years and older)	*	*	*	98.6°F	37°C

*Depends on the individual's physical health status.

TABLES

A wealth of tables offers the opportunity to highlight, summarize, and compare information.

components of the rule of threes. Whenever BVM ventilation is difficult, however, the rule of threes should be employed.

CONTENT REVIEW

➤ The Rule of Threes for Optimal BVM Ventilation
- Three providers
- Three inches
- Three fingers
- Three airways
- Three PSI
- Three PEEP

- ***Three providers.*** One provider on the mask, one on the bag, and one for cricoid pressure.
- ***Three inches.*** A reminder to place the patient in the sniffing position (elevate the head three inches) if not contraindicated.
- ***Three fingers.*** Three fingers on the cricoid cartilage to perform cricoid pressure.
- ***Three airways.*** In a worst-case scenario, the airway can be maintained, if necessary, with an orophrayngeal airway and two nasopharyngeal airways (one in each nostril).

CONTENT REVIEW

Content review boxes set off from the text are interspersed throughout the chapter. They summarize key points and serve as a helpful study guide—in an easy format for quick review.

index, and middle finger of one hand. If a lesser-trained provider is performing the maneuver, you should confirm that they are in the correct position (Figure 15-47).

Use caution not to apply so much pressure as to deform and possibly obstruct the trachea; this is a particular danger in infants. The necessary pressure has been estimated as the amount of force that will compress a capped 50-mL syringe from 50 mL to the 30 mL marking. In the event that the patient actively vomits, it is imperative to release the pressure to avoid esophageal rupture. Similarly, if cricoid pressure is being performed during intubation, reduce or release the pressure if the intubator is having difficulty visualizing the vocal cords.

Optimal BVM Ventilation Using the Rule of Threes

The *rule of threes* was developed to help providers recall the components of optimal BVM ventilation. Many patients can be easily oxygenated and ventilated without using all

- ***Three PSI.*** A gentle reminder to use the lowest pressure necessary to see the chest rise.
- ***Three seconds.*** A reminder to ventilate slowly and allow time for adequate exhalation.
- ***Three PEEP.*** Or up to 15 cm/H_2O positive-end expiratory pressure (PEEP) as needed to improve oxygen saturations.

Bag-Valve Ventilation of the Pediatric Patient

The differences in the pediatric patient's anatomy require some variation in ventilation technique. First, the child's relatively flat nasal bridge makes achieving a mask seal more difficult. Pressing the mask against the child's face to improve the seal can actually obstruct the airway, which is more compressible than an adult's. You can best achieve the mask seal with the two-person BVM technique, using a jaw-thrust to maintain an open airway.

For BVM ventilation, the bag size depends on the child's age. Full-term neonates and infants will require a pediatric BVM with a capacity of at least 450 mL. For children up to 8 years of age, the pediatric BVM is preferred, although for patients in the upper portion of that age range you can use an adult BVM with a capacity of 1,500 mL if you do not maximally inflate it. Children older than 8 years require an adult BVM to achieve adequate tidal volumes. Additionally, be

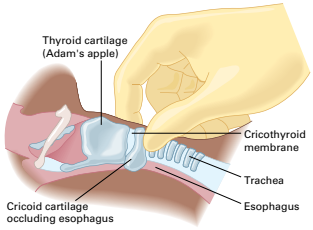

FIGURE 15-47 Cricoid pressure.

PHOTOS AND ILLUSTRATIONS

Carefully selected photos and a unique art program reinforce content coverage and add to text explanations.

Summary

The scene size-up is the initial step in the patient care process. Sizing up the scene and situation begins at your initial dispatch and does not end until you are clear of the call. As the call unfolds, you should be making constant observations and adjustments to your plan of action. Remember that your safety and the safety of your partner are paramount—it is hard to effectively treat both yourself and others.

Scene size-up should be practiced so much that it becomes second nature to you. It is like noticing veins on people in public after you begin starting IVs. (You have all done it—looked across the room at the back of someone's hand and noticed what nice veins they had.) Sizing up a scene is no different. After a while, you begin to notice mechanisms of injury and other important details almost subconsciously. But be careful and do not get complacent! Always make it a point to pause for just a few seconds and consciously look around the scene before proceeding into any situation.

Scene size-up is not a step-by-step process, but a series of decisions you make when confronted with a variety of circumstances that are often beyond your control. It is a way to make order out of chaos, keep yourself and your crew safe, and ensure that all necessary resources are focused on patient care and outcomes. With time and experience, you will learn to perform a scene size-up quickly and focus on important issues. Your careful size-up lays the foundation for an organized and timely approach toward patient care and scene management. And always remember that scene size-up is not a one-time occurrence. It is an ongoing process.

SUMMARY

This end-of-chapter feature provides a concise review of chapter information.

airway management in every patient, you should learn and use advanced skills such as intubation, RSI, and cricothyrotomy. You must maintain proficiency in all airway skills, especially the more advanced techniques, through ongoing continuing education, physician medical direction, and testing with each EMS service. If you cannot do this, it is in the patient's best interest to focus on less sophisticated airway skills. If you anticipate that every airway will be complicated, apply basic airway skills before using advanced procedures, and perform frequent reassessments, you will give the patient his best chance for meaningful survival.

You Make the Call

You and your paramedic partner, Preston Connelly, are assigned to District 4, a quiet suburban neighborhood, on a warm Saturday in June. At 2:00 P.M., you are dispatched to care for a choking child at the Happy Hotdog Restaurant on Main Street. On your way to the location, the dispatcher advises you that they are currently giving prearrival choking instructions to the bystanders at the scene. On arrival, you find a frantic mother who tells you that her 6-year-old son was eating a hot dog and drinking a soda when he started coughing and gasping for air. She keeps yelling for you to do something. Bystanders surround the child and are attempting to perform the Heimlich maneuver without success. On your primary assessment, you find a 6-year-old boy lying on the floor, unconscious and apneic, with a pulse rate of 130. There is cyanosis surrounding his lips and fingernail beds, with a moderate amount of secretions coming from his mouth. There are no signs of trauma. You and Preston immediately start management of this child.

1. What is your primary assessment and management of this child?
2. What are your first actions?
3. What are your options for managing the airway after the obstruction is relieved?
4. What are the major anatomic differences between pediatric and adult patients in terms of airway management?

See Suggested Responses at the back of this book.

YOU MAKE THE CALL

A scenario at the end of each chapter promotes critical thinking by requiring students to apply principles to actual practice.

REVIEW QUESTIONS

These questions ask students to review and recall key information they have just learned.

6. Which radio frequencies may be used by cities and municipalities for their ability to better transmit through concrete and steel?
   a. UHF
   b. VHF
   c. 800-mHz
   d. none of the above
7. Which frequency band is typically used by county and suburban agencies due to its ability to transmit over various terrains and longer distances?
   a. UHF
   b. VHF
   c. 800-mHz
   d. none of the above
8. What is the name of the basic communications system that uses the same frequency to both transmit and receive?
   a. Multiplex
   b. Duplex
   c. Simplex
   d. Complex
9. A communications system that uses a different transmit and receive frequency allowing for simultaneous communications between two parties is called _____
   a. multiplex.
   b. duplex.
   c. simplex.
   d. complex.
10. _____ communications systems are capable of transmitting both voice and electronic patient data simultaneously.
    a. Multiplex
    b. Duplex
    c. Simplex
    d. Complex

See answers to Review Questions at the back of this book.

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Further Reading

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CASE STUDY

This feature at the start of each chapter draws students into the reading and creates a link between text content and real-life situations.

Review Questions

1. When you couple the physical assessment findings with the patient's medical history, you are able to derive a list of _____
   a. clinical diagnostics.
   b. field prognoses
   c. chief complaints
   d. differential field diagnoses.
2. The pain, discomfort, or dysfunction that caused your patient to request help is known as the _____
   a. primary problem.
   b. nature of the illness.
   c. differential diagnosis.
   d. chief complaint.
3. You are assessing a patient who complains of cardiac-type chest pain that is felt in the jaw and down the left arm. This pattern of pain is known as _____
   a. sympathetic pain.
   b. tenderness.
   c. referred pain.
   d. associated pain.
4. Your patient has smoked 2 packs of cigarettes each day for the past 35 years. He is a _____ pack/year smoker.
   a. 35
   b. 70
   c. 730
   d. 25,550
5. The CAGE questionnaire is used as an evaluation tool to assess a patient with what type of history?
   a. Alcoholism
   b. Lung disease
   c. Allergies
   d. Pregnancy
6. What interviewing mnemonic should be used for each presenting problem a patient has?
   a. SAMPLE
   b. DCAP–BTLS
   c. OPQRST–ASPN
   d. AEIOU–TIPS
7. The mnemonic GPAL is used to evaluate a patient's _____
   a. alcoholism.
   b. allergies.
   c. pregnancy history.
   d. endocrine dysfunction.

Match the following elements of the present illness of the patient with a chief complaint of chest pain with their respective examples:

1. O	**a.** Pain is 6 on a scale of 1–10
2. P	**b.** Patient also complains of shortness of breath and nausea
3. Q	**c.** Pain had a sudden onset
4. R	**d.** Pain began 2 hours ago
5. S	**e.** Pain worsens while lying down
6. T	**f.** Patient denies dizziness
7. AS	**g.** Pain goes through to the back
8. PN	**h.** Pain is heavy and vise-like

See Answers to Review Questions at the back of this book.

REFERENCES

This listing is a compilation of source material providing the basis of updated data and research used in the preparation of each chapter.

FURTHER READING

This list features recommendations for books and journal articles that go beyond chapter coverage.

cleaning, p. 70
Code Green Campaign, p. 78
disinfection, p. 70
exposure, p. 70
isotonic exercise, p. 61
pathogens, p. 65
personal protective equipment (PPE), p. 66
sterilization, p. 70
stress, p. 74
stressor, p. 74
Tema Conter Memorial Trust, p. 78

Case Study

Howard is a 15-year veteran of a high-volume, inner-city EMS service. When he first started his career, Howard thought he knew what he was getting into, but the years have taught him differently.

Right now, Howard is in the spotlight for saving the life of a police officer who was shot in a hostage situation. "That call forced me to reflect on a few important things," he says. "Two years ago, I had a minor heart problem, and it was a good wake-up call. Since then I've been lifting weights and running, so I was able to get to the officer with enough strength to carry him to safety.

"Another thing is that I always use personal protective equipment. I never go to work without steel-toed boots and I never leave the ambulance without a pair of disposable gloves. Can you believe there are still paramedics who knock the concept of infection control? If any one of my partners sticks a needle into the squad bench in my ambulance, they know I'll speak up."

Howard, a mild-mannered, nondescript man, doesn't realize that his young colleagues regard him as a role model. They've seen him handle himself at chaotic scenes as well as when a situation demands sensitivity, patience, and gentleness. "Howard is the man I'd want to tell bad news to my mother," one of his partners says. "He can handle people involved in just about any circumstance—death situations, panicked parents, lonely elderly people, and even hostile drunks. I've never seen anyone treat others with such dignity and respect. He's the best partner anyone could want, especially when we have to manage patients who are thrashing around. But that was not always so, was it, Howard?"

"No, it wasn't," Howard replies. "There was a time when no one wanted to work with me. I was a rebel, and I figured there was only one way to do things: my way. But an incident that occurred a few years ago changed all that. It's a long story. But the upshot is that when I recovered from the stress, my outlook had been altered. I realized that though I couldn't save the world, I could save myself. That's when I learned how to deal with the effects of a stressful job. I started eating right, lost a lot of weight, and adopted a new attitude. Anyway, if I can maintain my own well-being, I can do a lot more to help others. Right? Isn't that what we're about?"

Introduction

The safety and well-being of the workforce is a fundamental aspect of top-notch performance in EMS.[1] As a paramedic, it includes your physical well-being as well as your mental and emotional well-being. If your body is fed well and kept fit, if you use the principles of safe lifting, observe safe driving practices, and avoid potentially addictive and and insidious infections. If you let your spirit appreciate the fear and sadness on other faces, you will find ways to combat your prejudices and treat people with dignity and respect. By doing all these things, you will also be able to promote the benefits of well-being to your EMS colleagues.

Death, dying, stress, injury, infection, fear—all these threaten your wellness and conspire to interfere with your good intentions. However, you can do something about

PROCEDURE SCANS

Visual skill summaries provide step-by-step support in skill instruction.

Procedure 7-4 Reassessment

7-4a Reevaluate the ABCs.

7-4b Take all vital signs again.

7-4c Perform your focused assessment again.

7-4d Evaluate your interventions' effects.

laryngospasm may be occurring. Airway and breathing management requires constant reevaluation.

oxygenation. Lip cyanosis indicates central hypoxia (overall oxygen status), whereas peripheral cyanosis indicates decreased oxygen to the tissues. Pallor and coolness sug-

Special Features

the present illness. Common sense and clinical experience will determine how much of the following history to use.

Preliminary Data

For documentation, always record the date and time of the physical exam. Determine your patient's age, sex, race, birthplace, and occupation. This provides a starting point for the interview and establishes you as the interviewer. Who is the source of the information you receive about your patient? Is it the competent patient himself, his spouse, a friend, or a bystander? Are you receiving a report from a first responder, the police, or another health care worker? Do you have the medical record from a transferring facility?

After you have gathered the information, you should establish its reliability, which will vary according to the source's knowledge, memory, trust, and motivation. Again, reconfirm the information with the patient, if possible. This is a judgment call based on your experience. For example, if the patient information you received from a particular EMT first responder has been accurate in the past, you probably will trust it again. On the other hand, if the nurse at a physician's office has repeatedly provided you with erroneous information, you probably will doubt its accuracy.

scious patient, the chief complaint becomes what someone else identifies or what you observe as the primary problem. In some trauma situations, for instance, the chief complaint might be the mechanism of injury, such as "a penetrating wound to the chest" or "a fall from 25 feet."

Patho Pearls

The renowned Canadian physician Sir William Osler said, "Listen to the patient, and he will tell you what is wrong." This advice is as true today as it was 100 years ago. A great deal of information can be determined from a skillful history taking. As you listen to a patient's medical history, try to understand the underlying pathophysiologic processes that might cause the symptoms the patient describes. This will help you to fully comprehend the disease process or processes affecting the patient.

For example, consider the following case. Mrs. J. Franklin is a 72-year-old pensioner, twice widowed, who lives in an older section of town. She summons EMS with what initially seem like vague complaints. She reports to the dispatcher, when queried, that she is "just sick." You arrive and begin an assessment, starting with a pertinent history. The patient reports that her symptoms began about two weeks ago after several family members came to her house with dinner, which included a baked ham. Since that time, she has developed some fatigue, progressive dyspnea, and occasional chest pain. She now reports that she often wakes up at 3:00 A.M. with breathing trouble that resolves when she walks around the room or

PATHO PEARLS

Offer a snapshot of pathological considerations students will encounter in the field.

LEGAL CONSIDERATIONS

Offer a snapshot of pathological considerations students will encounter in the field.

FIGURE 2-11 Patients may be transported by ground or air. Medical helicopter transport was introduced in the 1950s during the Korean War. *(© Ed Effron)*

Vietnam, and success of military evacuation procedures led to their use in civilian ambulance systems. In 1970, the Military Assistance to Safety and Traffic (MAST) program was established. This demonstration project set up 35 helicopter transportation programs nationwide to test the feasibility of using military helicopters and paramedics in

Legal Considerations

Emergency Department Closures. Numerous factors have resulted in emergency department closures and ambulance diversions. This can have a significant impact on the EMS system. All systems must address this situation so that patient care does not suffer.

In 1974, in response to a request from the DOT, the General Services Administration (GSA) developed the "KKK-A-1822 Federal Specifications for Ambulances." This was the first attempt at standardizing ambulance design to permit intensive life support for patients en route to a definitive care facility. The act defined the following basic types of ambulance:

- ***Type I* (Figure 2-13).** This is a conventional cab and chassis on which a module ambulance body is mounted, with no passageway between the driver's and patient's compartments.
- ***Type II* (Figure 2-14).** A standard van, body, and cab form an integral unit. Most have a raised roof.

