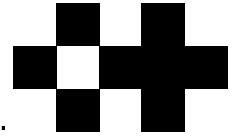


SECTION 1

Emergency and Urgent Care Services

One of sixteen
facility
components



Overview of the facility component

The emergency department (ED) serves as a critical point of entry for patients who require immediate treatment for life-threatening, traumatic, and other acute health conditions, as well as for other patients who have genuine medical, surgical, or psychiatric emergencies of day. The ED is also a gateway to the hospital's other medical services, such as inpatient care, specialty consultations, and patient care. The emergency department is the primary response for epidemics, disasters, and acts of terrorism.

Patients arriving by ambulance, private vehicle, or on foot must move directly from the entrance to the reception or triage area and to the appropriate treatment area. Non-emergency patients who consider themselves to be in immediate need of medical care are screened and directed to a waiting area, an appropriate treatment area for nonurgent conditions, a primary care clinic, or other outpatient services.

Urgent care centers — whether hospital-based or freestanding — offer a limited array of services for patients who need immediate care but do not have life-threatening conditions. Unlike an emergency department or a freestanding emergency center, urgent care centers do not provide care 24-7. An urgent care center may be co-located with an occupational health clinic or a primary care clinic.

A trauma center is a hospital-based emergency department equipped and staffed to provide comprehensive emergency medical services to patients suffering traumatic injuries. Trauma centers evolved with the realization that traumatic injury is a disease process unto itself requiring specialized and experienced multidisciplinary treatment and resources. In the United States, a hospital can receive trauma center verification by meeting specific criteria established by the American College of Surgeons and passing an on-site review. The Joint Commission also classifies emergency departments according to the level of services they provide. However, official designation as a trauma center is determined by individual state regulations. In general, the specific capabilities of

trauma centers are identified by "level" designations with Level I being the highest. Higher levels of trauma centers have trauma surgeons available, including surgeons trained in such specialties as neurosurgery and orthopedic surgery; nurse specialists in trauma care; and highly sophisticated medical diagnostic equipment. Lower levels of trauma centers may only be able to provide initial care and stabilization of a traumatic injury and arrange for transfer of the victim to a higher level of trauma care.



The operation of a trauma center is extremely expensive. Trauma centers often have a helipad for receiving patients who have been airlifted to the hospital from areas where trauma capabilities are not available. All EDs, regardless of trauma-level designation, must be able to evaluate and stabilize trauma patients. If the patient cannot be treated at that facility, he or she is transferred to an appropriate facility for further treatment.

Every hospital ED is different because it reflects the community's needs and resources. Some hospitals offer the full continuum of emergency services — including trauma and emergent care, nonurgent care, an observation unit, a chest pain unit, pediatric services, psychiatric crisis intervention, burn care, and even a hyperbaric unit — while others provide only basic services.

Other services that are essential to the operation of the ED, but are not necessarily co-located, also influence the layout and overall space allocation. For example, access to imaging services and specialty diagnostics, intensive care beds, the labor and delivery suite, and the surgery suite must be considered in the planning of an ED.

