

Section 1

# Principles of Emergency Medicine

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Excerpt  
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# 1 Approach to the emergency patient

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The emergency department (ED) is an extremely challenging environment for patients, families, and medical personnel. Many challenges result from the principles of our practice: available and prepared at any time for any patient with any complaint. Patients who come to the ED are most often unfamiliar with us, yet we must immediately help them feel confident about our abilities. Patients generally present to the ED during a time of great concern. Their needs may be as straightforward as a note excusing them from work or a prescription refill in the middle of the night, or as complex as an acute illness or injury, an exacerbation of a chronic condition, or a cry for help if depressed or suicidal. In their own way, patients almost always seek reassurance about something – is their child’s fever dangerous, their headache cancer, or their abdominal pain appendicitis? Providing reassurance to patients, parents and families whenever possible is a critical function of emergency physicians (EPs).

Qualities successful EPs exhibit include intelligence, sensitivity, humility, insight, proficiency in making decisions with and acting on limited information, and the ability to multi-task. Working well with individuals of different backgrounds and ethnicities while at all times strongly advocating for patients are essential qualities. EPs must also be skilled at leadership, negotiation and conflict resolution. They must be exceptional communicators. In addition to these traits, EPs must be experts in both medical and trauma resuscitation of adults and children.

The majority of patients use the ED infrequently. Many are experiencing this setting for the first time. Because patients lack familiarity with this environment, they may have expectations that go unmet. Their fear, stress, waiting time, lack of privacy and discomfort that brought them to the ED can negatively impact their experience. These are only some of the issues that patients contend with in the ED.

EPs confront numerous challenges when taking care of patients presenting to the ED. Perhaps the greatest challenge is the extensive disease spectrum that EPs must be familiar with. Rather than having to know only the first few minutes (or hours) of an illness, EPs must be familiar with all stages of all illnesses, often presenting in atypical fashion. As boarding times increase and observation units become more common, patients remain under an EP’s care for longer periods of time. In addition, time pressures inherent to providing emergency care, the lack of existing relationships with patients, unfamiliarity with their medical history, and the inability to review patients’ medical records challenge EPs daily. EPs must rapidly and simultaneously evaluate, diagnose and treat multiple patients with multiple conditions, often with limited information, and not confuse subtle nuances between patients. They must

be prepared to act and react to prevent morbidity and, when possible, mortality. EPs must maintain a healthy skepticism towards patient’s answers to common questions. Considering worst-case scenarios is fundamental to emergency medicine (EM) practice. Most importantly, EPs must be comfortable providing detailed, often devastating information using clear, understandable language to patients and family members with different educational or cultural backgrounds. All this must be done under time constraints, while demonstrating empathy and compassion.

It is indeed a privilege to care for patients during their time of greatest need or when they lack other options. Approaching patients sensitively, recognizing their apprehension, pain, concerns, and perhaps shame is critical to our mission. This is true no matter how trivial a patient’s problem may seem. Often, patients consult EPs seeking approval to leave an abusive spouse, for an opinion regarding a physician’s recommendation for surgery, or to confirm that they are making the right decision about a parent, child, or loved one. Serving in this capacity without judgment is not only appropriate, but also essential.

It is imperative that EPs approach each patient with an open mind, committed to identify and address not only the presenting problem, but also any coexisting problems. For example, a patient with a history and presenting complaint consistent with esophageal reflux may in fact have an acute coronary syndrome (ACS). A patient presenting with insomnia may have an underlying concern about his or her safety, security, or mental wellness. The ability of an EP to evaluate each patient using history-taking and physical examination abilities, as well as selecting appropriate laboratory or imaging studies (when necessary), is only a portion of our skill set. An experienced EP’s “sixth sense” is something that has become recognized and respected by non-EM colleagues.

Unfortunately, the ED is not always conducive to privacy. Despite the Health Insurance Portability and Accountability Act (HIPAA) of 1996 and Protected Health Information (PHI) for patients, attempts to maintain patient confidentiality in the ED present a continuous challenge. Discussions about patient care issues between health care providers, staff, patients and family members often take place behind nothing more than a curtain. Shared spaces, hallways, lack of private rooms or beds, and the demands of time-pressured discussions – often in open spaces, over the phone, or with consultants – stretch efforts at maintaining patient confidentiality. The leadership role that EPs have in the ED affords them the opportunity to demonstrate respect for patient confidentiality and to remind others of the importance of upholding this principle.

