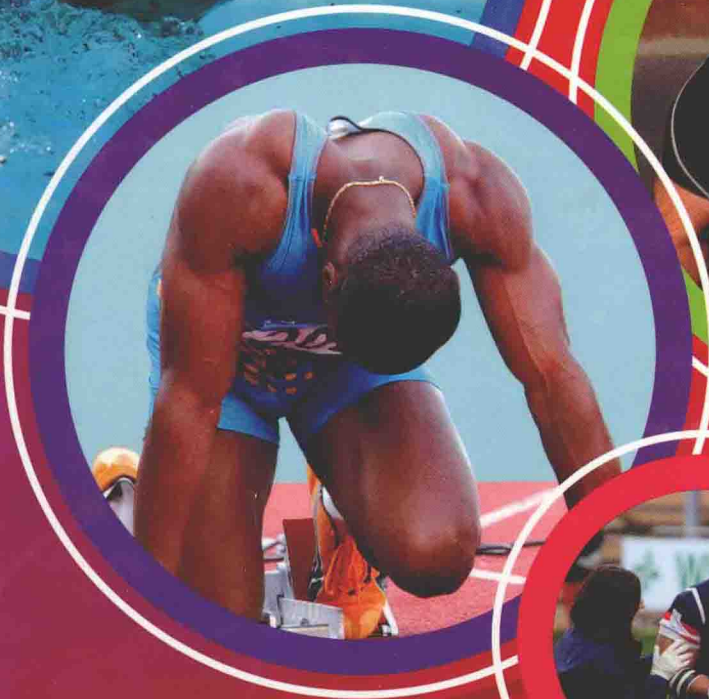


second edition

# General **MEDICAL** **CONDITIONS** in the **Athlete**



Micki Cuppett  
Katie M. Walsh

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second edition

# General **MEDICAL** **CONDITIONS** in the **Athlete**

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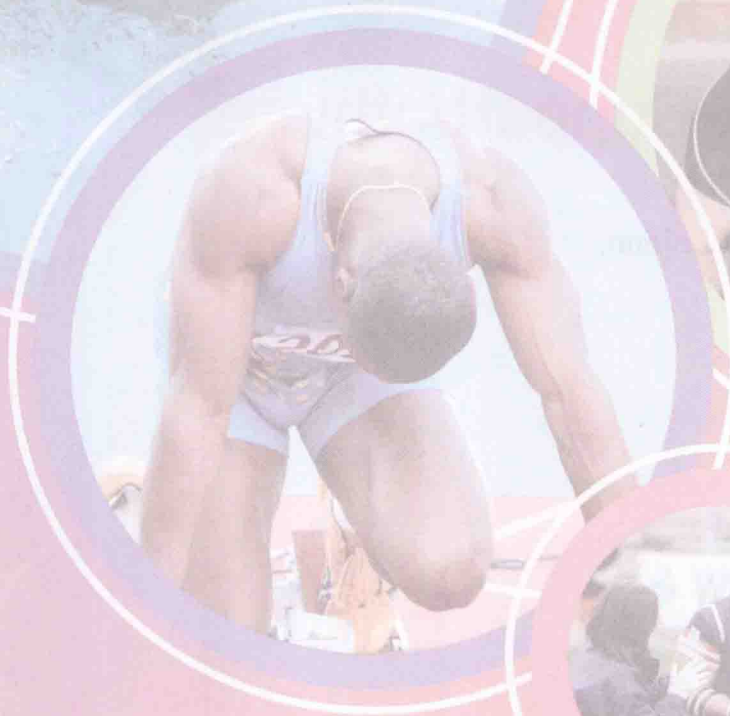
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In memory of my dad, Jim Cuppett, who taught me more than I will ever be able to realize.

To my mom, Annabelle Cuppett, thank you for being a wonderful role model.

To my sons, Derek and Kyle, who literally grew up in the athletic training room and have been an inspiration for me to contribute to the growth of the athletic training profession, if only in this small way.

**Micki Cuppett**

To my best friends forever: Tamsen Underwood Stainbrook,

my childhood friend who kept picking me up when I fell;

and Jill Walker Dale, my college roommate, who always believed in me.

To my youthful parents, Gerald and Phyllis Kelly, who boldly defy all the rules regarding age; and to Sean Bryce Flanagan, who brings sunshine into my world.