An important part of patient assessment is gathering information that is accurate, complete, and relevant to the present emergency. To begin, you must identify the patient's chief complaint. Although dispatch probably will have given you an idea of what the emergency is about, it is

Cultural Considerations

Eye contact is a major form of nonverbal communication. Short eye contact is often seen as friendly, whereas prolonged eye contact may be interpreted as threatening. Thus, timing is an important factor in how a person interprets eye contact.

One's culture also influences how eye contact is interpreted. Eye contact can mean respect in one culture and disrespect in another. Often, Asians will avoid eye contact even when they have nothing to hide. Eye contact between people of different sexes is problematic in Muslim cultures, in which a prolonged look in the face of a member of the opposite sex might be misinterpreted. Because of this, people in Middle Eastern countries might look a person of the same sex in the eye and not look into the eyes of a person of the opposite sex.

If you work in a culturally diverse community, you should learn the customs of eye contact and other forms of nonverbal communication of those you might encounter during the course of your work.

unexpected but important facts. For example, instead of asking your patient with abdominal pain, "Did you have breakfast today?" which can be answered with either a "yes" or a "no," ask: "What have you eaten today?"

- ***Use direct questions when necessary.*** Direct questions, or **closed questions**, ask for specific information. ("Did you take your pills today?" or "Does the abdominal pain come and go like a cramp, or is it constant?") These questions are good for three reasons: They fill in information generated by open-ended questions. They help to answer crucial questions when time is limited. And they can help to control overly talkative patients, who might want to tell you about their gallbladder surgery in 1969 when their chief complaint is a sprained ankle.
- ***Ask only one question at a time, and allow the patient to complete his answers.*** If you ask more than one question, the patient may not know which one to answer and may leave out portions of information or become confused. Equally important is having one person do the interview. Don't force your patient to discern questions from multiple interviewers.
- ***Listen to the patient's complete response before asking the next question.*** By doing so, you might find that

CULTURAL CONSIDERATIONS

Provide an awareness of beliefs that might affect patient care.

ASSESSMENT PEARLS

Offer tips, guidance, and information to aid in patient assessment.

Provocation/Palliation

What provokes the symptom (makes it worse)? Does anything palliate the symptom (make it better)? In many

Assessment Pearls

Chest pain is a common reason that people summon EMS. However, the causes of chest pain are numerous. In emergency medicine or EMS, we often look to exclude the most serious causes before determining whether chest pain is of a benign origin. Internal organs do not have as many pain fibers as do such structures as the skin and other areas. Pain arising from an internal organ tends to be dull and vague. This is because nerves from various spinal levels innervate the organ in question. The heart, for example, is innervated by several thoracic spinal nerve segments. Thus, cardiac pain tends to be dull and is sometimes described as pressure. It also tends to cause referred pain (i.e., pain in an area somewhat distant to the organ), such as pain in the left arm and jaw. Dull pain that is hard to localize (or to reproduce with palpation) may be due to cardiac disease. One sign often seen with patients suffering cardiac disease is Levine's sign. With Levine's sign, the patient will subconsciously clench his fist when describing the chest pain. Levine's sign is associated with pain of a cardiac origin (e.g., angina or acute coronary syndrome).

Ask about any activity, medication, or other circumstance that either alleviates or aggravates the chief complaint.

Quality

How does your patient perceive the pain or discomfort? Ask him to explain how the symptom feels, and listen carefully to his answer. Does your patient call his pain crushing, tearing, oppressive, gnawing, crampy, sharp, dull, or otherwise? Quote his exact descriptors in your report.

Region/Radiation

Where is the symptom? Does it move anywhere else? Identify the exact location and area of pain, discomfort, or dysfunction. Does your patient complain of pain "here," while holding a clenched fist over the sternum, or does he grasp the entire abdomen with both hands and moan? If your patient has not done so, ask him to point to the painful area. Identify the specific location, or the boundary of the pain if it is regional.

Determine whether the pain is truly pain (occurring independently) or **tenderness** (pain on palpation). Also determine whether the pain moves or radiates. Localized pain occurs in one specific area, whereas radiating pain

the result of a head injury, hypothermia, severe hypoxia, or drug overdose. Bradycardia is a common finding in the well-conditioned athlete, but it may be found in almost anyone. Treat bradycardia only if it compromises your patient's cardiac output and general circulatory status.

Tachycardia usually indicates an increase in sympathetic nervous system stimulation as the body compensates for another problem, such as blood loss, fear, pain, fever, drug overdose, or hypoxia. It is an early indicator of shock and may indicate ventricular tachycardia, a life-threatening cardiac dysrhythmia.

The pulse's quality can be weak, strong, or bounding. Weak, thready pulses indicate a decreased circulatory status, such as shock. Strong, bounding pulses may indicate high blood pressure, heat stroke, or increasing intracranial pressure. The pulse location may be another indicator of your patient's clinical status. The presence of a carotid pulse generally means that his systolic blood pressure is at least 60 mmHg. The presence of peripheral pulses indicates a higher blood pressure; their absence suggests circulatory collapse. Practice locating each of the pulse locations (Figure 5-12). As with other vital signs, take your patient's pulse frequently in the emergency setting and note any trends.

To take the pulse of a conscious adult or large child, the most accessible and commonly used location is the radial artery. With the pads of your first two or three

Pediatric Pearls

In infants and small children, use the brachial artery or auscultate for an apical pulse. Remember that auscultating an apical pulse does not provide information about your patient's hemodynamic status. To locate the brachial artery, feel just medial to the biceps tendon. Auscultate the apical pulse just below the left nipple.

fingers, compress the radial artery onto the radius, just below the wrist on the thumb side (Procedure 5-1b). In the unconscious patient, begin by checking his carotid pulse. To locate the carotid pulse, palpate medial to and just below the angle of the jaw. Locate the thyroid cartilage (Adam's apple) and slide your fingers laterally until they are between the thyroid cartilage and the large muscle in the neck (sternocleidomastoid).

First, note your patient's pulse rate by counting the number of beats in 1 minute. If his pulse is regular, you can count the beats in 15 seconds and multiply that number by 4. If his pulse is irregular, you must count it for a full minute to obtain an accurate total. Also note the pulse's rhythm and quality.

Blood Pressure

Blood pressure is the force of blood against the arteries' walls as the heart contracts and relaxes. It is equal to cardiac output times the systemic vascular resistance. Any

PEDIATRIC PEARLS

Offer tips, guidance, and information on how to deal with pediatric patients encountered in the field.

CUSTOMER SERVICE MINUTE

Shows how extending extra kindness and compassion can make an important difference to patients and families coping with an emergency.

Customer Service Minute

Following Up. Last week, a man took his dog to the vet for an upper respiratory infection. The dog was pretty sick, but the vet assured the owner that she was not critical, and with antibiotics she would be better in a few days, so he brought her home. The next day, the veterinarian called to find out how the dog was doing. She called every day until the dog was back to normal. Needless to say, the man was delighted in the service he received from that vet.

Physicians' offices, dentists' offices, and veterinary offices often call their patients a few days following a visit to see how things are going. Why don't we? Before you leave your patient and the family, why not ask them for permission to call the next day or in a few days to see how they're doing? If they say no or are hesitant to give permission, drop it. If they give permission, call them and see if there is anything you can do for them.

The follow-up has many benefits. You get to reconnect with the people in your community. It is great for public relations. It is educational because you can see whether your diagnosis was accurate. It's a winner from every angle. When they hang up, they'll be thinking, *"Wow!"*

Introduction

Patient assessment means conducting a problem-oriented evaluation of your patient and establishing priorities of your patient en route to the hospital to detect changes in patient condition.

Your proficiency in performing a systematic patient assessment will determine your ability to deliver the highest quality of prehospital **advanced life support** (ALS) to sick and injured people. Paramedic patient assessment is a straightforward skill, similar to the assessment you might have performed as an EMT. It differs, however, in depth and in the kind of care you will provide as a result.

Your assessment must be thorough, because many ALS procedures are potentially dangerous. Safely and appropriately performing advanced procedures such as administration of drugs, defibrillation, synchronized cardioversion, needle decompression of the chest, or endotracheal intubation will depend on your assessment and correct field diagnosis. If your assessment does not reveal your patient's true problem, the consequences can be devastating.

As always, common sense dictates how you proceed in the field. When you assess the responsive medical patient, the history reveals the most important diagnostic information and takes priority over the physical exam. For the trauma patient and the unresponsive medical patient, the reverse is true. However, trauma may cause a medical emergency, and, conversely, a medical emergency may cause trauma. Only by performing a thorough patient assessment can you discover the true cause of your patient's problems. This chapter provides problem-oriented patient assessment examples based on the information and techniques presented in the previous six chapters.

IN THE FIELD

Provides extra tips that can help ensure success in real-life emergency situations.

In the Field

The Tools of Your Trade: *The Ophthalmoscope*

An **ophthalmoscope** (Figure 5-27) is a medical instrument used to examine the internal eye structures, especially the retina, located at the back of the eye. Although it is most often used to diagnose eye conditions, you can discover information that may be relevant to other medical and traumatic events.

The ophthalmoscope is basically a light source with lenses and mirrors. It has a handle, which houses the batteries, and a head, which includes a window through which you visualize the internal eye; an aperture dial, which changes the width of the light beam; a lens dial to bring the eye into focus; and a lens indicator, which identifies the lens magnification number (i.e., 0 to +40 or 0 to –20). You examine the eye by looking through a monocular eyepiece into the eye of your patient. You can view different depths of the eye at different magnifications by rotating a disk of varying lenses within the instrument itself.

FIGURE 5-27 An ophthalmoscope is used to visualize the interior of your patient's eyes.

eye while the patient continues to fix his gaze on an object in the distance. Adjust the lens disk as needed to focus on the retina. Farsighted patients will require more "plus" diopters (black or green numbers), whereas nearsighted patients will require more "minus" diopters (red numbers) to keep the retina in focus.

Try to keep both your eyes open and relaxed. The optic disk should come into view when you are about 1.5 to 2 inches from the eye while you are still aiming your light 15 to 25 degrees nasally. If you are having difficulty finding the disk, look for a branching (bifurcation) in a retinal blood vessel. Usually the bifurcation will point toward the disk.

Follow the vessel in the direction of the bifurcation and you should arrive at the optic disk. The disk should appear as a yellowish-orange to pink round structure. Within the center of the disk there should be a central physiologic cup, which normally appears as a smaller, paler circle. The cup should be less than half the diameter of the disk. An enlarged cup may indicate chronic open-angle glaucoma. Indistinct borders or elevation of the optic disk may indicate papilledema, which is a marker of increased intracranial pressure.

Next, look at the arteries and veins of the retina. The arteries are usually brighter and smaller than the veins. Spontaneous venous pulsations are normal. Abnormalities of the retina such as hemorrhages, arteriovenous (AV) nicking, and cotton wool spots may indicate local or systemic disease such as retinal vein occlusion, hypertension, or many other conditions.

Finally, look at the fovea and surrounding macula. This area is where vision is most acute. It is located about two disk diameters temporal to the optic disk. You may also find the macula by asking the patient to look directly into the light of your ophthalmoscope. Prepare for a fleeting glimpse as this area is very sensitive to light and may be uncomfortable for your patient to maintain. A "cherry red" macula with surrounding pallor of tissue in the setting of acute painless monocular visual loss indicates a central retinal artery occlusion. Irreversible damage occurs


Image by Christof VanDerWalt

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ALWAYS LEARNING PEARSON

Chapter 1
Scene Size-Up

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STANDARD
Assessment

COMPETENCY
Integrate scene and patient assessment findings with knowledge of epidemiology and pathophysiology to form a field impression. This includes developing a list of differential diagnoses through clinical reasoning to modify the assessment and formulate a treatment plan.

Learning Objectives

Terminal Performance Objective After reading this chapter, you should be able to apply findings obtained through a scene size-up to decision making about the scene and patient.

Enabling Objectives: To accomplish the terminal performance objective, you should be able to:

1. Define key terms introduced in this chapter.
2. Discuss how the scene size-up integrates into the overall context of an emergency call.
3. Identify the individual components that compose the scene size-up.
4. Define Standard Precautions and discuss how they integrate into the scene size-up.
5. Define scene safety and discuss how it integrates into the scene size-up.
6. Define resource determination and discuss how this and the number of patients integrate into the scene size-up.
7. Define mechanism of injury/nature of illness and discuss how these integrate into the scene size-up.
8. Given a scenario, discuss how you would integrate these components into a comprehensive scene size-up.

KEY TERMS

hazardous materials, p. 9
index of suspicion, p. 15
mechanism of injury, p. 15
personal protective equipment (PPE), p. 4
scene safety, p. 6
Standard Precautions, p. 4

Case Study

On a quiet afternoon, paramedic Dean Barker hears the tones for a person slumped over the steering wheel of his car. He and his partner, Sarah Santorini, a new EMT, respond immediately. En route, Dean emphasizes to his rookie partner the need to put safety first and not to rush in without a quick evaluation of the scene. His partner nods agreeably but is obviously both excited and nervous about her first real emergency call.

When they arrive, Dean notices a very unusual and troubling scene. Dean grabs his partner and stops her from jumping out of the vehicle. He asks her to stop and look around. "Tell me what you see," he says. His partner nervously answers, "Right, OK, I see one car parked alongside a cemetery and it looks like someone might be inside. There seems to be a white cloud inside the car and I smell a strong odor of sulfur or rotten eggs. I also see a sign on the driver's side window with what looks like a hazard emblem on it."

"So, is there anything we should do before jumping out and entering this scene? What is our first priority? asks Dean. "Patient care." answers his partner. "No, safety first. We'll park our vehicle upwind from the car and I'll make a quick report to dispatch and call for more help. We already know this is more than we can handle by ourselves."

Dean assumes the role of incident commander; he calls for the fire department's hazmat team, cordons off the area, and alerts all responding personnel that the potential for fire and explosion exists. There also may be a need to evacuate the area. Waiting for the fire department to arrive seems like hours to his energetic partner. Dean asks her what they can do until they arrive. Sarah responds that they can shut down the road and secure the scene from bystanders.

When the hazmat team arrives, they read the signs that someone left on three of the four windows. They appear to be suicide notes and a warning to rescuers of the toxic atmosphere inside the car. The hazmat team begins the arduous process of identifying the toxic substance, containing the exposure, and decontaminating the victim and all rescuers. Dean and his partner are released and head back to the station.

Sarah asks Dean what the substance was inside that car and asks why they didn't try to extricate and resuscitate the driver. Dean calmly explains that the white cloud and rotten-egg odor strongly suggested a deadly asphyxiant, hydrogen sulfide, and if they had opened the door to extricate him, they would have been just as dead as their victim. This day a rookie learned a crucial lesson—on an EMS call, nothing is more important than her safety. Nothing.

Customer Service Minute

Exceeding Expectations. A suburban fire department was fighting a fire in a residence where one elderly woman lived with her 11 cats. The house was totally destroyed but, miraculously, she got out in time. Unfortunately her cats didn't—except for one. This lucky cat was found by one of the rescue teams alive, but barely breathing. They took the cat into the rescue truck and evaluated it. They provided oxygen and eventually inserted an endotracheal tube and transported it to an emergency animal clinic a few miles away. The cat survived. The woman was absolutely thrilled to have at least one family member survive the fire. She was overwhelmed that the firefighters would do something like that.

People call 911 because they're having a day that's worse than bad. Like all customers, they want two things: They want their problem solved and they want to be treated well. Like all customers, they have expectations and they will evaluate your agency based on whether you met those expectations. In the end, they will be either dissatisfied, satisfied, or delighted.

Some occupations don't require good customer service skills. In others, it is a necessity. In EMS you are delivering your service to people on their worst days. Your ability to delight them during these times with competent, compassionate care can make all the difference in the world.

Customer service is a mindset. Train yourself to be open to new ways of thinking. Look for opportunities to go beyond what is expected. Take that extra step. Perform one unexpected, random act of kindness to someone on your next shift. Just one. It's something they probably will never forget. You can't change the world, but you can make a world of difference in someone's life by a simple act of kindness. And you'll want to do it again.

Introduction

Scene size-up is the essential first stage of every emergency call. Sizing up an emergency scene is not a step-by-step process, but a series of timely decisions you will

make to ensure that you and your crew remain safe and to begin to secure the necessary resources to manage the scene and care for your patient. These informed, critical decisions will be based on judgment and instinct—the sum total of your education and experience. They will be some of the most important decisions you will ever make as a paramedic. The size-up components presented in this chapter can be done in order, but most likely you will perform your scene size-up as the situation dictates. In other words, you will make critical decisions about the scene as it reveals itself to you. Although you must consider all the elements of scene size-up important, circumstances will determine the priority you give to each one. And always remember—just because the scene appears safe right now doesn't mean it will stay that way. You don't just perform a scene size-up when you arrive at the scene. You repeatedly assess your scene all throughout the call.