Within the last decade, there has been tremendous and appropriate attention placed on medical error and patient safety in hospitals. Human error may occur at any time, but is more likely during high patient volumes or when multiple complicated patients of high acuity present simultaneously. These situations are common in EDs around the world. Human error has been demonstrated to occur more frequently when provider fatigue is greatest (e.g., at the end of a challenging shift or after being awake all night). Systems errors are even more likely to occur during these circumstances. The airline industry has served as a model for reducing errors and improving patient safety in medical practice, especially in the ED. Airline pilots, however, are not required to fly more than one plane at the same time, while simultaneously taking off, landing, and changing course. The EM community should embrace the federal government's attention to medical systems and its role in medical error, as patient safety must always be a top priority. Hospital quality committees review errors of omission and commission, medication errors, errors in patient registration, and errors of judgment. Given the pace of the ED environment, it is remarkable that more errors do not occur. The rapid need for patient turnover, room changes, and test result reporting does not occur with such immediacy in most other areas of the hospital. Hospital administrators and regulators with limited insight about the uniqueness of EM practice should focus attention to, and provide support for, this essential aspect of patient care.

EPs must recognize that patients signed over to them at the end of a shift pose increased risk. These patients typically have pending laboratory or radiography results, are being observed for continued improvement or worsening in their condition, or are waiting for consultants. The EP who initially evaluated these patients should determine the treatment and disposition plans to the greatest extent possible, based on anticipated outcomes. However, some signed-over patients may not have well-established dispositions and may benefit from a new EP's perspective. In such cases, it is better to inform the receiving EP that a clear understanding about what is going on with that patient does not exist than leave things vague. As long as patients present to EDs at any time, patients signed over at shift's end will continue to challenge our ability to provide safe care within our practice. Many hospitals now have regulations in place regarding this aspect of emergency care.

## Scope of the problem

A landmark article by Schneider, et al. in the EM literature defines our specialty as one "...with the principle mission of evaluating, managing, treating and preventing unexpected illness and injury." As emergency medical care is an essential component of a comprehensive health care delivery system, it must be available 24 hours a day. EPs provide rapid assessment and treatment of any patient with a medical emergency. In addition, they

are responsible for the initial assessment and care of any medical condition that a patient *believes* requires urgent attention. Patients may believe they require urgent attention when in fact they do not. It remains our mission to provide quality medical care and reassurance to patients even under this circumstance. EPs also provide medical support for individuals who lack access to other care opportunities. As the number of uninsured and underinsured persons in the United States increases, and growing numbers of health clinics close, many of these individuals will use the ED for their primary as well as emergency care. This has placed a tremendous burden on the safety net provided by the specialty of EM. It is unclear exactly how governmental health care reform will impact EDs, patient volumes, and overall physician and patient satisfaction.

According to the Centers for Disease Control and Prevention (CDC), which publishes the National Hospital Ambulatory Medical Care Survey (NHAMCS), there were 119.2 million ED visits in 2006; 18.4 million of these patients arrived by ambulance. This is an increase of over 11 million visits from 2000. Patients were admitted to the hospital in 12.8% of ED visits. The ED was the portal of admission for slightly over 50% of all non-obstetric admissions in the United States in 2006, an increase from 36% in 1996. In California, patients visiting EDs were sicker than ever before, with an increase in critical emergency care visits by 59% between 1990 and 1999. In 2000, there were slightly more than 4,000 EDs, yet this number continues to decrease as hospitals and trauma centers close. A 2008 workforce study by Ginde, et al. reported that despite nearly 40,000 clinically active EPs, this was not adequate to treat the growing number of people who visit EDs each year. Despite an increased number of certified residency training programs producing board-prepared EPs, and the increase in EPs from less than 32,000 in 1999, there remains a critical shortage of capable EPs, especially in the rural and central United States. The number of nurse practitioners and physician assistants trained to work in emergency care settings has increased in response to this shortage as well as administrative and financial pressures, and many hospitals staff urgent care and fast-track areas with these practitioners. With decreased funding available for non-ED clinics, and increasing numbers of uninsured patients using the ED as their primary (or only) source of health care, the worsening of ED overcrowding is inevitable.

Hamilton described the clinical practice of EM as one that "...encompasses the initial evaluation, treatment, and disposition of any person at any time for any symptom, event, or disorder deemed by the person – or someone acting on his or her behalf – to require expeditious medical, surgical, or psychiatric attention." This philosophy creates tremendous challenges, as well as opportunities, unique to the specialty of EM. EDs must be fully staffed and always prepared while never entirely certain of patient needs at any given moment. Despite statistics on the number of patients presenting at different times on different days in different months, no model can predict the exact number of medical staff needed to care for even one emergency patient. Clearly,

staffing an ED to be fully operational is an expensive proposition given this scenario.