CURRENT TRENDS

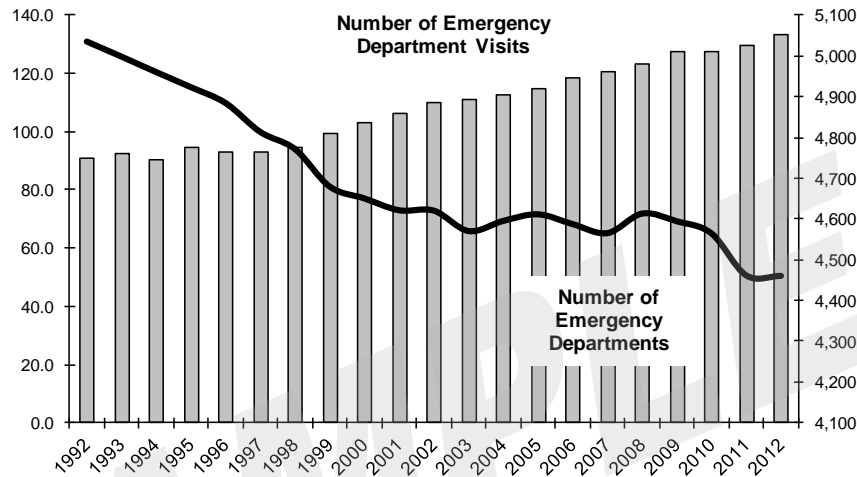
EDs are a focal point for hospitals. They account for a large percentage of inpatient admissions, and they serve as an initial point of contact with the healthcare system for many patients. The public’s perception of a hospital may well depend on the level of efficiency, professionalism, and customer service experienced during a visit to the ED.

EDs are facing a number of critical issues, including:

Increased demand and overcrowding. Overcrowding in the ED has been somewhat cyclical over the past several decades. In the late 1980s, EDs experienced sustained growth in patient visits for several years and capacity was viewed as a critical issue.

With the introduction of managed care in the 1990s — emphasizing primary care — ED overcrowding was projected to end and hospitals in the United States began reducing the resources used for the care of nonurgent patients. As shown in Figure 1-1, patient visits to the ED did indeed drop nationally from 94.7 million in 1995 to 92.8 million in 1997 and were projected to continue falling into the new millennium. However, by 1998, ED visits started to climb and ED overcrowding became a year-round problem rather than a sporadic issue, such as during the winter flu season. Despite a small dip in 2010, by 2012, ED visits in the United States had reached 133.2 million (AHA and Avalere Health 2014). Ideally, EDs should serve only those patients who are injured or seriously ill. However, EDs in the United States see a wide variety of patients, both emergent and nonurgent, insured and uninsured. By law, hospitals must treat all patients who arrive at the ED, regardless of health status or ability to pay. As a result, EDs have become a default option for patients

**Figure 1-1
National Trend in Emergency Department Visits and the
Number of Emergency Departments**



Source: American Hospital Association.

without insurance and for those with insurance who lack immediate or convenient access to care.

While emergency visits increased, the number of EDs dropped as a result of hospital closures and consolidation. Between 1992 and 2012, the number of EDs declined by 11 percent while ED visits increased 47 percent (AHA and Avalere Health, 2014).

According to the U.S. Census Bureau, there were 48 million people in the United States — 15.4 percent of the population — without health insurance in 2012. Many of the uninsured use the ED as their only point of contact with the healthcare system. Uninsured patients often suffer from medical problems that have persisted or worsened because they have not received recommended health screenings, early intervention, or preventative care. The uninsured also lack access to medications they need to manage serious conditions such as hypertension and diabetes. Hospitals increasingly provide uncompensated care to these seriously ill patients, who are typically sicker than those with insurance and who comprise a disproportionate percentage of the patients who consume the most expensive resources.

One of the goals of the Affordable Care Act is to reduce the number of uninsured people and to provide incentives for patients to seek care in less expensive settings — particularly patients requiring primary care or chronic care. At this point, with the Affordable Care Act just getting underway, it is not clear whether healthcare reform will result in an increase in ED visits, because more people are insured, or a reduction in ED visits, because there are more settings that deliver primary care and chronic care. Although a significant number of people remain uninsured as of the end of 2014, this will likely improve as more states choose to expand

Medicaid and more Americans elect to buy insurance as penalty amounts increase.

Diversion of ambulance patients due to inadequate staffing and facility capacity. With EDs across the country increasingly overcrowded, many frequently must divert ambulances to other facilities because they lack the staff and space to care for additional patients. In the most recent survey conducted by the American Hospital Association (AHA 2010), hospital leaders reported that a lack of critical care beds was the number one factor contributing to ambulance diversions. Aside from ED overcrowding, other factors leading to diversions included staffing shortages and a lack of specialty physician coverage.