Before you enter a scene, take the necessary time to assess the situation. The term *size-up* originated in the fire service, in which fire officers drive just past a burning house so they can see three of its sides before they make strategic decisions. Follow their lead. Never rush into any scene; first stop and look around (Figure 1-1).

On arrival, quickly determine whether the scene is safe. Are there any obvious hazards that could impede your efforts and threaten your lives? Does the situation require special personal protective clothing or equipment? Is the mechanism of injury or the nature of illness obvious? Are there multiple patients? Do you need immediate additional resources? After an initial scene assessment, if necessary, report to your dispatcher what you have, what you need, and what you are doing. This way, you keep everyone informed and your dispatcher can send any necessary additional support.

FIGURE 1-1 Always stop to size up the scene before approaching.
(© Daniel Limmer)

Although size-up is your initial responsibility, remember that it is an ongoing process. Emergency scenes are dynamic and can change suddenly. A call for an injury to a child can erupt into a violent domestic dispute if one parent blames the other. A patient, a bystander, a family member, and even a family pet can turn on you in an instant. A hazardous material spill can ignite. An improperly stabilized car can shift. Any scene involving a large number of inebriated people can be extremely unpredictable and dangerous. Always be alert for subtle signs of danger, and avoid becoming a patient yourself. There is a little voice inside everyone that alerts us to an impending catastrophe. It is our subconscious mind trying to warn us through a sudden uneasy feeling, as when the hairs at the back of your neck stand up and you don't really know why. If there ever was a time to listen to that little voice, it is during an emergency call, especially when sizing up a scene.

Scene size-up actually begins when you first receive the call. The emergency medical dispatcher will provide the address of the incident, the nature of the call, and any other pertinent information. From this information, you should begin to formulate a basic plan. For example, what immediately comes to mind when you hear the following dispatch? "Ambulance 6, respond priority one to Elm Street and James Avenue on a possible head-on collision involving a school bus and a tractor-trailer." A flood of possibilities should assault your conscious mind at this time:

- The possibility for a serious situation involving many underage patients
- The need to establish command and triage until help arrives
- The need to make an initial radio report and secure additional resources
- The need for safety precautions to protect you, your partner, and other responders from harm's way
- The possibility that the truck might be carrying hazardous materials

Imagining these possibilities en route can save you precious time when you arrive. You may be familiar with the address from previous incidents—a frequent patient, a nightclub known for violent activity, a vacant house in a run-down crime-infested neighborhood, traffic jams during rush hour, a strip mall with limited access and egress. Your experience with the location may alert you to possible hazards prior to arrival. Determine the need to stage away from a potentially unsafe scene until it is secured.

The nature of the incident also allows you to formulate an initial differential diagnosis prior to arrival. Take the following example:

EXAMPLE

"Unit 1, respond to 1337 Washington Boulevard, apartment 4B on a person with stridor."

You begin to think about some common causes for stridor (such as foreign body obstruction, infection, anaphylaxis, or respiratory burns) and the treatment strategies for each. The dispatcher usually provides you with enough important information to begin your scene size-up en route to the call.

An effective and efficient scene size-up will guide your actions. In trauma, the accident scene reveals the mechanism of injury. From this, you can estimate the degree of energy transfer and possible seriousness of injuries. In a medical emergency, you can sometimes determine the nature of your patient's illness from clues at the scene. The smell of a lower gastrointestinal bleed, the sound of a hissing oxygen tank, or the sight of drug paraphernalia provides clues and an initial insight into your patient's situation.

Learn to use all your senses when sizing up the scene. The components of a scene size-up include the following critical decisions:

- Is the scene safe for us to enter? Later on: Is it safe to stay?
- Which standard infection control precautions will be appropriate?
- What additional resources will be necessary?
- Have we located all the patients?
- What does the mechanism of injury or nature of the illness suggest?

You will revisit these critical decisions throughout the call, because conditions can change at any time. Always be aware of your surroundings and be prepared to change strategies and tactics on a moment's notice. Never allow complacency to lure you into a false sense of security.

Now, let us take an in-depth look at the five components of sizing up an emergency scene.

CONTENT REVIEW

➤ Components of Scene Size-Up
- Standard Precautions
- Scene safety
- Resource determination
- Location of patients
- Mechanism of injury/ nature of illness

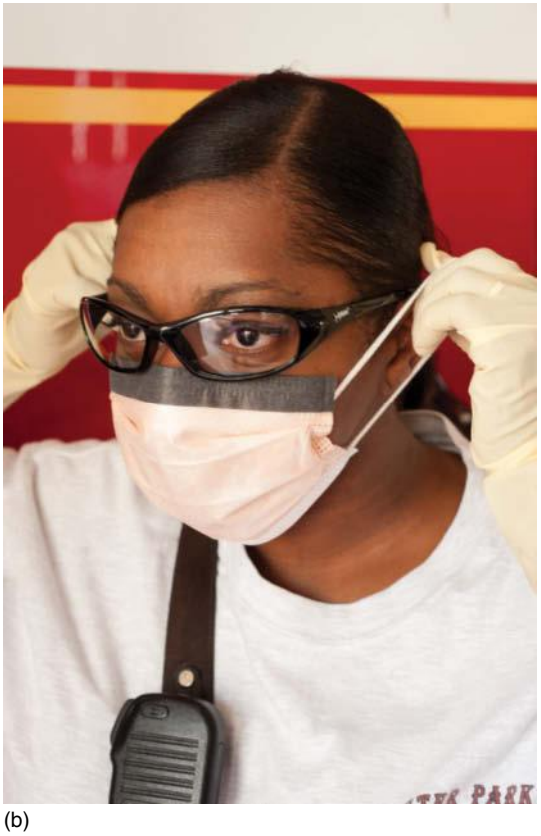
Standard Precautions

An integral component of scene safety is using a **Standard Precautions** strategy that matches your circumstances. You certainly do not want to wear a hazmat suit to assess a patient with an ankle injury from playing soccer. Likewise, do not approach a coughing or sneezing sick-looking patient without respiratory protection. When you list scene hazards, you must include the vast array of infectious diseases that your patient's body fluids may transmit to you and your crew. The most common risks for health care workers include HIV, hepatitis B and C, tuberculosis, and any bacterial or viral infection that your body may be susceptible to.

Standard Precautions is a strategy designed to reduce the risk of transmission of microorganisms from both recognized and unrecognized sources of infection.[1] You should assume that every person is potentially infected with an organism that he could transmit, and routinely apply the following infection control practices. Standard Precautions dictate that all EMS personnel take the same (standard) precautions with every patient. To achieve this, make sure that the appropriate **personal protective equipment (PPE)** is available in every emergency vehicle (Figure 1-2). The minimum recommended PPE includes the following:

- ***Hand hygiene.*** Have a waterless antimicrobial handwashing dispenser or alcohol-based towelettes available in each emergency vehicle and encourage proper handwashing whenever you have had contact with your patient's body substances. Perform a more thorough handwashing at the receiving facility after transferring your patient.
- ***Protective gloves.*** Wear disposable protective gloves before initiating any emergency care. When an emergency involves more than one patient, change gloves between patients. When gloves have been contaminated or torn, remove and dispose of them properly as soon as possible.
- ***Masks and protective eyewear.*** These should be worn together whenever blood spatter is likely to occur, such as with arterial bleeding, childbirth, endotracheal intubation and other invasive procedures, oral suctioning, and cleanup of equipment that requires heavy scrubbing or brushing. Both you and your patient should wear masks whenever the potential for airborne transmission of disease exists.
- ***HEPA and N-95 respirators*** (Figure 1-3). Because of the resurgence of tuberculosis (TB), you must protect yourself from infection through the use of a high-efficiency particulate air (HEPA) or N-95 respirator. Wear one whenever you care for a patient with confirmed or suspected TB or any other airborne communicable disease, such as meningitis, swine flu, H1N1, avian flu, and the like. This is especially true during procedures that involve the airway, such as the administration of nebulized medications, endotracheal intubation, or suctioning.

(a)



(b)

FIGURE 1-2 Always have personal protective supplies, including (a) a waterless handwashing dispenser and (b) eyewear and masks, available in the ambulance.

FIGURE 1-3 With a suspected tuberculosis patient, you may place a surgical-type mask on the patient while you wear a NIOSH-approved respirator. Monitor the patient's airway and breathing carefully.

- ***Gowns.*** Disposable gowns protect your clothing from splashes. If large splashes of blood are expected, such as with childbirth or major wounds with severe hemorrhage, wear an impervious gown.
- ***Disposable resuscitation equipment.*** Use disposable resuscitation equipment as your primary means of artificial ventilation in emergency care. Such items should be used once, then disposed of properly.[2]

The garments and equipment described here are intended to protect against infection through contact with potentially contaminated body substances, such as blood, vomit, and urine, as well as other agents, such as airborne droplets. When you are finished with them, place all contaminated items in the appropriate biohazard bag (Figure 1-4).

Infectious diseases also are minimized through the use of appropriate work practices and equipment especially engineered to minimize risk. For example, most invasive equipment is now used on a one-time, disposable basis. Of course, it is important to launder reusable clothing with infection control in mind.

General cleanliness and appropriate personal hygiene will do much to prevent infection. Probably the most important infection control practice is handwashing (Figure 1-5). As soon as possible after every patient contact and decontamination procedure, thoroughly wash your hands. To do so, first remove any rings or jewelry from your hands and arms. Then use soap and water. Lather your hands vigorously front and back for at least 15 seconds up to 2 or 3 inches above the wrist. Be sure to lather and rub between your fingers and in the creases and cracks of your knuckles. Scrub under and around the fingernails with a brush. Rinse your hands well under running water, holding your hands downward so that the water drains off your fingertips. Dry your hands on a clean towel. Plain soap works perfectly well for handwashing. As stated earlier, at times when soap is not available, you might use an antimicrobial

FIGURE 1-4 Place all contaminated items in the appropriate biohazard bag.

FIGURE 1-5 Careful, methodical handwashing helps reduce exposure to contagious disease.

handwashing solution or an alcohol-based foam or towelette. Finally, be sure to wash rings and other jewelry before putting them back on.

Scene Safety

Scene safety means doing everything possible to ensure a safe environment for yourself, your crew, other responding personnel, your patient, and any bystanders. Your personal safety is the top priority at any emergency scene. Make sure you do not become injured while attempting to provide care. If you become a patient yourself, you will do your own patient little good. Quickly determine whether hazards may endanger the lives of people on the scene. If your scene is unsafe, either make it safe or wait until someone else does (Figure 1-6). You have no obligation to enter an unsafe scene unless you are trained and equipped to manage it. In these cases your responsibility is to establish a safe perimeter, evaluate the hazard, and call for help.

FIGURE 1-6 Look for potential hazards during scene size-up. *(© Ed Effron)*

CONTENT REVIEW

➤ Order of Priorities for Scene Safety
1. You
2. Your crew
3. Other responding personnel
4. Your patient
5. Bystanders

Many factors can make an emergency scene unsafe. Through experience, you will learn to identify them quickly. Although there are specific dangers inherent in responding to a trauma, especially those involving violence, you can encounter the majority of hazards discussed in this chapter on any scene. Do not become complacent en route to a medical emergency on a quiet street in a small village. Sometimes even the most harmless-looking scene can turn into a disaster (Figure 1-7). If you are not sure the scene is safe, do not enter.

As you approach the scene, immediately evaluate the surrounding area. Is it as your dispatcher's information has led you to expect, or does something just not look right? Is the house completely dark? Do bystanders look angry, scared, or panicked? Be alert for situations that look or feel suspicious. If necessary, wait until law enforcement, the fire department, or other specially trained personnel secure the scene. Use all your senses to evaluate a scene, and learn to trust your intuition. If your instincts tell you not to enter or to get out, follow them. They are the subconscious sum of all your experiences. Listen to them; they are probably correct. Carefully look for and identify on-scene hazards before

FIGURE 1-7 Even the most peaceful-looking scene can pose potential dangers.

even attempting to reach your patient. To do otherwise places you, other rescuers, and your patient at risk.

If the scene is unsafe, do not enter unless you have the necessary training and equipment. Entering an unsafe scene is unacceptable unless there is an immediate life-threatening situation you are reasonably sure you can mitigate or avert to save your patient's life. If you are injured entering an unsecured scene, you only add to the problem: More resources will be needed to assist you and take care of the original problem.

Unsafe scene hazards come in a variety of forms. Let us look at some common types of hazards encountered in emergency services: environmental hazards, hazardous materials, roadway operations, and violence.

Environmental Hazards

Nature, and its environment, can provide a variety of obstacles that inhibit your ability to reach your patient, deliver care, and transport him to the appropriate facility. This section focuses on some common types of environmental hazards that may complicate your scene and threaten your well-being—weather, terrain, water, electricity, and confined spaces.

Weather

The most common obstacle, depending on where you practice your craft, may be extreme weather conditions. These everyday phenomena can make even the most basic emergency situations a challenge. For example, carrying a patient down an icy flight of stairs, trying to navigate your stretcher through a snow-covered driveway, or accessing your patient in a blinding rainstorm are just a few of the everyday hazards you can encounter (Figure 1-8). Working outdoors on extremely hot and humid days can result in serious heat-related injuries, such as heat exhaustion or heat stroke.

Even wind gusts can make simple tasks much more difficult. Extended operations on cold and windy days can produce cold injuries, such as frostbite and hypothermia. More treacherous natural phenomena, such as tornados, hurricanes, lightning strikes, hailstorms, and dust storms, can create life-threatening conditions for emergency responders. Unfortunately, there is nothing anyone can do to mitigate nasty weather conditions. But when you are up against nature's powerful and sometimes destructive forces, you are wise to be overly cautious and not take unnecessary chances with your crew.

FIGURE 1-8 Inclement weather can pose a variety of challenges at any emergency scene.

(© Mark C. Ide/Science Source)

Terrain

Unstable terrain can severely hinder your efforts to reach your patient. Mudslides, avalanches, rock slides, high-angle cliffs, earthquake crevices, and steep slopes challenge even the most skilled and experienced rescuer (Figure 1-9). Hikers, mountain climbers, and other outdoor enthusiasts will continue to find new ways of becoming trapped in the very terrain they love to navigate. Remember that in any case involving moving earth, such as rock or mud slides, avalanches, and cave-ins, there can be a second and third movement. Do not become complacent thinking that the event has "happened." Make sure things have been secured or stabilized prior to entering the scene. In every case, it is your responsibility to recognize the need for specialized rescue teams and control the scene until they arrive. Refer to the hazardous terrain rescue section in the chapter

FIGURE 1-9 Uneven and hazardous terrain that compromises your footing can create an extremely difficult situation.

"Rescue Awareness and Operations" for more information on this topic.

Hazardous terrain can also exist inside a building such as a house or an apartment. Poorly lit entranceways and hallways, broken stairs, slippery floors, loose floorboards, and rooms cluttered with trash all pose a significant risk of injury to responders. Uneven sidewalks and potholes can make navigating to and from your patient's location treacherous. Carry a flashlight and always be aware of your footing.

Water

Rescue scenarios can occur in standing water, such as a lake or swimming pool, or in rushing water, such as a raging river or the open sea. The potential for serious injury or death is real for the victims and their rescuers in these situations (Figure 1-10). Like their hiking counterparts, water-sport enthusiasts also seem to find new and ingenious ways of getting into trouble. When sizing up your scene, you must decide whether you can safely perform a water rescue or whether you need specialized resources. As always, do not place yourself in harm's way unless you believe you can mitigate the circumstance effectively.

One simple water rescue method is the Reach (with a long pole)–Throw (a flotation device)–Row (boat)–Go (water entry) technique. However, consider "Go" as a last-ditch effort and be aware of the life dangers inherent in that type of rescue attempt. In addition, anyone participating in a water rescue should wear a personal flotation device. Swift water rescues involve a number of underwater terrain situations that pose a unique and dangerous challenge to rescuers. Becoming trapped in recirculating currents, strainers, foot and extremity pins, and dam intakes can be lethal for the rescuer. These types of rescues should only be attempted by specialized personnel. Refer to the water rescue section in the chapter "Rescue Awareness and Operations" for more information on this topic.