## Clinical scope of the problem

Table 1.1 provides the 10 most common reasons that patients visit an ED, according to a recent 2006 national survey. Of all ED visits, over 35% were for an injury. Lacerations of an upper extremity were number 11; lacerations in the aggregate therefore did not make this list because of the manner in which they were categorized and recorded. These data show remarkable consistency in numbers and rank from survey to survey.

Table 1.1 Top 10 reasons for an ED visit

1. Abdominal pain (8,057,000)
2. Chest pain (6,392,000)
3. Fever (4,485,000)
4. Headache (3,354,000)
5. Back symptoms (3,304,000)
6. Shortness of breath (3,307,000)
7. Cough (2,956,000)
8. Vomiting (2,635,000)
9. Pain, site not referable to a specific body system (2,512,000)
10. Throat symptoms (2,278,000)

From the 2006 National Hospital Ambulatory Medical Care Survey, Centers for Disease Control and Prevention.

In fact, patients come to the ED as a result of only a few general categories of problems or complaints. These may be grouped as follows, listed in decreasing frequency.

### Pain

Pain is the most likely reason for patients to seek medical care at an ED. It can be traumatic or atraumatic in nature. Chest, abdominal, head, extremity, low back, ear, throat, and eye pain are only a few examples.

### Difficulty with...

This can be difficulty with breathing, vision, urination, swallowing, concentration, speaking, balance, coordination, ambulation, or sensation. Difficulty controlling seizure activity would also fall into this broad category.

### Fever

Fever is common in children and of great concern to parents. It can be a presenting complaint in adults as well. Conditions causing fever include viral or bacterial infections, such as upper respiratory infection (URI), gastroenteritis, otitis media, urinary tract infection (UTI), cellulitis, pneumonia, and bronchitis. Surgical conditions (such as appendicitis, cholecystitis, atelectasis, and postoperative wound infections), obstetric-gynecologic problems (such as pelvic or cervical infections, mastitis, postpartum

infections), deep venous thrombosis (DVT), drugs and drug interactions, cancer, tick-borne infections, malaria or other parasitic infections, vasculitis, and arthritis are other conditions causing fever.

### Bleeding

Bleeding may be painful or painless and may or may not have associated symptoms. Examples include lacerations, vaginal bleeding (with or without pregnancy), gastrointestinal (GI) bleeding, epistaxis, and hematologic illnesses such as anemia, von Willebrand’s disease, or hemophilia (often resulting in spontaneous bleeding).

### Social concerns

Social issues for which patients come to the ED include an inability to care for oneself, a change in behavior (either organic or functional), drug- and/or alcohol-related problems, homelessness, hunger, or concerns of family members that something might be wrong.

In EM, it is essential that care is *coordinated*. This means that EPs should seek assistance in providing patient care, relying on more than just the patient to assess the situation. Family members often provide additional information about illness progression that patients fail to recognize or neglect to share. Prehospital care providers often have useful information about the patient’s living situation and whether or not it is appropriate. Psychosocial aspects of each patient must be considered when interpreting presenting complaints and determining patient dispositions, including the appropriate use of consultation. Involving a consultant who focuses solely on his or her area of expertise may result in a less optimal outcome, as he or she may overlook a combination of etiologies causing the problem. When the care of a particular patient is beyond the scope of EM practice, the EP must make certain that the “proper” consultants and the appropriate teams are involved. Social services, discharge planners, patient care coordinators, and, if necessary, behavioral health or chemical dependency specialists may need to be included. EPs must identify whom to turn to in order to ensure and maximize beneficence and patient benefit. EPs often coordinate patient care behind the scenes, which takes time and effort, yet they rarely receive recognition for this.

## Anatomic essentials

Anatomic essentials for any patient presenting to the ED are covered in detail throughout the text. Airway, Breathing, Circulation, Disability, and Exposure (ABCDE) are crucial to the initial evaluation and management of patients with emergent or urgent conditions. This may be true for conditions that do not seem emergent at the time, such as the *airway* of a talking patient recently exposed to intense heat (fire, smoke, or steam). The airway is essential not only for gas exchange, but