**Katie M. Walsh**

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Rose Snyder



# PREFACE



The role of a health care provider in caring for physically active individuals continues to expand to more diverse populations. Today, athletic trainers (AT) provide orthopedic and medical care to youngsters, teens, young and mature adults, and special needs athletes. In all of these groups, underlying or preexisting medical conditions may be a concern. The AT is often the first person to learn about a medical problem in athletes and thus is in a position to determine if it is a minor illness or a potentially serious medical condition. Therefore it is imperative that those working with active populations be able to recognize and appreciate potentially serious medical conditions and determine when to seek additional medical consultation and care.

The second edition of *General Medical Conditions in the Athlete* provides a four-color textbook that contains new and updated content, as well as many more graphic elements. Our goal in writing the second edition was to expand the content and provide current assessment and treatment information for medical conditions that affect the physically active population. New chapters have been added, including Diagnostic Imaging and Testing and Common Procedures in the Athletic Training Clinic. An additional chapter has also been added to expand the content in pharmacology. Together with contemporary diagnoses and treatment, our goal is to provide a comprehensive text on medical conditions in the athlete that can be utilized by all health care providers.

The text begins with an overview of the basic information presented in subsequent chapters, including a discussion of the role of the AT as an initial health care provider and physician extender and the importance of the preparticipation examination (PPE). This introductory chapter also explains communication tools, policies, rules, legal concerns, and regulations associated with medical care and stresses prevention of disease transmission along with the process of reporting communicable diseases to health networks. Classification systems (ICD and CPT) are also discussed.

The second chapter, The Medical Examination, discusses the basic evaluation tools that will assist the reader throughout the

remainder of the book. A thorough explanation of health history, observation and inspection, palpation, and pertinent tests used for the diagnosis of medical conditions is presented. Photographs and carefully detailed procedures instruct the reader in the use of special equipment and techniques for the general medical examination.

Chapter 3, Diagnostic Imaging and Testing, is a new chapter that describes various diagnostic imaging procedures and their associated risks or side effects. Numerous laboratory tests are described so the reader may better inform the patient what to expect.

Chapters 4 and 5, Basic Principles of Pharmacology and Therapeutic Drug Categories, expand the pharmacology section from the first edition. Chapter 4 describes the overall principles that apply to pharmacology, including pharmacokinetics and pharmacodynamics, and generalized pharmacologic science, whereas Chapter 5 discusses the individual categories of medications and their effects on the body.

We are quite excited about Chapter 6, Common Procedures in the Athletic Training Clinic. In a step-by-step photographic demonstration (on pig skin), this new chapter provides a graphic depiction of aseptic technique and the application and removal of sutures and staples used for wound closure. Joint aspiration and injections are also discussed, and intravenous (IV) procedures are described and illustrated. The reader is reminded that some state practice acts do not allow ATs to perform some of the procedures included in this chapter.

The remaining chapters follow a systematic approach as they address common conditions and diseases by body system. Most chapters follow a simple template, beginning with an overview of the relevant anatomy and physiology as it relates to the body system; then identifying specific conditions; explaining signs and symptoms, referral and diagnostic tests, differential diagnoses, and treatment, and finally, discussing prognosis and implication for participation. If a specific condition has related age- or gender-specific considerations, those issues are also discussed. If relevant, implications for pediatric and mature athletes are also included.

Other enhancements to this second edition include moving the discussion of sexually transmitted infections (STIs) from the infectious disease chapter to Chapter 10, Genitourinary and Gynecological Systems, and including the PPE in Chapter 1, as opposed to an Appendix. Chapter 11, Neurological System, contains a robust section on sport-related concussions. When applicable, we include current National Athletic Trainers' Association (NATA), National Collegiate Athletic Association (NCAA), and National Federation of State High School Association (NFHS) position stands. We highly recommend the reader use the web resources at the end of each chapter to keep abreast of current updates in these organizations' position stands as they relate to medical safety in sport.

## FEATURES

Content is expanded and reinforced by special features that include Red Flag boxes and Web Resource listings in each chapter. Over 500 illustrations enhance the reader's comprehension of anatomy, physiology, and pathophysiology. Pharmacological tables provide easy access to a full range of drug categories that include generic and trade names, therapeutic uses, adult dosage information, and possible adverse effects. Important terminology

is highlighted throughout the chapters, and a glossary appears at the end of the text. Appendices containing information pertinent to health care assessment also appear in the back of the text.

## SUPPLEMENTS

This education package includes an Evolve website that has been carefully constructed to reinforce health assessment and physical examination techniques. The website provides video instruction of many examination techniques, audio and video interactive exercises, memory matches, and study tools. Educational adoptees of the text package can access the Evolve website at <http://evolve.elsevier.com/cuppett/athlete>.