FIGURE 1-10 Never enter a specialized rescue situation without proper training and equipment.

(© AP Photo/Standard Examiner, Brian Nicholson)

Electricity

Always approach a scene with downed power lines with extreme caution. Assume that the lines are energized and potentially dangerous until the power company removes the power lines or isolates them. Do not make the potentially fatal mistake of thinking you have the proper equipment to move a charged power line. You don't. Secure a safe perimeter and do not allow responders to enter. Use your public address system to warn car occupants to stay in the car and everyone else to stay outside the established perimeter.

Lightning strikes pose a significant hazard. Even though the chance of being hit by lightning is extremely remote, it still remains in the top three causes of environmental deaths.[3] A person can be hit directly, hit by an arc from a nearby object that was hit, or hit by ground current as much as 50 yards away from the original strike. Injuries can include respiratory and cardiac arrest, skin and vascular disruption, and blunt force trauma. The only real safe action is to seek shelter indoors. If you have to access or move a patient during a thunderstorm, do it quickly.

Confined Space

Confined space situations pose a number of fatal possibilities. These include oxygen deficiency, toxic or explosive chemicals, cave-ins, machinery entrapment, electricity, and structural collapse (Figure 1-11). Again, unless you are properly trained and equipped, your role includes recognition, assuming incident command, securing the scene, and calling for the help of a specialized rescue team. Confined spaces include, but are not limited to, underground vaults, tanks, storage bins, manholes, pits, silos, process vessels, and pipelines. OSHA defines a *confined space* as having one or more of the following characteristics:

- Contains or has the potential to contain a hazardous atmosphere
- Contains a material that has the potential to engulf an entrant
- Has walls that converge inward or floors that slope downward and taper into a smaller area that could trap or asphyxiate an entrant

FIGURE 1-11 Confined space rescues pose a special threat for victims and rescuers. Never enter confined spaces without adequate training, equipment, and experience.

- Contains any other recognized safety or health hazard, such as unguarded machinery, exposed live wires, or heat stress[4]

Because you may encounter a confined space in virtually any industry, recognition is the first step in preventing fatalities. The majority of deaths associated with confined spaces or hazardous atmospheres are rescuers rushing in for the patient and failing to recognize the hazard. These atmospheres often are toxic, oxygen deficient, or combustible. Because every industry has standards and references that aid in recognizing and evaluating hazards and possible solutions related to their confined spaces, you should simply secure the scene and wait for assistance from the appropriate personnel. Refer to the hazardous atmosphere rescue section in the chapter "Rescue Awareness and Operations" for more information on this topic.

Hazardous Materials

Hazardous materials are found everywhere. You may encounter them at any scene involving fires, automobile accidents, medical emergencies, transportation containers, or industrial or mercantile facilities (Figure 1-12). The primary hazards include chemical, biological, radiological, nuclear, and explosive agents (Table 1–1). These agents can cause thermal injuries, asphyxiation, neuromuscular paralysis, coma, and even death depending on the exposure and potency of the agent.

FIGURE 1-12 Toxic chemical spills can ignite or explode at any time.
(© AP Photo/Topeka Capital Journal, Chris Landsberger)

Table 1-1 Hazardous Materials

Agent	Examples
Chemical	Liquids, gases, solids, corrosives, poisons, nerve agents, and toxic industrial materials
Biological	Viruses (e.g., smallpox, swine flu, hemorrhagic fever), bacteria (e.g., plague, anthrax), and biotoxins (e.g., ricin, botulism)
Radiological	Nuclear weapons, "dirty bombs," nuclear waste products
Explosive	Low order (e.g., gunpowder), high order (e.g., TNT, dynamite), or improvised (e.g., pipe bombs, backpacks)

Hazards can occur during production, storage, transportation, use, or disposal of any of these agents. You and your crew are at risk if you arrive on a scene at which a chemical was used unsafely or released in harmful amounts into the environment. Hazardous materials in various forms can cause death, serious injury, and long-lasting health effects. Many products containing hazardous chemicals are used and stored in homes routinely, though usually not in quantities that cause major hazards. These products are also shipped daily on the nation's highways, railroads, waterways, and pipelines. Unfortunately these come in quantities large enough to cause a major environmental disaster.

Coming into contact with a hazardous material while performing your job is inevitable. These substances are most often released as a result of transportation accidents or chemical accidents in plants. Incidents involving hazardous material exposure can pose life-threatening problems for all responding personnel. A devastating chain of explosions can be set off by a simple spark near chemical spills or gas leaks.

Several training levels exist for managing a hazardous materials incident. As a paramedic student, you are most likely trained to the awareness level. This means that your main responsibilities are to recognize that the incident involves a hazardous material, establish incident command, and control the scene until help arrives.

A good pair of binoculars may be your best tool in assessing a possible hazmat scene (Figure 1-13). Stage your vehicle uphill, upwind, and far enough away from the site to need binoculars. If you don't have a set of binoculars, use the rule of thumb: Stick your thumb in front of you and in the direction of the scene. If you can still see the scene, you are too close.

Keep people away from the scene and avoid any contact with the material. *Do not enter* the scene unless you are properly trained and equipped. If possible, establish

FIGURE 1-13 Don't take any chances. Use binoculars to make a visual inspection of a potentially hazardous situation from a safe distance.

danger and safe (upwind, same level as danger zone) zones. Assume that all patients are contaminated. Call for help immediately and use an incident management system. Refer to the *North American Emergency Response Guidebook*, a common item in any ambulance or rescue vehicle, for help in identifying hazardous materials, managing the scene, and treating exposed patients (Figure 1-14). Adhere to the four "don'ts" when you approach a hazardous scene:

1. Don't rush in.
2. Don't assume anything.
3. Don't become a victim.
4. Don't test (smell, taste, touch) a foreign substance.

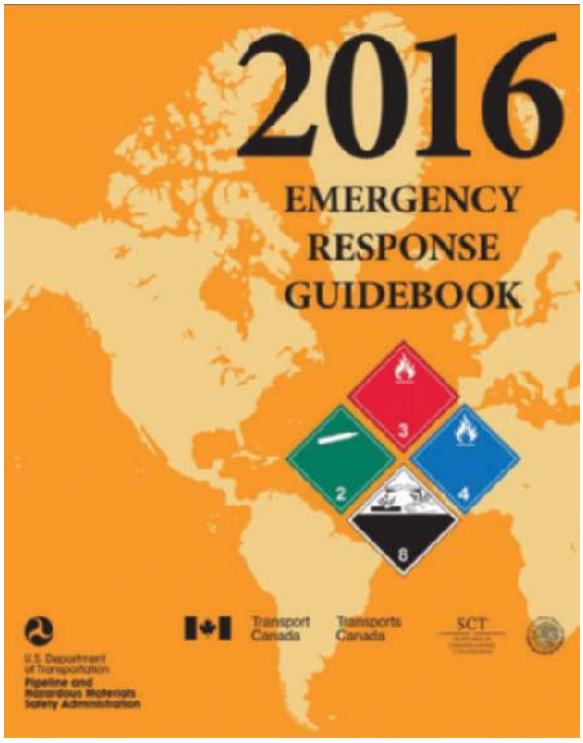


FIGURE 1-14 Carry a copy of the *Emergency Response Guidebook* in your vehicle at all times.

The ideal time for size-up is before the incident occurs. Survey your district and identify any sites of potential hazmat incidents. Develop preplans and practice the plan. Visit any industrial plants and work out a plan with their response teams. Refer to the chapter "Hazardous Materials" for more information on this topic.

Violence

Violence, especially violence aimed at emergency responders, can happen suddenly anywhere, anytime. It is not limited to a dark alley in the bad parts of town. You may encounter violence in the form of domestic abuse between husband and wife at home. You may drive up on a gang-related fight or a school shooting involving semiautomatic weapons. You may even arrive on scene of a terrorist bomb explosion in a crowded restaurant. Inner cities, suburbs, and rural areas are all affected by this recent surge in violent activity. You cannot escape it. You must be on high alert whenever responding to an emergency. As always, staying safe is your primary responsibility in these cases.

You may learn of a potentially violent situation on dispatch. In these cases, do not approach the scene until law enforcement personnel have secured it. In fact, do not even enter the neighborhood, because sitting in your ambulance on the scene may undermine an already unstable environment. If possible, turn off your lights and siren and stage your vehicle a few blocks away, where it cannot be seen from the scene. Do not assume that because police are on the scene, it is safe. You may come on a situation in which police are struggling to secure a weapon from a perpetrator. This unfortunate mistake in judgment could cost you and your partner your lives. Always keep your level of awareness up even if law enforcement personnel arrive before you do.

You may not know of the potential for violence until you arrive. Look for signs of trouble during your size-up. Is a crowd gathering? Is there an unusual silence or escalating noise? Does the scene match the dispatch information, or does your instinct tell you something is wrong? In these cases, be ready to retreat and leave the scene if necessary. Violence may erupt during the course of the call. Bystanders may become agitated and violent at any point, and you may opt to remove your patient to a safe location or transport him from the scene. Your personal safety should come before patient abandonment considerations. The law does not expect you to place yourself in grave danger while providing care. Always have a way out. Never allow yourself to be trapped inside a room or on a scene.

When responding to a crime scene, remember that dangerous weapons probably were used and that the perpetrator may still be on the scene, or could return. If your patient is the perpetrator, he may attack you in an attempt to flee the scene and escape prosecution. Gang activity

occurs in the cities, the suburbs, and rural areas. No one is immune. Be alert for classic signs of gang activity in your district: clothing colors, graffiti, tattoos, and hand signals. When responding to an area of known gang activity, be overly cautious, especially if you wear a uniform that closely resembles that of law enforcement.

Domestic violence is an ever-rising situation that can turn from bad to worse in a matter of seconds. Things may escalate once the police attempt to arrest the violent offender. These types of scenes can become very ugly very quickly. Always be aware of your positioning in the room and have your emergency egress in sight.

Methamphetamine (meth) labs pose a double threat. The volatile chemicals used to manufacture illicit drugs may be present and provide a high possibility for explosion. In addition, the people who participate in this illicit, highly profitable criminal activity will be extremely uncooperative with your efforts to manage the scene and probably disrupt their lucrative livelihood. If you suspect a meth lab, wait for help.

Sometimes even a family pet can become a safety hazard to responders if the pet believes it is protecting its master from intruders. The loyalty of a dog, in these cases, is amazing. If you respond to an automobile collision involving a police canine unit and the dog is loose in the car, for example, do not attempt to reach the injured officer. That officer and his dog are as close as any two partners can be, and the dog will sacrifice its own life to protect him. Call for someone who works with these dogs, preferably another canine unit officer, to mitigate the situation before accessing your patient.

Maintain a vigilant awareness of your surroundings. If you find yourself in the middle of a potentially violent situation, try to back away to a safe location. Use the equipment you brought with you as cover, if necessary. Make sure you always have a way out if things escalate. Try to de-escalate the situation by using a calm tone and being empathetic. If possible, try to understand the other person's point of view. Avoid phrases such as "calm down, relax, settle down." Never use threats and continue to try to reason with the agitated person. If none of these tactics works, and law enforcement has not yet arrived, make every effort to retreat to a safe location. If you cannot, and things are still escalating, you may be forced to defend yourself. Use whatever force is necessary, but no more.

Patho Pearls

Here are a dozen tips to help keep you safe:

1. Park so you can make a fast exit from a potentially lethal situation.
2. Always make sure the dispatchers know your exact location. If you move from your original location, notify them.

FIGURE 1-15 Hold a flashlight to the side of your body, not in front of it. Armed assailants usually aim at the light.

3. At night carry your flashlight to the side, never in front of your body, while you and your partner approach a building separately. Do not present a large, lit, easy target for some shooter (Figure 1-15).
4. When knocking on a door, always stand off to the side. You never know what awaits you on the other side of the door (Figure 1-16). Have someone lead you to the patient, but do not let this person follow. Always know who and what are behind you.
5. When talking with agitated people, speak calmly, maintain a monotone voice, watch your posture, and make sure they can see that you are there to help and not be an intrusion.
6. Watch your tone with crowds of people; identify yourself as a paramedic so there is no confusion if you are dressed like law enforcement.
7. Keep your hair tied up so it cannot be grabbed. Avoid wearing anything around your neck, including your stethoscope, for the same reason.
8. Look for traditional (e.g., knives, guns) and nontraditional (e.g., bats, broken bottles, sharp objects) weapons when you survey the scene. Be especially wary of patients' bulging pockets. They may be concealing weapons.

FIGURE 1-16 Always stand to the side of a door when knocking.

9. If possible, never get between people who are fighting. This is not your job.
10. Crews that work together should have a "code of trouble" if something happens.
11. If the police tell you to get out, listen to them.
12. If your gut tells you something is wrong, listen to it.

Refer to the chapter "Crime Scene Awareness" for more information on this topic. It is worth repeating that when you are on the scene of a potentially unstable situation always be aware of your exit route. Never allow yourself to be blocked from exiting a room. Under no circumstances should you ever allow yourself to be placed in grave danger.

Roadway Rescue Operations

You will encounter a number of rescue scenarios as a paramedic. By far the most common rescue situation is the motor vehicle collision on a major roadway. The greatest hazard to any emergency worker during a roadside rescue operation is traffic flow. The obvious danger of passing motorists gazing at the scene often results in secondary responder injuries and, often, death.

CONTENT REVIEW

➤ Minimum Rescue Operation Equipment
- Four-point suspension helmets
- Eye goggles or industrial safety glasses
- High-quality hearing protection
- Leather work gloves
- High-top steel-toed boots
- Insulated coveralls
- Turnout gear

Never work at a roadside incident, even during the day, without wearing a safety vest that readily identifies you as an emergency worker (Figure 1-17). Position your ambulance to protect the scene but do not allow the patient loading area to be exposed to traffic. Place traffic cones and flares strategically to reroute traffic a safe distance from where you will be working. Always assess your scene with a special eye for circumstances that may cause harm to you, your crew, other responders, and bystanders. Look for fuel leaking and the potential for fire and explosion, downed electrical wires, unstable vehicles, and automobile systems intended to prevent harm, such as energy-absorbing bumpers, air bags, and other supplemental restraint systems. Do not overlook the obvious. Sometimes it is just the potential for injuries from working around broken glass or jagged metal.

FIGURE 1-17 Always wear reflective clothing whenever working at a roadside incident. Make sure oncoming traffic can easily see you.
(© Ed Effron)

How involved you become in any rescue is determined by your training and equipment. Match the rescue scenario and conditions with the gear you will use. Refer to the chapter "Rescue Awareness and Operations" for more information on this topic.

Resource Determination

If you need additional resources to manage your scene, request them as early as possible. Crash scenes requiring heavy-duty rescue procedures, scenes at which toxic substances are present, crime scenes with a potential for violence, or scenes with unstable surfaces, such as slippery slopes, ice, or rushing water, all call for specialized crews, additional medical supplies, and sophisticated equipment. As stated earlier, do not even consider entering such situations unless you have the proper clothing, equipment, and training to work in them. Because getting backup requires extra time, this phase is critical. A prompt call to your dispatch center can save critical minutes in a life-threatening situation.

As the first unit on the scene, you may overestimate your capability to manage a particular rescue situation. Individual acts of courage are sometimes necessary, but modern rescue operations emphasize safety first, not heroics. Foolish heroics often end in tragedy. If in doubt, it is better to err on the side of caution than to risk personal harm.

Without the appropriate protective gear, you will jeopardize your safety and that of your patient. To participate in a rescue operation, you should have at least the following equipment immediately available: four-point suspension helmets, eye goggles or industrial safety glasses, high-quality hearing protection, leather work gloves, high-top steel-toed boots, insulated coveralls, and turnout gear

CONTENT REVIEW

➤ Minimum Patient Safety Equipment
- Construction-type hard hats
- Eye goggles
- Hearing and respiratory protection
- Protective blankets
- Protective shielding

FIGURE 1-18 Full protective gear, including eye protection, helmet, turnout gear, and gloves.