also for protection against aspiration. It may be used for the administration of certain medications. With conditions causing increased intracranial pressure (ICP), airway management with modest hyperventilation results in cerebral vasoconstriction, one aspect of therapy. *Breathing* depends not only on the lungs, but also on the thoracic cavity, respiratory musculature, and central nervous system (CNS). *Circulation* may be compromised as a result of hemorrhage, dehydration, vascular catastrophe, cardiovascular collapse, or vasoconstriction or vasodilatation in response to shock. Evaluating *disability* includes a focused neurologic exam, including an assessment of the level of consciousness (LOC), mental status, and evaluation of motor, sensory, reflexes, cranial nerves, and cerebellar function. A thorough understanding of the neurovascular supply to extremities, especially following traumatic lacerations or injuries, helps identify limb threats or potential morbidity. Knowledge of dermatomes is also helpful when assessing neurologic symptoms. The Alertness, Verbal response, Pain response, Unresponsive (AVPU) scale and the Glasgow Coma Scale (GCS) are two tools that can be recorded to describe the general neurologic status of a patient, as well as follow neurologic status over time. The National Institutes of Health Stroke Scale (NIHSS) is used for patients with cerebral vascular accidents (CVA). Several scores have been validated to predict stroke risk in patients with transient ischemic attacks (TIA); the ABCD2 score (Age, Blood pressure [BP], Clinical features, Duration, Diabetes) is preferred. *Exposure* is essential so injuries are not missed, as well as to consider possible environmental elements contributing to the presentation (e.g., heat, cold, water, toxins).

## History

The patient’s history has always been considered one of the most important elements in determining a final diagnosis. It is accepted that the history (and physical examination) can determine the diagnosis in up to 85% of patients. A patient’s history should focus on the current problem(s), allowing room to identify additional information and determine its relevance. When patients present in extremis, the traditional approach to obtaining the patient’s history must be abandoned. In this situation, history and physical examination information must be obtained concurrently. EPs are forced to rely on clinical assessment and impression, and utilize important diagnostic studies during their decision making. Studies that assist in establishing a final diagnosis, such as an electrocardiogram (ECG), glucose, urine dipstick, and other point-of-care (bedside) tests, can be obtained while gathering historical data. Despite this, establishing a final diagnosis is not always possible during the course of the patient’s evaluation in the ED. Fortunately, having a final diagnosis is not always necessary, as an appropriate disposition with follow-up evaluation and tests during hospitalization or as an outpatient may be of much greater importance.

When approaching any emergency patient, providers should offer a brief introduction using the appropriate prefix (doctor or medical student) and relevant background information, such as their current level and specialty of training. A gentle yet professional touch, such as a handshake or touch of the wrist, is generally favorably received. Before questioning a patient about his or her present illness or medical history, sit down at the patient’s bedside if the situation allows. This not only eliminates towering over a patient, but demonstrates that you are interested in what he or she has to say, and plan to be present and listen for a while (even if this time is short). Patients recall that the amount of time their physician spent with them was greater if their physician sat down during the interaction. After sitting down, *listen* to what the patient has to say. Physicians interrupt their patients early and often, with EPs being some of the biggest offenders. Look patients in the eye so they know you are present, listening and care about their concerns. If you take notes during the interview, do so following a short period of good eye contact. If these notes are done on a computer, remember not to “hide” behind the computer screen. Demonstrate respect for a patient’s well-being and privacy by offering a pillow or blanket, adjusting their bed, assisting with covering their body, or providing water (if appropriate). These kind gestures are easy to do yet greatly appreciated, and can be done in a few seconds at the start of each patient interaction.

When possible, use open-ended questions to elicit historical information about a patient’s condition. This allows patients to describe their concerns using their own terms. Certainly, some questions require yes or no answers (“Do you have diabetes?”). There will be times when directed questions are required, such as to a patient in extremis, or when a patient does not answer questions promptly or concisely. However, most patients will get to the point of their visit in a relatively short time.

The P-Q-R-S-T mnemonic assists with gathering important historical elements of a presenting complaint from a patient. Using pain as an example, questions relating to the history of a painful condition include those shown in Table 1.2.

Table 1.2 P-Q-R-S-T mnemonic for history of a painful condition

P	is for <i>provocative/palliative</i> , as in “What makes this pain worse or better?”
Q	is for <i>quality</i> of pain, as in “Describe your pain?” or, “Is your pain sharp or dull?”
R	is for <i>region/radiation</i> , as in “What region of your body does this pain occur?” and “Does it radiate, or move, to any other location(s)?”
S	is for <i>severity</i> , which may be communicated using a numeric scale from 0–10, a happy–sad faces scale, or the terms mild, moderate, or severe.
T	is for <i>timing/temporal</i> relationships associated with the pain. Questions include “When did the pain start?”; “How long did the pain last?”; and “What were you doing when the pain started (eating, exercising, watching television, going to bed)?”