## A TEXTBOOK AND REFERENCE SOURCE

We are athletic training educators and practitioners who have pooled our experience and worked with our colleagues in athletic training and medicine to design this textbook and website resource. We present it to you as an informative and easy-to-use instructional tool for beginning and advanced students and an indispensable reference guide for practitioners in the field. We look forward to your feedback and suggestions for future editions.



# ACKNOWLEDGMENTS



We wish to thank many people who made this project possible. First of all, we thank the chapter contributors for providing their knowledge of the subject matter and expertise in their fields. They took time away from their busy practices and lives to ensure the content is accurate and current. We appreciate their spectacular responses to a tight timeline and their ongoing support of the project.

We are forever grateful to the Elsevier team that has made publication of this second edition an enjoyable process. We are very fortunate to have the opportunity to work with Jolynn Gower, our Managing Editor, on this edition. Her timeless patience, suggestions, and creativity allowed us to grow, and her challenges to us resulted in a much-improved textbook. Her continuous communications kept us on task, and her editorial experience provided tremendous guidance. Her ongoing efforts will always be appreciated. We are also thankful to Karen Rehwinkel, our Project Manager, for her dedication to this project and for keeping us focused.

We also thank the Athletic Training Faculty and Staff at East Carolina University and the University of South Florida for their patience, advice, and understanding while we were working on this project. Additional thanks go to Dean Stephen Klasko and former Vice Dean Paul Wallach of the University of South Florida College of Medicine who had the vision to include athletic training faculty in the medical curriculum. It is out of those experiences and opportunities that much of the inspiration for this edition grew.

Many of our colleagues kindly allowed us to use their photographs in the text. Thank you to Chuck Baldwin, photographer for the College of Health and Human Performance at East Carolina University, for taking many of the photos in the book. And special thanks go to Chuck Slonim, MD, for providing most of the photos of eye disorders and trauma.

We also want to recognize the efforts of the undergraduate and graduate athletic training students at East Carolina University and the University of South Florida for their input and assistance. Their comments, suggestions, and energy assisted in making this edition stronger. Their images grace the pages in many chapters, and we are grateful for their dedication to athletic training.

This edition would not have been possible without the encouragement and support of our professional colleagues. They provided advice, suggestions, critical appraisal, and challenges. They transformed this text into a user-friendly resource. We extend a very special thank you to Rodney Strong for helping us when the writing became challenging.

Finally, we recognize and appreciate the tenacity of our friendship, which began at a professional meeting and evolved into "Hey, we can do this project!" It has stood strong throughout our vision of improving the educational experience in the field of medicine for the athletic trainer. We have learned that with vision, drive, and determination, anything is possible if good friends keep pulling and pushing each other in the same direction with a common goal.



# ABOUT THE AUTHORS



**Marchell (Micki) Cuppett** is an Associate Professor in the College of Medicine and Director of the Athletic Training Education Program at the University of South Florida. A native of Thief River Falls, Minnesota and graduate of the University of North Dakota and the University of Northern Iowa, Dr. Cuppett has 20 years of experience as an educator and nearly 30 as an athletic trainer. She teaches across the Health Education spectrum, providing curricula for medicine, nursing, and athletic training programs. Before moving to South Florida, she was the AT Program Director at the University of Nebraska at Omaha. She has also been a faculty member at the University of Northern Iowa and the United States Military Academy.

Dr. Cuppett has published and presented both nationally and internationally on athletic training education, health care simulation, and technology. She is best known for her work with high-fidelity simulators in athletic training education. Dr. Cuppett has received numerous honors and awards. She was recognized by the National Athletic Trainers' Association with a *National Service Award* in 2007, the University of Northern Iowa *Hall of Excellence* in 2008, the University of North Dakota *Athletic Hall of Fame* in 2006, and the Lincoln High School *Hall of Fame* in 1990. She and Dr. Walsh, along with the Media Innovation Team at the University of Southern Florida (USF), were awarded the International Davey Award for the DVD that accompanied the first edition of this textbook.

Dr. Cuppett is currently President-Elect of the Commission on Accreditation of Athletic Training Education (CAATE). Before being elected to the Commission, she served on the Annual Review subcommittee and as a Site Visitor. Previous committee service for the profession included the Role Delineation Committee for the Board of Certification and the NATA Multimedia Committee.