(Figure 1-18). Only personnel thoroughly trained in hazardous material suits or self-contained breathing apparatus (SCBA) should use them (Figure 1-19). These items are often supplied on specialty support vehicles such as hazmat response units and heavy-rescue trucks (Figure 1-20).

After you ensure that responding personnel have adequate safety equipment to manage the rescue scene, consider patient safety. Many considerations for rescuer safety also apply to patients. Additionally, patient safety equipment should at least include construction-type hard hats, eye goggles, hearing and respiratory protection, protective blankets, and protective shielding. You will need these to protect your patient during rescue operations (Figure 1-21). Patient safety also includes simple measures such as removing patients from unstable environments such as temperature extremes, smoky rooms, or hostile crowds. For example, the simplest way to begin managing

FIGURE 1-19 Self-contained breathing apparatus (SCBA).

FIGURE 1-20 Hazardous materials responses require special training and equipment.

FIGURE 1-21 Protect the patient from hazards at the scene.
(© Ed Effron)

FIGURE 1-22 A tape line can help to keep bystanders out of hazardous scenes.

(© Ed Effron)

a patient suffering from hypothermia is to move him into a warm environment. In every case, let common sense dictate scene management.

Safe, orderly, and controlled incident management is essential for everyone's safety. Call for specialty personnel to stabilize wreckage or turn off electrical power. Make sure someone routes traffic safely around a vehicle collision. Control bystanders and spot potential human hazards. Be certain that a hostile crowd or someone who assaulted your patient is not ready to attack you. Scenes involving toxic exposures, environmental hazards, and violent patients are especially worrisome. When possible, have law enforcement personnel establish a tape line to cordon off the hazard zone or use other measures to protect bystanders who do not realize the potential dangers of watching operations (Figure 1-22).

Location of Patients

Scene size-up also includes a search of the area to locate all the patients. Ask yourself whether other persons could be involved in the crash or affected by the medical problem. Determine where you are most likely to find the most seriously injured patients and how many will need transport. The mechanism of injury or the nature of the illness can help you determine the number of patients. For example, a two-car crash must include at least two drivers. Clues such as diaper bags, child auto seats, toys, coloring books, clothing, or twin spider-web impact marks in the windshield should lead you to search for more patients, especially children, than those who may be readily apparent. Some medical situations such as carbon monoxide poisoning can affect an entire household. A hazardous liquid spill in the chemistry lab can affect students and staff in an entire wing of a school.

If you find more patients than you can manage safely and effectively, call for assistance early. If possible, you should do this before you make contact with any patients, because you are less likely to call for help once you become involved with patient care. Often, as you proceed into a scene, more patients become apparent. It is wise to overestimate when asking for help at the scene.

Multiple-casualty incidents can range from two to hundreds of patients. For example, you respond to an imminent delivery at a residence in the suburbs. You deliver a normal, healthy baby but the mother still complains of labor pains. You suddenly realize that a second baby is coming. It is born pulseless and apneic. Now you have three patients: one healthy baby, one frantic mother, and one clinically dead baby. It is not necessarily how many patients you have but how many patients will overtax your resources. A simple motor vehicle collision with three or four patients can overwhelm a rural EMS system or a large system already taxed beyond its capacity.

For any multiple-patient incident, it is wise to implement an incident management system according to local protocols. If the first unit to arrive establishes incident command and begins the triage process, it will save time and energy playing catch-up later on. Initiate the incident management system according to local protocols (Figure 1-23). Again, try not to become immediately involved in patient care, because two important functions must occur in the initial stages of any multiple-casualty incident: command and triage.

If you and your partner find yourselves in a situation that overwhelms your resources, one of you should establish command while the other begins triaging patients. The command person performs a scene size-up, determines the needs of the incident, makes a radio report requesting the necessary additional help, and directs oncoming crews to their duties until he transfers command duties to an

FIGURE 1-23 Follow local protocols when you respond to a multiple-casualty incident.

(© Ed Effron)

FIGURE 1-24 The incident commander directs the response and coordinates resources at a multiple-casualty incident.

FIGURE 1-26 With trauma, try to determine the mechanism of injury during scene size-up.
(© Daniel Limmer)

FIGURE 1-25 The triage person examines and prioritizes patients.

arriving officer (Figure 1-24). The triage person performs a triage exam on every patient and prioritizes them for immediate or delayed transport (Figure 1-25). He may perform simple lifesaving procedures such as opening the airway or controlling bleeding, but as a rule he should not stop to provide intensive care for any one patient. Refer to the chapter "Multiple Casualty Incidents and Incident Management" for more information on this topic.

Mechanism of Injury / Nature of Illness

The **mechanism of injury** is the combined strength, direction, and nature of forces that injured your patient. It is usually apparent through careful evaluation of the trauma scene and can help you anticipate both the location and the seriousness of injuries. Identify the forces involved, the direction from which they came, and the bodily locations potentially affected (Figure 1-26). For example, in a fall injury, how high was the patient, what did he land on, and what part of his body hit first? If your patient jumped from a significant height and landed on his feet, for example, expect lower extremity, pelvis, and lumbar spine injuries.

Although trauma poses a serious threat to life, its appearance often masks your patient's true condition. Extremity injuries, for example, are frequently obvious and grotesque, yet they rarely cause death. Conversely, life-threatening problems such as internal bleeding and rising intracranial pressure often occur with only subtle signs and symptoms. Your assessment of trauma patients must look beyond obvious injuries to significant mechanisms of injury for evidence that suggests life-threatening situations. Although now downplayed, certain significant mechanisms predictably cause serious internal injury.

In an automobile crash, the mechanism of injury is the process by which forces are exchanged between the automobile and what it struck, between your patient and the automobile's interior, and among the various tissues and organs as they collide with one another within the patient. Close inspection of the automobile and the forces, or various collisions, can lead to an **index of suspicion** (a prediction of injuries based on the mechanism of injury) for possible injuries. What does the car look like? If the windshield is cracked, expect head and neck injuries. If the steering wheel is bent, expect chest and abdominal injuries. With a major intrusion into the passenger compartment, expect major multisystem trauma.

Other significant mechanisms of injury can result from seat belts, air bags, and child safety seats. Do not rule out serious injury just because your patient wore a seat belt. Seat belts can actually cause injuries, even when worn properly. Always ask your patient whether he wore a seat belt and look for bruises across the chest or around the waist. If these are present, expect hidden internal injuries.

In general, air bags have been effective devices in preventing serious injury by protecting passengers from

hitting the windshield, steering wheel, and dashboard. Originally, they deployed only when the front of the car hit another object. Many automakers currently have installed side air bags that deploy when the car is struck from the side. Air bags are not without complication, however. For example, they are designed to cushion the chests of large adults. If the passenger is a child or a short adult, the air bag will hit him in the face, possibly causing injury. In addition, air bags are designed to deflate automatically within seconds after inflation, which may allow passengers to be propelled into the steering wheel or dashboard. For this reason, they may not be effective without the seat belt. Always lift the deployed bag and inspect the steering wheel for deformity. Suspect serious internal injuries if you discover a bent steering wheel (Figure 1-27). There is also danger of the bag not deploying in the crash. It may deploy during the rescue operation, putting rescuers in danger of serious injury.

FIGURE 1-27 A bent steering wheel signals potentially serious injuries.

(© Kevin Link)

A child safety seat, when used appropriately, also can save a life. If the safety seat is not securely fastened to the car seat, though, it can come loose and be thrown when the collision occurs, causing severe head, neck, and body cavity trauma to its occupant. If the harness straps are not tight on the child, the child may come out of the seat during the crash. If the safety seat is used in the car's front seat, the child can suffer a serious injury when the air bag deploys.

Expect a pedestrian struck by a car to have fractures of the lower extremities. If the auto was moving at 20 miles per hour, expect less-severe fractures than if it had been moving at 55 miles per hour. Internal injuries are also less likely at lower speeds than at higher speeds. By evaluating the strength and nature of impact, you can anticipate which organs are injured and the degree of their damage.

For a gunshot patient, determine the type of gun used, the range of the shot, and whether an exit wound exists. This information will enable you to estimate the damage along the bullet's path and to formulate an index of suspicion for your patient's possible injuries. Expect the internal injuries from serious blunt trauma to be more extensive and severe than those you see externally. Often, the mechanism of injury is the only clue to the possibility of serious internal injury. The chapters "Blunt Trauma" and "Penetrating Trauma" describe the mechanisms of these injuries in depth.

Determine the nature of the illness from bystanders, family members, or your patient himself. If the patient is alert and oriented, he is usually the best source of information about his problem. If he is unresponsive, disoriented, or otherwise unable to provide information, rely on family members, bystanders, or visual cues for this information.

The scene can give additional clues to your patient's condition. How is your patient positioned? Does he sit bolt upright, gasping to breathe? Are pill bottles or drug paraphernalia nearby? Is medical care equipment, such as an oxygen tank, a nebulizer, or a glucometer, in the room? For example, if you respond to a "difficulty breathing" call and your patient is using his nebulizer when you arrive, suspect a history of pulmonary disease such as asthma, emphysema, or chronic bronchitis. If your patient is an agitated 17-year-old with a rapid pulse and you notice crack cocaine ampules on the floor, suspect a substance abuse problem.

Sometimes the nature of the illness is not readily apparent. Your patient with severe difficulty breathing, for instance, may be suffering from respiratory disease, a cardiac problem, an allergic reaction, or a toxic exposure. Remember that the nature of your patient's illness may be very different from his chief complaint.

Summary

The scene size-up is the initial step in the patient care process. Sizing up the scene and situation begins at your initial dispatch and does not end until you are clear of the call. As the call unfolds, you should be making constant observations and adjustments to your plan of action. Remember that your safety and the safety of your partner are paramount—it is hard to effectively treat both yourself and others.

Scene size-up should be practiced so much that it becomes second nature to you. It is like noticing veins on people in public after you begin starting IVs. (You have all done it—looked across the room at the back of someone's hand and noticed what nice veins they had.) Sizing up a scene is no different. After a while, you begin to notice mechanisms of injury and other important details almost subconsciously. But be careful and do not get complacent! Always make it a point to pause for just a few seconds and consciously look around the scene before proceeding into any situation.

Scene size-up is not a step-by-step process, but a series of decisions you make when confronted with a variety of circumstances that are often beyond your control. It is a way to make order out of chaos, keep yourself and your crew safe, and ensure that all necessary resources are focused on patient care and outcomes. With time and experience, you will learn to perform a scene size-up quickly and focus on important issues. Your careful size-up lays the foundation for an organized and timely approach toward patient care and scene management. And always remember that scene size-up is not a one-time occurrence. It is an ongoing process.

You Make the Call

It is a cold evening, and your county has experienced record rainfall in the last few days. You and your EMT partner are dispatched to the scene of "vehicle off the roadway", along with a BLS engine company. As you approach the reported location of the accident, you see a minivan that appears to be on its side approximately 20 feet down the roadside embankment. The van sits in a depression that is flooded with standing water reaching about halfway up the vehicle. As you pass the accident you see an adult female who appears to be attempting to climb out a passenger side window.

Describe how you would size up this scene. Make sure you cover the following areas:

- Vehicle placement
- Initial radio report
- Assuming incident command
- Safety
- Hazard control
- Standard Precautions
- Location and triaging of patients
- Mechanism of injury
- Resource determination

See Suggested Responses at the back of this book.

Review Questions

1. Which of the following statements bests describes the scene size-up phase of assessment?
   a. The purpose of the scene size-up is to find and treat life threats.
   b. The scene size-up should be performed by the senior crew member.
   c. The scene size-up is an ongoing process.
   d. The scene size-up determines whether the patient is a high or low priority.

2. For which of the following situations should the HEPA mask be used by the paramedic?
   a. In an extended care facility where multiple residents have similar respiratory diseases
   b. In a child care facility where one child has bitten another on the arm for taking a crayon
   c. At a multiple-casualty incident where a commercial airliner has crashed at a regional airport
   d. When entering a home in which there is a suspicion of high levels of carbon monoxide

3. You are at the scene of a car crash where the car has been found overturned in a small river parallel to the road. You can still see the wheels and undercarriage of the car, but the patient compartment is submerged. A witness to the incident states that no one has emerged from the vehicle. In this situation, what is most important?
   a. Containing the fuel cell to prevent an environmental hazard
   b. Extricating the patient from the car if you think you can
   c. Ensuring that the witness is kept safe
   d. Your personal safety at the scene

4. As you approach a dark home at night, something just does not seem right. It is not anything you can put your finger on, just a sense that something is wrong or is about to happen. What should you do?
   a. Wait until law enforcement arrives before entering.
   b. Have your partner enter the scene while you wait outside in case an emergency occurs.
   c. Enter the scene with something with which to protect yourself.
   d. Call out for the patient to come outside so you can initiate care.

5. You are dispatched for a shooting at a local drinking establishment. You ask dispatch if law enforcement is en route also; dispatch confirms that they are, but does not know whether they are on scene yet. Given this information, what should your EMS crew do?
   a. Park the ambulance outside the bar but do not exit the ambulance until law enforcement arrives.
   b. After you arrive on the scene, send one EMS provider inside to ensure scene safety.
   c. Tell dispatch you will not respond until you are assured by the police that the scene is safe and the perpetrator is in custody.
   d. Stage your ambulance a few blocks away until law enforcement clears the scene.

6. You arrive on the scene and see that a power line lies close to your pediatric patient. You are fairly certain the line is live and decide to move it with a dry piece of equipment. Which of the following should you use?
   a. A wooden-handled ax
   b. A fallen tree branch
   c. A nylon rope
   d. None of the above

7. Early one morning, near the end of your 12-hour shift, you are dispatched to a school bus-versus-truck crash. You are the first to arrive and you notice that the bus is lying on its side. Numerous children are crawling out of the bus, others are walking around, and some are lying on the ground nearby. What should be the first task(s) completed by your EMS unit?
   a. Begin treating the first patients you encounter.
   b. Establish incident command and begin the triage process.
   c. While you start triaging patients, your partner should begin loading the minimally wounded into the ambulance.
   d. Start at opposite ends of the scene and begin assessing patients.

8. The most important infection control measure you can employ to prevent contracting or spreading disease is _____
   a. handwashing
   b. wearing gloves
   c. donning eyewear
   d. wearing a full body gown

9. Most paramedics are trained to what level concerning a hazardous material spill?
   a. Awareness level
   b. Action level

c. Coordination level
d. Technician level

10. The "Reach–Throw–Row–Go" technique is used to _____
a. remove power lines from a car with entrapped people.
b. isolate a hazardous material that endangers civilians.
c. conduct a search in a confined space.
d. rescue a drowning victim.

See Answers to Review Questions at the back of this book.

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Chapter 2
Primary Assessment

Richard A. Cherry, MS, EMT-P

STANDARD
Assessment

COMPETENCY
Integrate scene and patient assessment findings with knowledge of epidemiology and pathophysiology to form a field impression. This includes developing a list of differential diagnoses through clinical reasoning to modify the assessment and formulate a treatment plan.

Learning Objectives

Terminal Performance Objective: After reading this chapter, you should be able to perform a primary assessment in which you identify and intervene in all immediate threats to life.

Enabling Objectives: To accomplish the terminal performance objective, you should be able to:

1. Define key terms introduced in this chapter.
2. Discuss how the primary assessment integrates into the overall context of an emergency call.
3. Identify the individual components that comprise the primary assessment.
4. Discuss the forming of a general impression and integrate this into the primary assessment.
5. Identify the clinical need to stabilize the cervical spine during the primary assessment.
6. Discuss how to assess baseline mental status and integrate this into the primary assessment.
7. Discuss how to assess and manage the airway as it integrates into the primary assessment.
8. Discuss how to assess and manage breathing as it integrates into the primary assessment.
9. Discuss how to assess and manage circulation as it integrates into the primary assessment.
10. Discuss how to establish patient priorities as it relates to the primary assessment findings.
11. Given a scenario, discuss how you would integrate these components into a comprehensive primary assessment.

KEY TERMS

circulation assessment, p. 29
decerebrate, p. 25
decorticate, p. 25
general impression, p. 22
primary assessment, p. 22

Case Study

En route to the scene, paramedic Andy Illingston and EMT Diane Tomlinson prepare for the worst. The initial report from bystanders at the scene says that a woman jumped from a fourth-floor balcony at the downtown shopping mall. She reportedly landed four stories below on the marble floor and lies bleeding with multiple injuries. If this is true, Andy thinks, he and Diane will find a critical patient with serious injuries.