Additional important historical information may be obtained using the mnemonic A-M-P-L-T-O-E (Table 1.3).

Table 1.3 A-M-P-L-T-O-E mnemonic for additional history

A	is for <i>allergies</i> to medications, food, latex, seasonal allergens, or other things.
M	is for <i>medications</i> , including prescription and non-prescription. Surprisingly, many patients do not consider acetaminophen, ibuprofen, oral contraceptives, insulin, vitamins or herbal remedies to be medications, and do not offer this information.
P	is for <i>previous or past medical history</i> , which may provide a clue to the present condition. If this patient has had a similar illness before, he or she may have it again or is at greater risk for it to recur.
L	is for <i>last meal</i> , perhaps the least helpful of these questions. Last meal does, however, relate to airway protection in the event of procedural sedation or a surgical procedure.
T	is for <i>tetanus</i> status, which should be updated every 5–10 years, depending on the type of wound and its likelihood for being tetanus-prone.
O	is for <i>other associated symptoms/operations</i> . Associated symptoms may assist in reaching a diagnosis and may afford the opportunity to relieve discomfort. Some patients do not include previous surgeries in their medical history.
E	is for <i>events/EMS/environment</i> , which include the events leading up to the illness, the role of emergency medical services (EMS) during transport (interventions, response, complications), and any environmental influences on the presentation (heat, cold, water, fire, altitude, rave or other party).

Information regarding a patient’s family and social history should also be reviewed. Family members with similar illnesses or conditions are important to identify. Examples include a strong family history of cardiac or thromboembolic disease, appendicitis, gallbladder disease, bleeding disorders, or cancer. Social history includes the patient’s living situation; marital status; use or abuse of tobacco, alcohol, and/or drugs; occupation; and handedness (in the setting of neurologic disease or extremity trauma).

Several key questions might therefore include:

- How did the pain begin (sudden vs. gradual onset)?
- What were you doing when the pain began?
- How would you describe your pain?
- On a scale of 0–10, how severe is the pain?
- Where is your pain?
- Has it always been there?
- Does the pain radiate anywhere?
- Does anything make the pain better or worse?
- Have you had this pain before?
- Have any family members had pain similar to this?
- What do you think is the cause of your pain?

Associated symptoms are important, as many diseases have a specific collection of symptoms associated with them. The concept of *parsimony* is an important one, in which a diagnosis has a higher likelihood of being correct if one disease can be used to explain the entire constellation of associated symptoms. This provides a more

likely explanation than the coincidence of more than one disease being responsible for a patient’s illness. Additional caution is needed when evaluating patients at the extremes of age (newborn and elderly), as the likelihood of serious infection and comorbid or coexisting conditions is greatly increased. This is also true for immune-compromised patients and others without physiologic reserve (morbidly obese, postoperative, malnourished, diabetic, steroid-dependent, or often those with mental illness). Some key associated symptoms are listed in Table 1.4. Warning signs in the history are provided in Table 1.5.

Table 1.4 Key associated symptoms

<b>Cardiopulmonary symptoms</b> Cough, dyspnea, orthopnea, palpitations, dizziness, syncope, and chest pain
<b>Gastrointestinal symptoms</b> Abdominal pain, nausea, vomiting, anorexia, constipation, diarrhea, and bleeding
<b>Genitourinary symptoms</b> Dysuria, frequency, urgency, hematuria, and pneumaturia
<b>Obstetric/gynecologic symptoms</b> Pregnancy, menses, age of menarche, contraception, infertility, sexual history, sexually transmitted infections (STI), vaginal discharge or bleeding, dyspareunia, previous surgeries, recent procedures, and other pelvic infections
<b>Neurologic symptoms</b> Weakness, difficulty speaking, concentrating, swallowing, or thinking, imbalance, sensory or motor changes, visual problems, and headache

Table 1.5 Ten warning signs in the history

1. Sudden onset of symptoms (especially first time)
2. Significant worsening of symptom(s) that had been stable
3. True loss or alteration of consciousness
4. Cardiopulmonary symptoms (dyspnea, chest pain or pressure)
5. Extremes of age (newborn, elderly)
6. Immune compromise (HIV-positive, AIDS, cancer, diabetes, or on immunosuppressant therapy such as chemotherapy or chronic steroids)
7. Poor historian, including language barriers
8. Repeated visit(s) to a clinic or ED, especially recent
9. Incomplete immunizations
10. Patient signed over at the end of a shift