Dr. Cuppett has served the University of South Florida on numerous committees and currently serves on the Education Cabinet and the Interprofessional Education Committees for the College of Medicine. She previously served as chair of the Committee on Athletic Fees, and on the College of Education Technology Committee. She served as a committee member on the Faculty Committee for the Admission of Student Athletes, as well as numerous other department and college committees.

Dr. Cuppett was an athletic trainer in both inpatient and outpatient settings in high school, college, and military programs before becoming an academic program director. She also served as the Director of Educational Design and Technology for the USF College of Medicine before returning to her position as Director of Athletic Training Education at USF.



**Katie M. Walsh** is director of Sports Medicine and Athletic Training at East Carolina University. A native of Carmel, California, she is a graduate of Oregon State University, Illinois State University, and the University of Southern California in Los Angeles. Dr. Walsh has worked as an educator and athletic trainer for over 30 years. She has taught and developed curricula in all aspects of athletic training. In her current role she is responsible for the undergraduate athletic training program in the Department of Health Education and Promotion, within the College of Health and Human Performance.

Her published research includes infection and disease transmission in the athletic training setting, policies in athletic training,

proactive emergency action planning, and the NATA position on lightning safety for athletics. Dr. Walsh also was a member of the Inter-association Task Force on Exertional Heat Illness that produced the document on recognition and treatment of heat illnesses. She has conducted national and international presentations on treatment, athletic trainer education programs, lightning and liability, the development of emergency action plans, and on various aspects of safety in sport. She is a reviewer for the *Journal of Athletic Training* and other academic publications, and a national consultant for athletic training education programs. Dr. Walsh copresented on the risks of two-a-day practices, a presentation that contributed to NCAA rule changes.

Dr. Walsh serves as chair for the Department of Health Education and also chairs the Promotion, Personnel, and Tenure Committees. She served on the Commission of Accreditation of Athletic Training Education (CAATE [formerly the JRC]) for 7 years, spending her final year in 2009 as Vice President of the Commission. She has chaired the CAATE site review team, was chair of the Mid-Atlantic Athletic Trainers' Association Program Committee from 1999 to 2006, and served in the North Carolina Athletic Trainers' Association for 10 years, including 3 years as Vice President. Dr. Walsh twice received the North Carolina Athletic Trainers' Association College and University Athletic Trainer of the Year Award. She was recognized by the National Athletic Trainers' Association with a *National Service Award* in 2006 and as *Most Distinguished Athletic Trainer* in 2010.

Dr. Walsh has been the head athletic trainer for the Chicago Power Men's Professional Soccer Team. In addition, she has been the athletic trainer for women and men's teams representing the United States during various international tours and for the U.S. Soccer Federation for national and international tours. She has been a volunteer athletic trainer for the Olympic Training Center in Colorado Springs, Colorado and for the Centennial Olympic Games in Atlanta, Georgia.



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# INTRODUCTION TO MEDICAL CONDITIONS

Katie M. Walsh

## OBJECTIVES

At the completion of this chapter the reader should be able to do the following:

1. Discuss the basic differences between orthopedic and general medical assessment
2. Appreciate the athletic trainer as a health care provider in the recognition, referral, and disposition of medical conditions
3. Use proper communication as a valuable tool in the general medical assessment of the physically active person
4. Apply principles of disease transmission prevention
5. Implement and use the regulations and laws that govern care and privacy of patients
6. Apply CPT and ICD codes to medical conditions
7. Explain the purpose of the preparticipation examination (PPE) for athletes, and identify the medical organizations that provide guidelines
8. Differentiate between the office visit and station-based PPE

## INTRODUCTION

This textbook is designed for the health care provider who works with a physically active population. The name of that provider is interchanged throughout the text from *athletic trainer* to *health care provider* to *clinician*. By using interchangeable titles, the reader may identify with the role played in identifying and treating the various conditions outlined in this text. Athletic training programs across the country have tended to concentrate on the knowledge and skills used for orthopedic assessment and provide a systematic overview of athletic injuries. Emphasis is on students learning how to follow the history, inspection/observation, palpation, special tests (HIPS/HOPS) plan in taking a history, and determining what decisions to make regarding return to play. In these largely orthopedic situations, an injury is usually obvious because it has been witnessed by the athletic trainer, and a thorough history may shed light on the type of damage sustained.