On arrival, Andy's worst fears come true. A woman in her mid-30s is lying on the floor in a pool of blood with signs of obvious multiple trauma. Immediately, Andy directs Diane to stabilize the woman's head and neck and manually open her airway with a jaw thrust. Andy begins the primary assessment by evaluating their patient's level of response. He quickly notes that the patient is unresponsive to all stimuli. He then assesses the airway, which is noisy with gurgling blood, and immediately suctions the oropharynx and listens for air movement. The patient has shallow respirations at a rate of 38 per minute. Andy instructs Diane to insert an oropharyngeal airway and begin ventilations with a bag-valve mask and supplemental oxygen while he continues his assessment.

Because the patient exhibits signs of severe respiratory distress, Andy decides to assess her neck and chest before proceeding with the primary assessment. He quickly exposes the patient's chest and notices deformity to the right side with probable multiple rib fractures. He auscultates the chest and, noticing decreased breath sounds on the right side, suspects a flail chest and a pneumothorax. Andy feels for radial and carotid pulses. He notes the absence of a radial pulse and the cool, pale look of the patient's skin. The carotid pulse is weak at a rate of approximately 130 beats per minute. Diane comments that the patient is in shock. Andy designates her as a priority 1 patient, indicating rapid transport to the appropriate medical facility.

While Diane continues to maintain manual stabilization of the patient's neck, Andy begins a rapid secondary assessment. He starts at the head and quickly palpates a depressed skull fracture. Andy notes that the patient's trachea is midline and jugular veins are flat, temporarily ruling out a tension pneumothorax. He notices a rigid, distended abdomen and suspects an intraabdominal bleed, which is most likely causing the profound shock. Next, he palpates the pelvis and notes an unstable pelvic ring, indicating fracture. He also notes severe deformity and angulation to both femurs, suggesting bilateral fractures. As additional help from the fire department arrives, he instructs them to quickly immobilize the patient on a vacuum mattress while he prepares the back of the ambulance for transport.

Once in the ambulance, Andy reassesses his patient's mental status and ABCs during the 4-minute ride to Memorial Hospital. At this time, he takes a full set of vital signs and notes the following: heart rate, 130 and weak; blood pressure, 76/40 mmHg; respirations, 38 and shallow. Andy decides to administer a rapid fluid bolus. Advanced EMT Joe Calloway, one of the firefighters, performs the procedure and runs both lines "wide open." Andy contacts the hospital and gives a quick report to Dr. Prasad, the attending physician. On arrival, they transfer their patient to the emergency department staff and watch as an experienced team of trauma specialists prepares the patient for a quick ride to surgery.

Customer Service Minute

The Human Touch A paramedic field preceptor was working with a student one afternoon when they responded to a call for an unknown illness. The patient was an elderly woman who drifted in and out of consciousness. The paramedic student provided first-class medical care. He conducted an efficient and relevant assessment, provided advanced life support, and did everything right. By the end of this call, he was exhausted. The only thing the preceptor did was sit by the patient's head en route to the hospital and talk with her. He put a hand on her shoulder and provided some reassurance during her lucid moments. When they arrived at the emergency department and prepared to get out of the ambulance, she suddenly gave the preceptor a big hug and thanked him. The student was dumbfounded. Afterward

he asked his mentor, "Why did she hug you? I did all the work!" But he eventually understood.

What do our patients expect from us? First, they want us to respond quickly. If it's not quick, it's not emergency service. They expect us to solve their problem by being smart (book smart and street smart), by being skillful, and by using good, sound clinical judgment.

Mostly, they expect us to be nice. Treat your patients just as you would your mother. Focus on them, explain things, and say good-bye before you leave the hospital. They will remember how you treated them long after they've forgotten that you missed the IV three times. Patient care is about human contact. Let your patients know that they've been taken care of by an EMS professional.

Customer service is always human being to human being. This is especially true in EMS. We bring with us thousands of dollars in patient care monitoring technology, but what patients remember most was how we treated them. When we make a connection with our patients, we remind patients that we, in EMS, care about people.

Introduction

The **primary assessment** is the basis of all prehospital emergency medical care. Its goal is to identify and correct immediately life-threatening conditions of the patient's airway, breathing, or circulation (ABCs). If you find these conditions during this part of your assessment, treat them at once. For example, open a closed airway, provide ventilation, or control hemorrhage before moving on.

Immediately following the primary assessment, decide whether to provide immediate transport or to perform further on-scene assessment and care. As with the scene size-up, think of the primary assessment not as a step-by-step process, but as a series of critical decisions based on what you find. In most cases, you will proceed systematically through the ABCs, but sometimes the situation may determine how much priority you give to any one component. For example, if you suspect that your patient is in cardiac arrest, begin your assessment with a circulation check, followed by airway and breathing. In another situation, if you find your patient bleeding profusely from an arterial wound, it would be a waste of time to secure his airway first if, by the time it was secured, he would have exsanguinated. Think of the primary assessment as a solid framework from which to begin but always allow common sense to dictate the best way to proceed.

CONTENT REVIEW

➤ Steps of Primary Assessment
- Form a general impression.
- Stabilize cervical spine as needed.
- Assess baseline mental status.
- Assess and manage airway.
- Assess and manage breathing.
- Assess and manage circulation.
- Determine priorities.

The primary assessment consists of the following components:

- Forming a general impression
- Stabilizing the cervical spine as needed
- Assessing a baseline mental status
- Assessing and managing the airway
- Assessing and managing breathing
- Assessing and managing circulation
- Determining priorities of care and transport

The primary assessment should take less than 1 minute, unless you have to intervene with lifesaving measures. Perform the primary assessment again as part of your reassessment throughout the patient contact, especially after any major intervention or whenever your patient's condition changes.

Let's now take an in-depth look at the components of a primary assessment.

Forming a General Impression

The **general impression** is your first, intuitive evaluation of your patient. It is also known as your "view from the door." It will help you determine his general clinical status (stable versus unstable) and priority for immediate transport. Base your first impression on the information you gather from the environment, the mechanism of injury, the nature of the illness, your patient's posture and overall look, the chief complaint, and your instincts.

One of the first determinations you will make is whether your patient "looks dead or doesn't look dead." Because this is a critical step in the management of a patient in cardiac arrest, it must be determined as soon as possible. If your patient looks dead, make a quick evaluation of responsiveness and breathing. If he is unresponsive and is apneic or has agonal respirations, quickly feel for a pulse and, if the pulse is absent, begin chest compressions immediately. Continue the standard CPR sequence of 30 compressions and 2 quick breaths. If your patient shows any signs of life, such as moaning, groaning, or moving, or if he shows a significant breathing effort, conduct the standard primary assessment (ABC) as outlined in this chapter.

Your patient's age, gender, and race often influence your index of suspicion. Very old and very young patients are more apt to have severe complications from injury or illness. This is because their compensation mechanisms are

either not yet fully formed or have deteriorated with age. Suspect a woman of childbearing age with lower abdominal pain and vaginal bleeding to have a life-threatening gynecologic emergency known as ruptured ectopic pregnancy. Black Americans have a higher incidence of hypertension and cardiovascular disease than members of other races.

Determine whether your patient's problem results from trauma or from a medical problem. Sometimes this will not be readily apparent. For example, did your patient slip and fall or get dizzy and fall? Note your patient's face and his posture and decide whether rapid intervention or a more deliberate approach is warranted. With experience, you will be able to recognize even the most subtle clues of a patient in critical condition. Generally, the more serious the condition, the quieter your patient will be. Look at, listen to, and smell the environment. Gather as many clues as possible as you enter the scene.

Take the necessary Standard Precautions with every patient. Then, if your patient is alert, identify yourself and begin to establish a rapport. For example, "Hello, I'm Marko Johnson, a paramedic with AVON Ambulance Service. I'm here to help you." This establishes your level of training, authority, and reason for being at your patient's side. It also allows your patient to refuse care. As discussed in the chapter, "Medical–Legal Aspects of Prehospital Care," you cannot provide care without either implied or informed consent.

Reassure your patient. Listen to him and do not trivialize his complaints. Frequently, we forget how significant an injury or illness, even a minor one, seems to a patient. With your experience, his problem may seem insignificant to you, but for your patient it is a real concern. There is a fine line between reassuring your patient and minimizing his condition. Remain calm and reassure him while you take his situation seriously. The ill or injured patient may worry about the long-term consequences for work, child care, and finances. Understand these fears and support your patient psychologically as well as physiologically.

If the mechanism of injury is significant or if your patient is unresponsive, have your partner manually stabilize your patient's head and neck (Figure 2-1). Approximately 2 percent of victims with blunt trauma have a spinal injury; this risk is tripled if the victim has a craniofacial injury.[1] Do this before establishing his mental status and continue manual stabilization until you make the decision whether or not full spinal motion restriction is indicated as directed by local protocols. If your patient is awake, explain what you are doing and ask him not to move his neck. You do not want him to turn his head when you try to assess mental status. Ask your partner to maintain your patient's head in a neutral position as you begin your assessment. If your patient is a small child, place a small towel or pad beneath the shoulders to maintain proper alignment of the cervical spine (Figure 2-2). This will compensate for the large occiput of the child's head, which normally would flex his neck when he is placed on a flat surface.

FIGURE 2-1 Manually stabilize the head and neck on first patient contact.

(a)

(b)

FIGURE 2-2 Place a folded towel under your young patient's shoulders to keep the airway aligned. (a) Airway not aligned. (b) Airway aligned after using a towel.

Patho Pearls

Patient assessment actually starts as soon as you approach the scene. Clues about the patient's underlying pathophysiology might be evident from such things as positioning of a vehicle, downed power lines, or the appearance and actions of bystanders. However, your safety, and that of your fellow rescuers, is always paramount. Never approach a scene that appears unsafe. With time, you will develop a "sixth sense" about emergency scenes and bystanders.

As you begin the patient encounter, process all that you see into your patient assessment and care. For example, consider this scenario: A car with two 16-year-old girls fails to negotiate a turn on a country road and overturns into a flowing creek adjacent to the road. Although the ambient temperature is in the 60s, you know that the temperature of the water in this area often is in the 40s. Thus, you should immediately suspect the possibility of hypothermia.

As the girls are removed from entrapment, no obvious injuries are noted. Vital signs are normal other than slight tachycardia. However, peripheral pulses are weak and the skin is pale and cool. Is it shock? Is it hypothermia? Is it both? Your index of suspicion is high for both hypothermia and blunt force trauma. You follow local protocols with regard to immobilization, fluid therapy, and monitoring. Once in the ambulance and wrapped in blankets, both girls start to show signs that blood flow to the skin is improving. By the time you reach the hospital, their skin has a normal color and their pulse rates are normal.

Following a comprehensive assessment in the emergency department, the girls are discharged to their parents with no apparent injuries. Thus, your instincts were right. The potential for shock was a greater risk to the girls than the potential for hypothermia, and you had to treat based on this risk. But hypothermia turned out to be the principal problem. Integrating information from the scene size-up, patient history, and patient examination gave you a clear picture of the patients' underlying pathophysiologic process.

Mental Status Assessment

Your assessment of baseline mental status is crucial for all patients.[2] For example, when you deliver your head injury patient to the emergency department, the neurosurgeon will want a chronological report of your patient's mental status from the time you arrived on the scene. This vital information helps the surgical team diagnose a deteriorating brain injury. For example, if the patient was alert and oriented when you arrived, then became sleepy en route, and within 30 minutes was responsive only to deep pain stimuli, the suspicion for epidural hematoma with subsequent rising intracranial pressure is high. Rapid surgical intervention in these and many other cases can save lives if the diagnosis is made quickly. Your baseline mental status documentation is critical to these patients' emergency care.

CONTENT REVIEW

- AVPU
  - ***A***lert
  - ***V***erbal stimuli
  - ***P***ainful stimuli
  - ***U***nresponsive

Establishing a baseline mental status is also crucial in assessing the variety of medical situations that cause altered levels of response. Drug overdoses, poisonings, diabetic emergencies, sepsis, hypoxia, and hypovolemia are just a few of the many conditions that result in altered mentation. For the stroke patient, identifying the time of the symptoms' onset is critical for the emergency physician to consider administering clot-dissolving drugs. This is possible only with your accurate assessment of your patient's change in mental status.

AVPU Levels

To record your patient's mental status, use the acronym AVPU. Your patient is either **A**lert, responds to **V**erbal stimuli, responds only to **P**ainful stimuli, or is **U**nresponsive. Perform this exam by starting with verbal stimuli, then moving to painful stimuli only if he fails to respond to your verbal cues.

Alert

An alert patient is awake, as evidenced by open eyes. He may be oriented to person (who he is), place (where he is), time (day, month, and year), and situation (what is going on) and give organized, coherent answers to your questions. In contrast, an alert patient also may be disoriented and confused. For example, a patient with a suspected concussion will often present as dazed and confused. A hypoxic or hypoglycemic patient may present as combative. A shock patient may be restless and anxious. If his eyes are open and he appears awake, however, he is categorized as alert.

Children's responses to your questions will vary with their age-related physical and emotional development. Infants and young children usually will be curious but cautious when a stranger approaches. Their level of response may not indicate the gravity of their condition. In fact, the quiet child is usually the seriously injured or ill child.

Verbal

If your patient appears to be sleeping but responds when you talk to him, he is responsive to verbal stimuli. He can respond by speaking, opening his eyes, moaning, or just moving. Note the level of his verbal response. Does he speak clearly, mumble inappropriate words, or make incomprehensible sounds? Children may respond to your verbal commands by turning their heads or stopping activity. For infants, you may have to shout to elicit a response.

Pain

If your child or adult patient does not respond to verbal stimuli, try to elicit a response with painful stimuli. Pinch his fingernails or perform a "horsebite" (pinching tender areas such as under the arms, flanks, inner thigh, or back of the knee) and watch for a response. Again, the patient may respond by waking up, speaking, moaning, opening his eyes, or moving. Note the type of motor response to the painful stimuli. Is his response purposeful or nonpurposeful? If he tries to move your hand away or to move himself away from the pain, it is purposeful.[3] **Decorticate** (arms flexed, legs extended) or **decerebrate** (arms and legs extended) posturing is nonpurposeful and suggests a serious brain injury. For the infant, flick the soles of the feet and expect crying as the appropriate response.

Unresponsive

The unresponsive patient is comatose and fails to respond to any noxious stimuli.

The AVPU scale describes your patient's general mental status. Avoid using terms such as "semiconscious," "lethargic," or "stuporous" because they are interpreted broadly and you have not had a chance to conduct a comprehensive neurologic exam at this point.

Your patient's response to stimulation will tell you a great deal about his condition. Any alteration or deterioration in mental status may indicate an emergent or already serious problem. A patient with an impaired mental status may have lost, or be in danger of losing, the ability to protect his airway. Take immediate steps to protect your patient's airway by proper positioning and the use of basic and advanced airway adjuncts as appropriate. Provide oxygen if your patient exhibits a pulse oximetry reading below 95 percent and provide only enough until your reading is in the normal range (95 to 100 percent).

Airway Assessment

If your patient is responsive and can speak clearly, you can assume that his airway is patent. If your patient is unconscious, however, his airway may be obstructed. The supine unconscious patient's tongue often obstructs his upper airway. Because the mandible, tongue, and epiglottis are all connected, gravity allows these structures to block the patient's upper airway as his facial muscles relax. Assume that the unconscious patient has no gag reflex and cannot protect his airway. Because of this, secretions probably have settled in the hypopharynx even if you do not hear a gurgling sound. Routine oropharyngeal suctioning will clear these secretions effectively.

You can open your patient's airway with one of two simple manual maneuvers: the jaw-thrust maneuver or the head-tilt/chin-lift maneuver. If you suspect a cervical spine injury, open the airway using a jaw thrust without head extension.[4] Place your thumbs on your patient's cheeks and lift up on the angle of the jaw with your fingers (Figure 2-3). For all other patients, use the head-tilt/chin-lift maneuver. Place one hand on your patient's forehead and lift up under the chin with the fingers of your other hand (Figure 2-4). Because maintaining a patent airway and providing adequate oxygenation and ventilation are priorities in managing critical patients, use a head-tilt/chin-lift maneuver if the jaw thrust does not open the airway.