## Physical examination

The physical examination for emergency patients should be complete to identify unexpected conditions, with special focus on areas likely contributing to or responsible for disease. Unfortunately, many EPs are challenged for time and must act quickly, performing abbreviated physical

examinations while relying on laboratory and radiology studies. In some circumstances, this may be necessary. However, it is best to do a detailed, problem-pertinent physical examination so that important findings are not missed. In addition, concentrating on associated organ systems that may have a role in the illness is recommended. These areas may provide clues to the etiology of the pain or illness. In fact, establishing a comprehensive differential diagnosis for each complaint and examining areas of the body that may contribute to it allow EPs to prioritize the likelihood of other diagnoses causing the symptoms.

As this chapter describes the approach to the emergency patient, it addresses only general appearance, vital signs, and general physical examination pearls. Other chapters provide details for specific conditions or constellation of symptoms.

General appearance

This may be the most important element of the physical examination for EPs, as it assists with determining who is sick and who is not. Experienced EPs can look at patients and have a reasonably accurate idea of who needs to be hospitalized. This is one reason why EPs are concerned about patients in the waiting room whom they have not yet visualized. General appearance is particularly important in the pediatric population, as social interaction, alertness, playfulness, physical activity (including strength of cry), respiratory effort and hydration status (e.g., amount of tears) are significant findings that can be identified within moments. The younger the patient is, the more difficult it is for EPs to determine wellness based on general appearance alone. The fact that a patient’s general appearance is less helpful to EPs at the extremes of age makes caring for these patients more challenging.

Vital signs

Vital signs are important for all emergency patients. A complete set of vital signs should be obtained and repeated at least once during the emergency visit. Often, the vital signs are obtained in triage and not repeated until many hours later when patients are placed in examination rooms. Many EDs have policies that vital signs must be repeated at certain intervals on patients in the waiting room. Though this is a wise strategy, abnormal vital signs may not require action, and normal vital signs may accompany serious illness. EPs should at the very least review one complete set of appropriate vital signs on every patient and address each abnormal vital sign (or consider why it is abnormal). At times, rechecking the vital signs is extremely important, such as the heart rate in a patient with ACS or acute myocardial infarction (AMI), the respiratory and heart rates in patients with difficulty breathing, or the temperature of a child who experienced a febrile seizure. It is of far greater importance to recheck the temperature of a previously afebrile patient with a possible surgical condition or serious bacterial infection (SBI) than a febrile child’s temperature following acetaminophen or

ibuprofen if they are now well-appearing, playful, and at low risk for a febrile seizure. Orthostatic vital signs (heart rate and blood pressure in supine, sitting, and standing positions) are inherently time-consuming, unreliable, and nonspecific. However, if the situation suggests that these measurements would be in the patient’s best interest, they may provide useful information. It is good practice to recheck a patient’s vital signs prior to discharge. Table 1.6 provides a list of vital signs to consider in the ED.

Table 1.6 Sixteen vital signs to consider in the ED

1. General appearance (perhaps the most important and underutilized vital sign)
2. Temperature (rectal temperature should be considered in newborns or infants, the elderly who are hypothermic, tachypneic and mouth-breathing, or in patients with alterations of consciousness)
3. Heart rate (including strength, quality, and regularity)
4. Respiratory rate (often miscalculated due to multiplication error)
5. Blood pressure (consider orthostatic BP, although may be falsely negative; also consider BP measurements in each arm or upper and lower extremities in certain conditions)
6. Oxygen saturation (pulse oximetry)
7. Blood sugar (bedside glucose), which provides an immediate value for situations including an altered LOC, a diabetic with the likelihood of abnormally high or low glucose, or when glucose is the only blood test necessary
8. Pain score (from 0–10, or happy–sad faces scale), repeated frequently and after interventions as indicated
9. GCS (best eye opening, verbal and motor responses) from 3–15, or other methods that measure LOC or mental status, such as AVPU or mini-mental status examination
10. Visual acuity (for patients with visual or certain neurologic complaints)
11. ET <sub>CO</sub> <sub>2</sub> (to identify ventilatory status, especially for all intubated patients and during procedural sedation)
12. Fetal heart tones (for pregnant patients)
13. Peak flow (for asthmatic patients or those with difficulty breathing)
14. Bedside pulse CO-oximetry (when carbon monoxide exposure is suspected)
15. IOP (for suspected glaucoma)
16. Compartment pressure (for patients with suspected compartment syndrome and vascular compromise)
AVPU: alertness, verbal response, pain response, unresponsive; BP: blood pressure; ET <sub>CO</sub> <sub>2</sub> : end-tidal carbon dioxide; GCS: Glasgow Coma Scale; LOC: level of consciousness; IOP: intraocular pressure.