Unlike the typical athletic injury, medical conditions are not always immediately apparent in an assessment. This book is a comprehensive resource for health care students and providers that includes medical conditions by body system, their mechanism of acquisition, signs, symptoms, referral, differential diagnoses, treatment, and return-to-participation criteria. Its purpose is not only to provide information but also to help the reader develop a framework for decision-making. We assume that the reader is versed in basic human anatomy and physiology and can build on that knowledge. The text also includes associated

chapters on diagnostic imaging and tests, pharmacology, psychological and substance abuse disorders, and special populations.

This introductory chapter provides an overview of the basic information necessary for understanding subsequent chapters. It reviews the role of the athletic trainer in the diagnosis and treatment of medical conditions, the importance of effective communication, the prevention of disease transmission, legal concerns, and the administrative aspects of the preparticipation examination (PPE).

## THE ROLE OF THE ATHLETIC TRAINER IN GENERAL MEDICAL CONCERNS

Although this text is not exclusively for certified athletic trainers, he or she is often the person who has the first opportunity to identify a medical issue for an athlete. A brief understanding of education and training of certified athletic trainers is warranted for the reader to appreciate their role with the physically active patient (Box 1-1). An athlete who is feeling ill commonly turns to the athletic trainer because the athletic trainer is the most accessible health care provider. The athletic trainer working with a team has established a rapport with the athletes and is familiar with their previous medical history and normal performance. This may allow the athletic trainer to detect a condition that otherwise might go unnoticed. The athletic trainer working with college or professional teams is also responsible for the health care of the entire team while on the road. Although many medical problems are orthopedic, the conditions an athletic trainer encounters also



**BOX 1-1 CERTIFIED ATHLETIC TRAINERS (ATs)**

A certified athletic trainer is an allied health care provider with a minimum of a Bachelor's degree from an accredited (Commission on Accreditation of Athletic Training Education; CAATE) athletic training education program. ATs work with physicians in a number of settings, most traditionally in high school, college, professional, and Olympic sports. They can also be found in clinics, hospitals, and industry. Accredited programs require a minimum of the following content areas:

- Anatomy, physiology, exercise physiology, biomechanics
- Orthopedic clinical examination and diagnosis
- Pharmacology
- Medical conditions and disability
- Therapeutic modalities
- Risk management
- Health care administration
- Professional development and responsibility
- Acute care of injuries and illnesses
- Psychosocial intervention and referral
- Four semesters of clinical experience with different populations and various levels of risk, including a general medical experience
- At least 75% of the student's clinical experiences must be with an AT
- ATs must pass a national certification examination (from the Board of Certification [BOC]) on graduation
- Most states require state licensure or registration to practice athletic training in that state

can include infections, colds, and other maladies, which need to be identified and properly treated in order for the athlete to continue to participate in sports at optimal levels.

In 1999 the National Athletic Trainers' Association (NATA) first identified a new series of educational competencies and clinical proficiencies that focused on several areas not previously part of the athletic trainers' educational process<sup>1</sup>: pathology of injury and illness, pharmacology, and general medical conditions and disabilities. These competencies and proficiencies have become part of athletic training educational curricula throughout the country and have been expanded in subsequent professional requirements.<sup>2</sup>

The athletic trainer has also taken on a greater role in the general health care of the physically active, thereby requiring greater emphasis on the clinical evaluation and diagnosis of general medical problems. This is a result, in part, of advances in medical science that enable athletes with medical conditions, who would formerly have been excluded from participation, to compete at the highest levels. It also is the result of expanding employment opportunities for athletic trainers. Athletic trainers are now employed in corporations, industries, inpatient hospitals, outpatient clinics, and other nontraditional workplaces as well as the traditional realms of interscholastic, intercollegiate, and professional sports.<sup>3,4</sup> Athletic trainers also serve as physician extenders in many states and see a more diverse population, including the pediatric athlete (Figure 1-1), physically active mature and older adults, as well as those with physical impairments.<sup>5</sup>



**FIGURE 1-1** Physically active people who are involved in a variety of activities may require the support, knowledge, and skills of an athletic trainer. (Courtesy Tam Stainbrook.)

Learning more about medical conditions and their assessment is therefore a part of the comprehensive educational process of the athletic trainer. A recent study on the continuing educational needs of athletic trainers revealed that staying abreast of the latest techniques and continuing the learning process throughout their careers were some of the most important reasons cited for completing continuing education.<sup>6</sup> The athletic trainers included in this study expressed a desire to obtain information about general medical conditions more frequently than other orthopedic conditions because those conditions had been well covered previously in the athletic training curricula.<sup>6</sup>

### **Communication**

Because the medical examination is largely concerned with symptoms, the nature of questions asked when acquiring a health or illness history from an athlete is just as critical as the information gained from them. One way to improve this dialogue between the practitioner and the athlete is to ask open-ended questions, such as “Why have you come to see me today?”