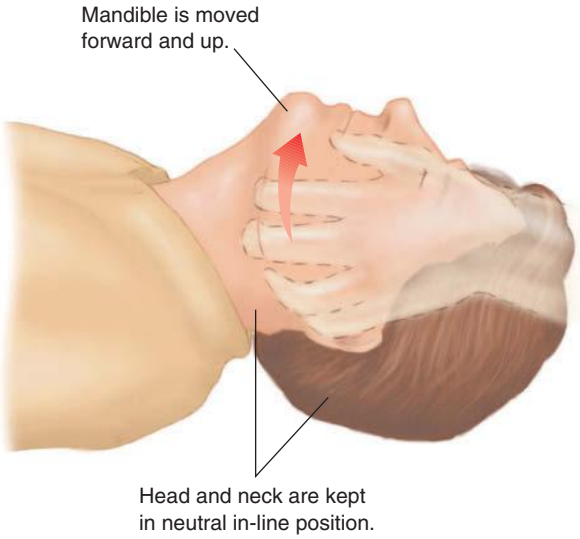

FIGURE 2-3 Use the jaw-thrust maneuver to open your patient's airway if you suspect a cervical spine injury.

To open the airways of infants and young children, apply a gentle and conservative extension of the head and neck (Figure 2-5). These patients' upper airway structures are very flexible and are easily kinked when their necks are flexed or hyperextended. It may be necessary to move the child's head through a range of positions to obtain optimal airway patency and effective rescue breathing.[5]

To assess your patient's airway, look for chest rise while you listen and feel for air movement. If the airway is clear, you should hear quiet airflow and feel free air movement. A noisy airway is a partially obstructed airway. Snoring occurs when the tongue partially blocks the upper airway. In this case, reposition the head and neck and reevaluate. Gurgling indicates that fluid, such as blood, secretions, or gastric contents, is blocking the upper airway. Gently open and examine the mouth for foreign bodies you can remove easily and quickly. Use aggressive suctioning to remove blood, vomit, secretions, and other fluids.

The high-pitched inspiratory screech of stridor is caused by a life-threatening upper airway obstruction that may be caused by a foreign body, severe swelling, allergic reaction, or infection. If you suspect a foreign body obstruction and your patient exhibits poor air movement,

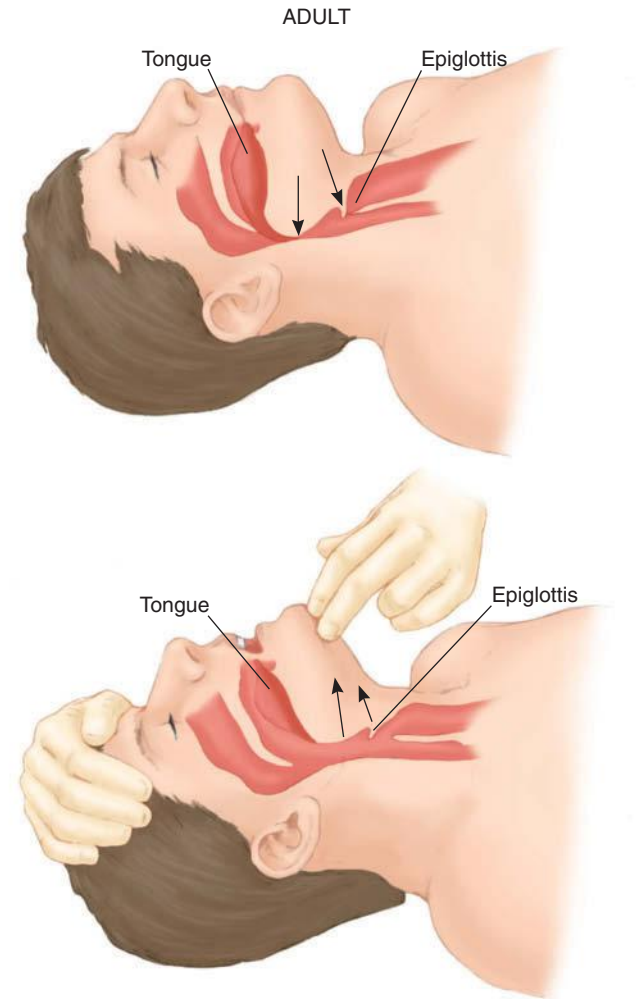

FIGURE 2-4 The head-tilt/chin-lift maneuver in an adult.

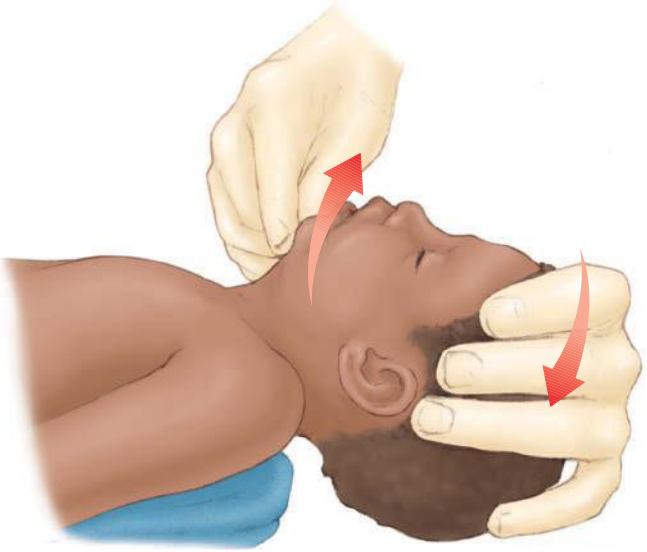

FIGURE 2-5 The head-tilt/chin-lift maneuver in an infant. Do not overextend the head and neck.

a weak cough, or a diminishing mental status, immediately deliver abdominal thrusts to dislodge the object. If your patient is less than 1 year old, use back blows and chest thrusts instead of abdominal thrusts. If these maneuvers are ineffective, remove the object under direct laryngoscopy with Magill forceps. If these attempts fail, try inserting an endotracheal tube in the hope of passing it past or through the object or pushing it down into the right mainstem bronchus, thereby clearing the way for left lung ventilation.

Other causes of stridor require vastly different approaches. Upper respiratory infections such as croup or epiglottitis call for oxygen administration (if your patient's pulse oximetry is below 95 percent) and a quiet ride to the hospital. In croup cases, vaporized epinephrine is helpful, and minimally invasive, in opening the upper airway. More invasive maneuvers, such as positive pressure ventilation, continuous positive airway pressure (CPAP), bilevel positive airway pressure (BiPAP), intubation, and cricothyrotomy, are indicated only if the airway becomes totally obstructed.

Respiratory burns can cause rapid massive swelling of the upper airway and require rapid endotracheal intubation. Anaphylaxis necessitates vasoconstrictor medications to decrease upper airway swelling. Because these vastly different management techniques are potentially life threatening when applied inappropriately, your correct field diagnosis is critical. If your patient presents with stridor, take time to evaluate the history and clinical signs and symptoms for the common causes of stridor: foreign body obstruction (sudden onset while eating), epiglottitis (fever, illness, drooling, inability to swallow), respiratory burns (history of facial burns, hoarseness), and anaphylaxis (hives, history of allergies).

The softer, expiratory whistle of wheezing is caused by constricted bronchioles, the smaller, lower airways. You may hear it audibly (without a stethoscope) in cases such as asthma, bronchitis, emphysema, acute pulmonary edema, or other causes of bronchospasm. Bronchiolitis, a lower respiratory infection, often causes these sounds in infants and young children. If you do hear wheezing, use a stethoscope to better hear and identify the sounds before you proceed with treatment. Wheezing patients require a bronchodilator medication to dilate the bronchioles and reduce airway resistance. Use aerosolized medications, such as albuterol and ipratroprium, for this purpose.

If your patient is not moving air, quickly feel for a pulse. If he is pulseless, begin CPR immediately. If he has a pulse, he is in respiratory arrest. Immediately provide ventilation with a bag-valve mask and high-concentration oxygen (Figure 2-6). Give two rescue breaths, each over 1 second, with enough volume to produce visible chest rise. Be careful not to overventilate (by breathing either too fast or too deeply). Ventilate adult patients at a rate of 10 to 12 breaths per minute and all children at a rate of 12 to 20 breaths per minute.[5, 6] If you cannot ventilate the lungs,

FIGURE 2-6 Immediately use a bag-valve mask to ventilate patients who are not moving air.

reposition the head and neck and try again. If there is still no air movement, assume a complete obstruction and apply the measures explained earlier.

In an infant, if you have difficulty making an effective seal over the mouth and nose, try either mouth-to-mouth or mouth-to-nose ventilation.[6] If you use the mouth-to-mouth technique, pinch the nose closed. If you use the mouth-to-nose technique, close the mouth. In either case, make sure the chest rises when you give a breath.

Sometimes, in cases of massive face and neck trauma, you may have to use unorthodox methods to find and secure the airway. For example, a patient with facial trauma and a massive open neck wound may require you to look for the presence of bubbles in the neck wound and trace them to an opening in the larynx or trachea. Then insert an endotracheal tube or other tracheal device into the opening and ventilate your patient. These types of situations are extremely challenging, but managing the difficult airway is certainly part of a paramedic's scope of practice.

Once you have cleared the airway, keeping it open may require constant attention. In these cases, insert a basic airway adjunct to help keep the tongue from blocking the upper airway. If your patient is unconscious and lacks a gag reflex, insert an oropharyngeal airway (Figure 2-7). If he has a gag reflex or significant orofacial trauma, insert a nasopharyngeal airway (Figure 2-8). Be cautious when using a nasopharyngeal airway if you suspect a basilar skull fracture because these airways have been passed through the skull fracture and into the brain. If the patient has no gag reflex and cannot protect his airway, you will need to use advanced techniques to maintain airway patency.[5, 6] These include the many forms of endotracheal intubation (Figure 2-9), the many multilumen airways (Figure 2-10), and transtracheal techniques such as needle or surgical cricothyroidotomy (Figure 2-11). The multilumen airways are not appropriate for use in children. If your patient has an airway problem and shows signs of hypoxia (pulse oximetry below 95 percent), administer oxygen by nonrebreather mask. All these devices for maintaining upper airway patency are described in detail in the chapter "Airway Management and Ventilation."

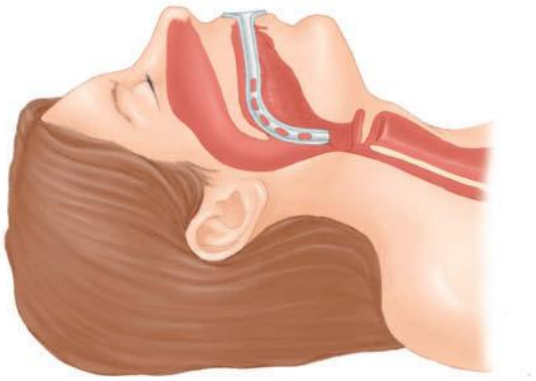

FIGURE 2-7 Use an oropharyngeal airway for unconscious patients without a gag reflex.

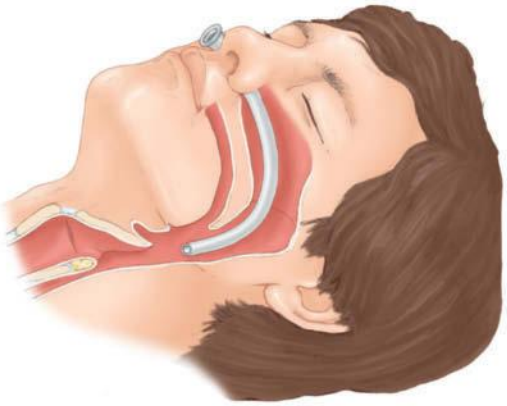

FIGURE 2-8 The nasopharyngeal airway rests between the tongue and the posterior pharyngeal wall.

FIGURE 2-9 Endotracheal intubation.

FIGURE 2-10 A variety of multilumen airways are becoming more popular in managing the airway of critical patients.

FIGURE 2-11 QuickTrach® device.

Table 2-1 Respiratory Rates

Age	Low Rate	High Rate
Newborn	30	60
Infant (<1 year)	30	60
Toddler (1–2 years)	24	40
Preschooler (3–5 years)	22	34
School age (6–12 years)	18	30
Adolescent (13–18 years)	12	26
Adult (>18 years)	12	20

Breathing Assessment

Assess your patient for adequate breathing. Immediately note any signs of inadequate breathing:

- Altered mental status, confusion, apprehension, or agitation
- Shortness of breath while speaking
- Retractions (supraclavicular, suprasternal, intercostal)
- Asymmetric chest wall movement
- Accessory muscle use (neck, abdominal)
- Cyanosis
- Audible sounds
- Abnormally rapid, slow, or shallow breathing
- Nasal flaring

Assess the respiratory rate and quality. Normal respiratory rates vary according to your patient's age. Abnormally fast or slow rates (Table 2–1) actually decrease the amount of air that reaches the alveoli for gas exchange. For patients with abnormally fast or slow respiratory rates and decreased tidal volumes, provide positive-pressure ventilation with, for example, a bag-valve mask and supplemental oxygen, to ensure full lung expansion and maximum oxygenation.

Note the respiratory pattern. Rapid (tachypneic), deep (hyperpneic) respirations are a compensatory mechanism and suggest that the body is attempting to rid itself of excess acids. They may indicate a diabetic problem, severe acidosis, or head injury. They also may result from hyperventilation syndrome or from simple exertion. Kussmaul's respirations (deep, rapid breathing) accompanied by a fruity breath odor are a classic sign of a patient in diabetic ketoacidosis. In either case, always ensure an adequate inspiratory volume and administer only enough oxygen to correct hypoxia.

Cheyne-Stokes respirations, a series of increasing and decreasing breaths followed by a period of apnea, most likely result from a brainstem injury or increasing intracranial pressure. Biot's respirations, identified by short, gasping, irregular breaths, may signify severe brain injury. Again, ensure adequate inspiratory volume and provide ventilation with supplemental oxygen as needed. Some patients with acute pulmonary edema can benefit from a CPAP unit (Figure 2-12). These devices provide a constant back pressure that keeps the airways open, especially during exhalation, when they tend to collapse. They can also help drive oxygen across the alveolar–capillary membrane and prevent the need for endotracheal intubation.

If your patient's breathing appears inadequate, immediately assess the neck and chest before moving on to circulation. Quickly inspect and palpate the rib cage for rigidity and wounds. Auscultate bilaterally high and low for adequate and equal breath sounds. Identify and correct any life-threatening conditions before moving on. If you find a sucking chest wound, cover it immediately at

FIGURE 2-12 CPAP can provide positive airway pressure, which will maintain lower airway patency.

FIGURE 2-13 To assess an adult's circulation, feel for a radial pulse.

CONTENT REVIEW

- ➤ Signs of Inadequate Breathing
  - Altered mental status, confusion, apprehension, or agitation
  - Shortness of breath while speaking
  - Retractions
  - Asymmetric chest wall movement
  - Accessory muscle use
  - Cyanosis
  - Audible sounds
  - Abnormally rapid, slow, or shallow breathing
  - Nasal flaring

the end of exhalation (to prevent trapping air in the pleural space) with an occlusive dressing taped on three sides. This will act as a relief valve, allowing air to escape but not enter.

If you find signs of a tension pneumothorax (absent breath sounds on one side, diminished breath sounds on the other side, distended neck veins, unequal chest expansion), immediately decompress the affected side with a large IV catheter at the second intercostal space, midclavicular line. If you find a flail segment and resultant hypoventilation, immediately perform positive pressure ventilation. If you visualize or feel paradoxical movement of the segment, apply a large dressing to stabilize it. If your patient exhibits adequate breathing, or if you have successfully corrected his breathing problem move directly to circulation.

Two noninvasive devices can be extremely helpful in objectively assessing the adequacy of your patient's breathing: the pulse oximeter and the continuous waveform capnography monitor. Pulse oximetry is a useful tool in quantifying the oxygen saturation of the red blood cells and, ultimately, the tissues. Continuous waveform capnography can be invaluable in assessing not only your patient's ventilatory status, but also his general circulation. Whether these simple procedures should be routinely used during the primary assessment is debatable and situation dependent. Refer to the chapter "Patient Monitoring Technology" for more information on these two devices.