Pearls specific to the physical examination

Be professional

A professional greeting and introduction should evoke warmth and kindness. Patients want to know that the



EP they “have” (they did not “choose”) is considerate, sensitive, thoughtful, competent, and listens well; in other words, a true professional. Most patients aren’t interested in a joke or a discussion of current events when they are in the ED, at least not immediately. EPs should wash their hands when entering each patient room, preferably so that patients can witness this. They should wear clean and appropriate physician clothing; be polite, well-mannered and well-groomed; and appear well-rested. A current hospital ID badge with name and photograph should be prominently displayed. A health care provider should never bring food or beverages into the examination room.

Go slowly

Try not to rush patients, or seem rushed to them, despite how busy you may be. Speak slowly and clearly, with increased volume for elderly patients should they need it. Warm and clean hands are essential for patient comfort. If you are using gloves, let patients know that this is your practice for all patients. A well-lighted, warm room (if possible) is also preferred. Having a chaperone of the same gender as the patient present is always a good idea, especially during examination of private areas, such as the genitalia, rectum and breasts. Let patients know that this is your standard practice and you are doing it for their benefit (even if you are doing this to protect yourself). Having translators or family members present (when appropriate) also makes patients more comfortable.

Be gentle

Do not proceed immediately to the area of pain, and do not palpate a tender area using more pressure than is absolutely necessary. If possible, attempt to distract patients while examining a painful area. This is especially true for pediatric patients.

Be sensitive

Make patients aware that your focus is on them during your examination, not on other patients with other problems. Furthermore, let patients briefly know what you find immediately following each phase of the examination. There is no reason to do your entire examination and then tell the patient that it was normal. Share with patients that their heart or lungs sound fine immediately after auscultation. If patients have abnormal findings, they may be aware of these from a previous physician’s examination. If they were unaware of this finding, avoid accusing their physician of missing something. When appropriate, promptly tell them that it is not dangerous or worrisome if this is the case. There is no reason to increase their anxiety by telling them they have a heart murmur if it is inconsequential. Offering findings in this manner increases patients’ confidence in your abilities, especially when you identify a heart murmur that they knew existed.

Be thorough

This is important so that critical findings or other clues to the patient’s final diagnosis are not missed. For example, lacerations, contusions or bruises might imply intimate partner violence. If it is relevant to the presenting complaint, expose the patient’s skin during the examination of the body region. Rashes may be present that identify life-threatening infectious diseases or may eliminate the need for further diagnostic studies (e.g., meningococemia or herpes zoster). Always examine the joints above and below an injured area, as injuries may coexist due to transmitted forces. Remove all constricting jewelry and clothing distal to an injured area, as swelling due to dependent edema is likely to occur. Patients may not appreciate this gesture at the time, but it is valuable in terms of patient safety and preventing damage to an item that may require removal later. Make sure that any removed item is given to the patient or a family member.

Be thoughtful

Use language that patients and family members understand. It does not impress patients when physicians use technical jargon to look smart. If patients are not familiar with abbreviations or terms that you have used, they may not be comfortable asking for their meaning. For example, despite the common use of the abbreviation “MI” for myocardial infarction, many people do not know what this means. You may tell a patient that he had an MI, only to be asked later if he suffered a heart attack. In children, involve parents with the examination, such as looking in a parent’s throat or ear first. Other skills to use when examining children include letting the child touch your stethoscope or otoscope before using it. Involve older children in the examination by asking which ear they prefer be examined first. Recognize that hospital gowns are not flattering; it is thoughtful to assist a patient by offering to tie his or her gown, especially if they are getting up from their gurney.

Be efficient

An entire physical examination does not need to be done on every patient. For example, funduscopy does not need to be performed on a patient presenting with an ankle injury. Furthermore, examining patients starting with the position they are in rather than the traditional head-to-toe method saves time. For example, if the patient is supine, consider examining their abdomen before their lungs.

Differential diagnosis

Following a thorough history and physical examination with careful review of the vital signs, a differential diagnosis should be established. This differential diagnosis should be as comprehensive as possible, as it suggests which diagnostic tests should be obtained, and in which order. This differential diagnosis also establishes which therapeutic approaches should be initiated, if they have not already begun.