The health care provider can also facilitate and encourage communication by slightly leaning toward the patient, maintaining eye contact, having an open posture, repeating key words the athlete uses, and using simple phrases for encouragement, such as “go on” or “mm-hmmm.”<sup>7</sup> Being empathetic—for example, “that sounds difficult”—and allowing pauses that give the athlete time to add to comments reassure the patient that the clinician is listening carefully (Figure 1-2). Asking about the patient's feelings associated with symptoms is also appropriate in medical assessment. Last, a good practitioner can summarize and interpret the athlete's comments by saying, “I hear you say...” rather than empathetically injecting words or opinions into the conversation during the subjective review of symptoms.<sup>7</sup>

Along with verbal communication skills, the health care provider must be sensitive to cultural, ethnic, and gender issues when





**FIGURE 1-2** Athletic trainers use an open posture to facilitate discussion when talking with athletes. Note that the athletic trainer is sitting down rather than standing above the athlete and is leaning forward in a posture that encourages discussion and questions.

working with a patient. In certain cultures, touching is impermissible because it violates a personal space. Knowing the patients or asking them if they are comfortable is a good beginning. A person will more freely give medical history if the health care provider uses a quiet and private place to communicate.

The athletic trainer must always be aware of the surroundings when communicating with an athlete about a medical issue. When a practitioner assesses a patient of a different gender, a person of the athlete's gender should be present in the room as well. Using proper draping and maintaining privacy during physical examinations or discussion of private topics are critical.

### Communication With Health Professionals

Federal regulations allow health care providers to exchange information in the medical care of a given patient. This discussion can occur after the patient signs permission under the Health Insurance Portability and Accountability Act (HIPAA). Athletic trainers should be familiar with medical terminology so that they can discuss medical conditions on the same level as other health care providers.

#### KEY POINTS SIGNS AND SYMPTOMS

Although generally used together when assessing a medical condition, signs and symptoms are not synonymous.

- *Sign* refers to something that the athletic trainer sees or feels, such as a temperature, respiration, heart beat, and blood pressure.
- *Symptom* (Sx) refers to something the athlete feels, such as a headache, nausea, dizziness, or pain.

**TABLE 1-1 Common Medical Terminology**

| Term                     | Definition  |
|--------------------------|---|
| Adventitious             | Coming from an external source; occurring spontaneously   |
| Afebrile                 | Without a fever; also <i>apyretic</i>   |
| Biopsy                   | Removal and examination of tissue   |
| Comorbid                 | Two or more possibly unrelated medical conditions existing at the same time                       |
| Constitutional           | Relating to the body as a whole   |
| Erythema                 | Redness of the skin brought about by capillary dilation   |
| Febrile                  | Having a fever  |
| Malaise                  | A general feeling of discomfort or uneasiness; often the first symptom of an illness or infection |
| Morbidity                | Consequences of a given illness   |
| Mortality                | Death from a particular illness or disease  |
| Palliative or supportive | Reducing the severity of an illness or treatment of disease without curing it                     |
| Prodromal                | Preillness symptoms   |
| Purulent                 | Pus filled  |
| Sequela, sequelae        | A condition occurring as a consequence of a given illness or disease                              |
| Suppurative              | Pus forming   |

Because some of these communications may be in written notes, athletic trainers need to understand standard abbreviations as well. Appendix A lists many common abbreviations that relate to medical care. Table 1-1 lists terminology used to describe medical conditions and situations that are used throughout this text.

### Prevention of Disease Transmission

Everyone who works in the health care field appreciates the need to prevent disease transmission. Protection from infection and maintaining a sanitary environment are two critical elements in caring for patients with illnesses. Another prevention technique is immunization from specific diseases by vaccine. Chapter 15 discusses vaccination as well as established standards for preventing the spread of disease and illnesses.

### Occupational Safety and Health Administration

The Occupational Safety and Health Administration (OSHA) is an organization that sets standards to protect health care workers and their patients. OSHA standards apply only to established relationships between employers and employees and do not extend federal protections to students.<sup>8</sup> However, students who could potentially be exposed to hazardous waste in facilities where they practice or observe should follow the safety standards set forth by OSHA, receive training, and have ready access to precautionary materials, such as barriers and proper disposal containers.

OSHA has a right to inspect any facility under its auspices without prior notification, and it has the power to suspend or