Circulation Assessment

The **circulation assessment** consists of evaluating the pulse and skin and controlling hemorrhage. Go directly to the wrist and feel for a radial pulse (Figure 2-13). Its presence suggests adequate peripheral perfusion. If the radial pulse is absent, check for a carotid pulse (Figure 2-14). The carotid pulse's presence along with the absence of a peripheral pulse suggests a low flow state. In the infant, palpate the brachial pulse (Figure 2-15) or, if necessary, auscultate the apical pulse. If your patient is pulseless, begin chest compressions immediately, evaluate the cardiac rhythm, and provide prompt defibrillation as needed.

Assess your patient's pulse for rate and quality. The normal heart rate varies with your patient's age (Table 2–2). Very fast rates (tachycardia) and very slow rates

FIGURE 2-14 If you cannot feel a radial pulse, palpate for a carotid pulse.

FIGURE 2-15 To assess an infant's circulation, palpate the brachial pulse.

FIGURE 2-16 Combat application tourniquet.

(bradycardia) may indicate a life-threatening cardiac dysrhythmia. Abnormally fast or slow rates may result in decreased cardiac output. If your patient is hemodynamically unstable (i.e., altered mental status, hypotension, cool ashen skin) with an abnormally fast rate, quickly attach your monitor and prepare to perform synchronized cardioversion as appropriate. If the rate is abnormally slow, prepare to administer atropine and/or perform external cardiac pacing. For more information on this topic, refer to the chapter "Cardiology."

Note the quality of the pulse. The normal pulse should be regular and strong. An irregular pulse may indicate a cardiac arrhythmia requiring advanced cardiac life support procedures. In head injury, heat stroke, or hypertension, you will often find a strong, bounding pulse. A weak, thready pulse usually indicates poor perfusion due to fluid loss, pump failure, or massive vasodilation.

Stop your patient's bleeding if you have not already done so (Figure 2-16). Major bleeding usually originates with trauma, but it also can result from a medical emergency. For example, vaginal bleeding, rectal bleeding, and even a nosebleed associated with hypertension can result in life-threatening blood loss. For external bleeding, employ any appropriate measures for hemorrhage control. First try direct pressure with elevation for an extremity wound followed quickly by a tourniquet (Figure 2-16) if the bleeding isn't controllable. For places not suitable for applying a tourniquet, for example the head or abdomen, use hemostatic agents (Figure 2-17) such as HemCon®,[7] QuikClot®,[8] and Celox™. Internal bleeding is not easily controlled in the prehospital setting and demands initiating transport as soon as possible.

Assess the skin for temperature, moisture, and color (Figure 2-18). Peripheral vasoconstriction decreases peripheral perfusion to the skin early in shock. The skin may appear mottled (blotchy), cyanotic (bluish), pale, or ashen. It may also feel cool and moist (clammy). This often indicates that warm, circulating blood has been shunted away from the skin to the core of the body to maintain perfusion of vital organs. If you find any of these signs, suspect conditions related to or caused by poor perfusion. In infants and young children, capillary refill is a reliable indicator of

Table 2-2 Normal Pulse Rate Ranges

Age	Low Rate	High Rate
Newborn	100	180
Infant (<1 year)	100	160
Toddler (1–2 years)	80	110
Preschooler (3–5 years)	70	110
School age (6–12 years)	65	110
Adolescent (13–18 years)	60	90
Adult (>18 years)	60	100

FIGURE 2-17 Hemostatic agent.

FIGURE 2-18 Assess the skin for color, temperature, and moisture.

FIGURE 2-19 Capillary refill time provides important information about the circulatory status of infants and young children.

circulatory function (Figure 2-19). In adults, smoking, medications, cold weather, or chronic conditions of the elderly may affect capillary refill, so you should always consider the other indicators of circulatory function.

Priority Determination

Once you have conducted a primary assessment, determine your patient's priority. If the primary assessment suggests a serious illness or injury, conduct a rapid head-to-toe assessment to identify other life threats and transport the patient immediately to the nearest appropriate facility that can deliver definitive care. Do not delay transport for detailed assessments and procedures that you can provide en route to the hospital.

In 2011, the Centers for Disease Control and Prevention published a revised set of guidelines for field-triaging injured patients (Figure 2-20).[9] Its recommendations include a four-step process designed to decrease morbidity and mortality from trauma. Let's look at this process.

Step 1 is aimed at vital signs and level of consciousness. If your patient's Glasgow Coma Scale score is less than 14, his systolic blood pressure is less than 90 mmHg, or the respiratory rate is less than 10 or greater than 29 (less than 20 in infants <1 year), transport him to the highest-level trauma center in your community.

Step 2 is aimed at the anatomy of injury. If your patient has any of the following injuries, transport him to the highest-level trauma center in your community: penetrating injuries to the head, neck, torso, or extremities proximal to the elbow or knee; chest wall instability or deformity; two or more proximal long bone fractures; crushed, degloved, mangled, or pulseless extremity; amputation proximal to the wrist or ankle; pelvic fracture; open or depressed skull fracture; paralysis.

Step 3 is aimed at mechanism of injury and evidence of high-energy impact. If your patient suffered from one of the following mechanisms, transport him to the closest appropriate trauma facility (it need not be the highest level of trauma center): a fall of more than 20 feet for an adult, more than 10 feet for a child or two to three times the height of the child; high-risk auto crash (more than 12 inches intrusion into occupant site or more than 18 inches into any site; partial or complete ejection, death in same passenger compartment, vehicle telemetry data consistent with high risk of injury); auto-versus-pedestrian/bicyclist thrown, run over, or with significant (>20 mph) impact; and/or motorcycle crash >20 mph.

Step 4 is aimed at miscellaneous findings. If any of the following conditions exist, contact medical control and consider transport to a trauma center or specific resource hospital: age greater than 55; children; anticoagulants or bleeding disorders; burns without other trauma mechanism: triage to burn facility; burns with other trauma mechanism triage to trauma center; pregnancy greater than 20 weeks; EMS provider judgment.

In these cases, decide whether to stabilize your patient on the scene or expedite transport and initiate advanced life support procedures en route. On the way to the hospital you can conduct a general secondary assessment and provide additional care as time allows. If your patient is stable, before transport you can conduct a problem-oriented secondary assessment, followed by reassessment during transport as the situation requires, if time allows.

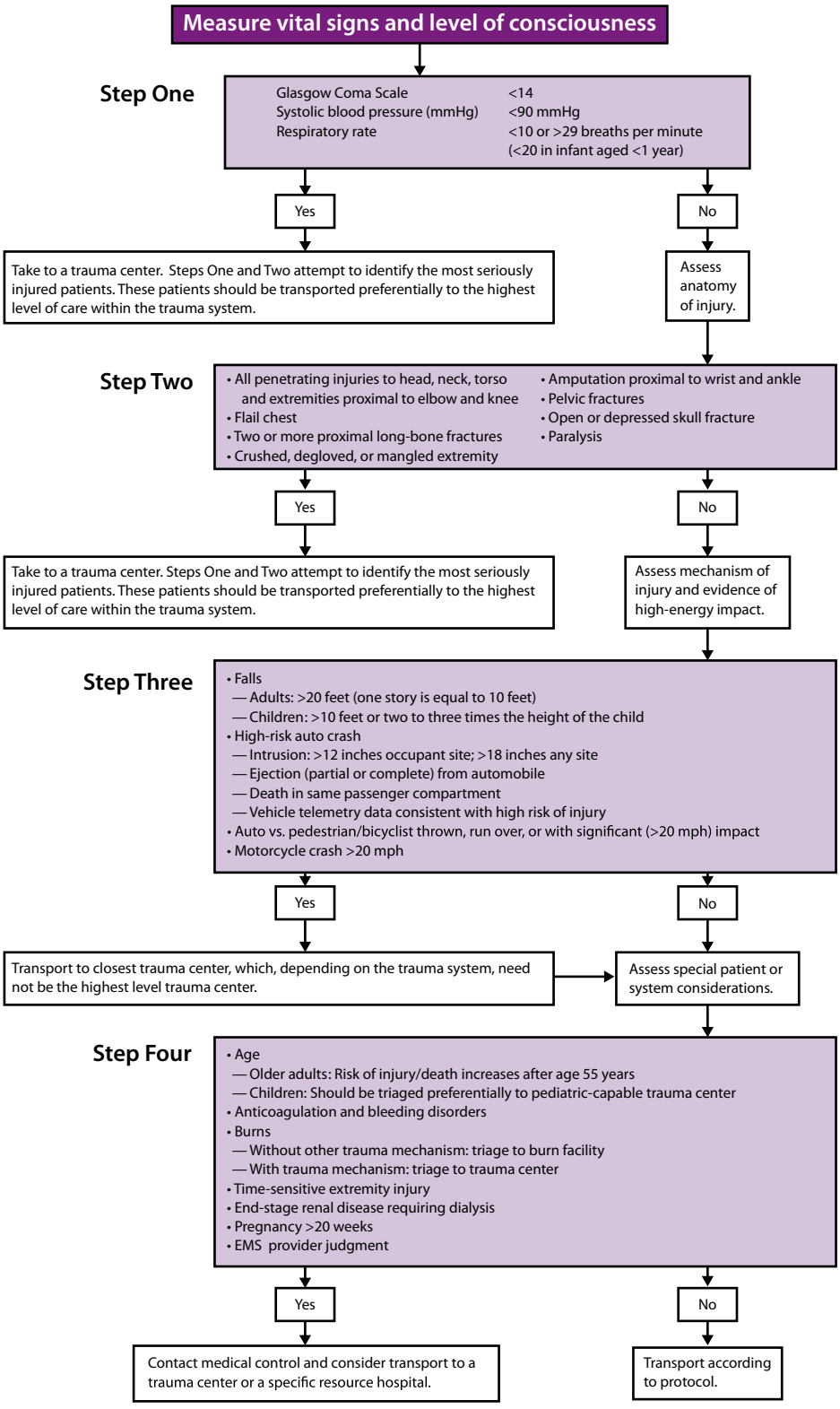

FIGURE 2-20 The 2011 Centers for Disease Control and Prevention Field Triage Guidelines.

(Centers for Disease Control and Prevention, http://www.cdc.gov/mmwr/pdf/rr/rr6101.pdf)

Summary

The primary assessment is the crucial first stage in providing lifesaving measures to seriously ill or injured patients—with the key term being "lifesaving" measures. The primary assessment is used to identify and correct immediate life threats to your patient. You will generally save more lives during the primary assessment than anywhere else in your patient care. It is here that you will reopen an obstructed airway, decompress a tension pneumothorax, seal an open pneumothorax, provide emergency ventilation and oxygenation, stop a major hemorrhage, or defibrillate a cardiac arrest. The list could go on. There is no more important element of your patient assessment than conducting a systematic primary assessment. It is time well spent.

After securing the scene and ensuring your personal safety, your goal is to identify and correct, if possible, any life threats in airway, breathing, circulation, and mental status. If you are systematic and have practiced, it should take you less than 1 minute to perform the primary assessment, yet it will provide you with enough vital information to begin correcting any life threats and confirm your priority determination for the patient and for transport.

Along with the obvious life threats, the primary assessment includes a "gut check" component that takes the patient's general appearance into account. What does your gut say when you first encounter the patient? If you walk in the room and your gut says "Oh crap!" you can mark that patient as a higher priority. If you walk into the room and your gut is saying "hmm," you need a little more information before you can make a decision. Either way, the primary assessment is a quick assessment of potentially life-threatening injuries, including cervical spine injuries, airway or breathing problems, circulatory issues, or any other situation that would cause an immediate threat to life.

In the next few chapters we will discuss continuing assessments for patients, including obtaining a thorough history, performing detailed physical exams, communicating effectively, and making clinical decisions based on your assessments.

You Make the Call

You respond to a residence for a report of a patient having difficulty breathing. You enter the living room and see a young man sitting on the couch. You notice he is slumped forward, resting his elbows on his knees, and that he does not look up at you as you enter. As you perform your primary assessment, you identify that his airway is patent and a rapid and strong radial pulse is present. While assessing his breathing, you see his head bobbing with each breath and identify a respiratory rate of about 10 breaths per minute with accessory muscle use. A family member states "He has asthma and has been working hard to breathe for several hours now."

1. How would you describe this patient's respiratory status? What factors influence this determination? What immediate interventions, if any, would you provide at this time?

See Suggested Responses at the back of this book.

Review Questions

1. Of the following components of the primary assessment, which should you normally perform first?
   a. Determine airway adequacy.
   b. Assess for breathing adequacy.
   c. Access circulatory parameters.
   d. Determine the patient's mental status.
2. During the primary assessment of an unresponsive pediatric patient who was ejected from a vehicle during a crash, you are providing manual cervical spine immobilization. To help maintain proper alignment of the child's head and neck, you should place a folded towel under which region of the body?

a. Head
b. Neck
c. Shoulders
d. Occiput

3. Your patient presents with his eyes open, and he responds to you when you speak to him. He answers your questions but is obviously disoriented as to time and place. Given this response to your stimulation, how would you grade him on the AVPU scale?
   a. Alert
   b. Verbal
   c. Painful
   d. Unresponsive

4. During your primary assessment, you determine that your trauma patient responds to loud verbal stimuli with moaning, he has a weak carotid pulse with no peripheral pulse, his breathing is labored at 32/minute, his airway displays sonorous sounds, and you note cyanosis to the face and hands. Given this information, what is your priority for treatment?
   a. Apply high-flow oxygen via nonrebreather mask.
   b. Suction the airway with a rigid-tip catheter.
   c. Apply a manual airway technique.
   d. Insert an oropharyngeal airway.

5. At what point should you initially determine that your patient has a partially occluded airway?
   a. During the primary assessment
   b. During the scene size-up
   c. During the rapid trauma assessment
   d. After making your patient priority determination

6. Your patient presents unconscious, without a gag reflex, and with decreased respirations that yield no airway sounds. During your initial management of the patient during the primary assessment, you should perform all of the following *except*

   _____

   a. open the airway manually.
   b. perform bag-valve-mask ventilation.
   c. administer oxygen.
   d. provide full spinal immobilization.

7. Your trauma patient presents with cool, pale skin; a weak central pulse rate of 110/minute; absence of peripheral pulses; and a capillary refill time of 5 seconds. From this information, what can you conclude about his circulatory condition?
   a. It is normal, given a history of traumatic injury.
   b. It shows findings of early circulatory compromise.
   c. It shows findings of severe circulatory collapse.
   d. He requires immediate CPR, starting with chest compressions.

8. While caring for a trauma patient, which of the following would be the *last* finding to be managed during the primary assessment?
   a. Airway compromise
   b. Inadequate ventilation
   c. Major hemorrhage
   d. Lumbar spinal cord transection

9. Of the following assessment parameters, which would be the *least* reliable indicator of ventilatory adequacy?
   e. Chest rise and fall
   f. Air movement in and out of the mouth
   g. Presence of bilateral breath sounds
   h. Pulse oximetry

10. You are managing an unresponsive medical patient who had a large amount of blood in the airway. During oral suctioning, you noted that the patient had an intact gag reflex. Following the suctioning, the airway now displays snoring sounds, and manual airway techniques have failed. What should you do next?
    a. Insert an oropharyngeal airway.
    b. Insert an endotracheal tube.
    c. Insert a nasopharyngeal airway.
    d. Perform a surgical cricothyrotomy to secure the airway.

11. If your afebrile patient presents with a sudden onset of severe respiratory distress and an inability to speak or cough, what intervention should you perform?
    a. Attempt to intubate.
    b. Deliver abdominal thrusts.
    c. Perform needle cricothyrotomy.
    d. Administer humidified oxygen.

12. If your patient presents with a self-inflicted open chest wound to the anterior right thorax, what would be the appropriate intervention?
    a. Perform needle chest decompression.
    b. Intubate the trachea.
    c. Apply a sterile dressing to stop the bleeding.
    d. Seal the wound with an occlusive dressing.

13. Your patient presents with marked severe respiratory distress, jugular venous distention, unequal chest expansion, absent lung sounds on the left, and diminished lung sounds on the right. What should be your priority intervention?
    a. Perform BVM ventilation with oxygen.
    b. Decompress the chest with a large-gauge IV needle.
    c. Continue with the primary assessment.
    d. Splint the chest wall with a bulky dressing.