## Diagnostic testing

Diagnostic testing in the ED is performed to identify (“rule in”) or exclude (“rule out”) conditions responsible for the patient’s symptoms. As such, it is imperative that EPs have a notion of pretest probability, including disease incidence and prevalence, and the sensitivity, specificity, positive and negative predictive values, and accuracy of the tests they are ordering. It is also helpful to be familiar with likelihood and odds ratios.

## Laboratory studies

Because of the time pressures for patient dispositions, many tests now can be performed at the bedside to decrease the turnaround time for results. Classic examples of *point-of-care testing* are the bedside (fingerstick) glucose and urine dipstick or pregnancy (hCG) tests. Numerous implications of this rising technology’s role in EM have been studied. Extensive research using new bedside tests for cardiac markers and other tests of cardiac function is ongoing. Treadmill tests on low-risk cardiac patients have been performed from (or in) the ED to risk-stratify patients regarding their need for hospitalization or further testing. The role of nuclear medicine testing has increased tremendously in diagnostic cardiac evaluation from the ED, perhaps in part due to its decreased role in the diagnostic evaluation of pulmonary embolism. Bedside ultrasonography is a test being utilized by EPs with increased frequency to assist with patient diagnosis, treatment, and disposition. As more EDs subscribe to these practices, and more EPs gain skills in these areas, these tests will assume an even greater role in the evaluation and treatment of emergency patients. Unfortunately, government regulations have removed some tests from the ED that were previously performed there. Having these tests done in a laboratory increases the time to receive results, if for no other reason than sample transport time. The implications of increased laboratory and radiology turnaround times are enormous given ED closures, lack of ED and hospital bed availability, and increased patient volumes in EDs across the United States.

Some tests are being ordered or performed by certified nurses during the triage process, where patients register for evaluation and wait for EPs. These tests include urine collection to screen for pregnancy, blood, or infection; ECGs to evaluate cardiac function; and radiographs. Often nurses use protocols to order blood tests from the triage area, and several high-volume EDs have EPs evaluating patients in the triage area to assist with patient throughput. Research has developed rules that health professionals may use to determine a patient’s need for X-ray. If these clinical criteria are met, trained nurses in many institutions may order X-rays from the triage area in an effort to streamline care and reduce overall patient time in the ED. Examples of some rules found in the literature include the Ottawa ankle, knee, and foot rules; the Pittsburgh knee rule; the NEXUS rule for cervical spine

radiographs; and several head computed tomography (CT) rules (see Appendix A). Depending on the situation, nurses generally use extremity rules in their practice, whereas physicians apply decision rules for C-spine and head CT.

## Electrocardiography

It is a good idea to review old ECGs whenever possible and compare these with the new (current) ECG. This is of particular importance in patients with abnormal conduction, abnormal intervals, or abnormal ST and T wave segments. ECGs should be repeated in the ED if patients develop chest pain or if their chest pain resolves, whether spontaneously or following intervention. The importance of serial ECGs cannot be overemphasized in the setting of ACS or chest pain possibly of cardiac etiology. ECGs are invaluable in patients with acute ST-segment elevation MI (STEMI), as the decision to pursue thrombolysis or percutaneous coronary intervention (PCI) is influenced by the timing of the first diagnostic ECG. They also serve as useful adjuncts in the evaluation of several toxic ingestions or presenting symptoms, such as weakness, dizziness, abdominal pain, back pain, confusion, or alterations of mental status.

## Radiologic studies

All physicians seem to rely on diagnostic imaging to a greater extent than they did years ago. This has many factors, including the greater role imaging plays in patient care, the increased availability of CT scanners, the manner in which physicians are currently trained, and the increased concern over litigation. Diagnostic imaging (especially CT) has become a standard that physicians must accept and that patients often demand. Failure to order radiologic studies to identify certain conditions may be indefensible, as these tests are sensitive, specific, and readily available 24 hours a day in nearly all EDs. The development of guidelines to help determine which patients require X-rays has provided physicians the ability to safely reduce the number of radiographs ordered. Physicians and patients should be cognizant of the implications of radiation exposure.

EPs use bedside ultrasonography as part of their physical examination skill set in many hospitals, often with the support of radiology. This situation arose out of the need for EPs to have ultrasound available for their patients on a 24-hour basis. Limited focused bedside sonography by EPs can identify hemoperitoneum following abdominal trauma, abdominal aortic aneurysm (AAA), gallbladder disease, cardiac tamponade, intrauterine (and possibly ectopic) pregnancy, DVT, foreign body or abscess, ocular problems, and pneumothoraces, to name a few. Ultrasound research by EPs is identifying additional pathology important for emergency care. EPs first used