Inadequate specialist coverage. Emergency physicians rely on their colleagues in other specialties to assist in the care of complicated patients and to admit patients to the hospital. Depending on the patient mix, between 15 and 25 percent of ED patients require a specialty consultation. Traditionally, primary care physicians and specialists were required by hospital bylaws to take ED “call” as part of their hospital privileges agreement. Physicians are increasingly resistant to provide ED coverage — primarily due to poor reimbursement and rising malpractice insurance costs. With physicians reducing the number of hospitals at which they serve on staff, the pool of physicians available to cover ED call is diminished further. This growing problem can create bottlenecks in an ED and increase the frequency of diversion.

Mental health crisis. Services to mental health patients have been reduced in recent years — frequently because of Medicaid cuts. Consequently a growing number of mental health patients have been unable to obtain drugs or other treatment. If their conditions become acute, many are admitted to the hospital ED as a response to antisocial or self-destructive behavior. With a scarcity of inpatient mental health beds, an increasing number of mental health patients are “housed” in the ED until an inpatient bed at a mental health facility becomes available.

Why Are Emergency Departments Overcrowded?

- Growth and aging of the population
- Hospital closures and mergers
- Federal legislation regarding access by the uninsured
- Lack of inpatient beds
- Limited access to primary care physicians
- Economics of providing episodic care and after-hours care in alternative settings
- Consumer expectations regarding immediate access to care and state-of-art technology

Disaster preparedness. There is intense media attention on the importance and adequacy of our nation’s disaster response capabilities. EDs can serve as receiving, triage, and initial treatment centers in the event of disasters, infectious disease outbreaks, and nuclear, biological, or chemical (NBC) exposure. Some emergency facilities may be designed with surge capacity and special design features for NBC control.

Patient privacy. Ensuring patient privacy is paramount as patient records and data become available to multiple physicians, insurance companies, researchers, and government offices as hospitals implement new electronic data management systems. Balancing the need to provide expedient emergency care with protection of the patient’s privacy continues to challenge emergency caregivers.

Patient complaints and community perception. Many healthcare organizations regard their EDs as the “front door” to the hospital — the place where many patients and their families experience their initial contact with the institution and develop long-lasting impressions. Yet hospitals must balance customer service with the competing demands of time and space in addition to the demands of other constituents such as caregivers, payers, and legislators.

Most of these challenges have been addressed by emergency departments intermittently for many years. Many emergency departments in the United States that they may have all reached a crisis level at the

Key Planning Issues

KEY PLANNING ISSUES

Key functional and operational issues pertaining to the ED that should be addressed and clearly documented in the functional program prior to space planning include:

Patient population and type of services to be provided. An understanding of the demographic composition of the patients to be served and an analysis of expected acuity levels is key to the successful planning of a new or renovated ED. This workbook includes guidelines for all potential components of a hospital-based ED including trauma/emergent care, nonurgent care, and observation/holding. It can also be used to plan

- Will the ED be designed with surge capacity and special design features for infectious disease outbreaks or nuclear, biological, or chemical control? Will a human decontamination room be provided? Is there a disaster preparedness plan?
- How will supplies be delivered, stored, and inventoried within the ED? Where will the sterile processing of reusable instruments occur? How will trash and hazardous wastes be removed?
- What staff/administrative space will be provided? Can classrooms and conference rooms be shared with other departments? Which administrative offices must be located in the patient treatment area rather than in an administrative office suite?

Space Planning Approach

$$\begin{aligned} \text{Peak monthly workload (PMW)} &= 10\% \text{ of total annual visits} \\ \text{Average daily workload peak month (ADWPM)} &= \text{PMW} \div 30.5 \text{ days} \\ \text{Peak daily workload (PDW)} &= \text{ADWPM} + [2.33 \times \sqrt{\text{ADWPM}}] \\ \text{Peak shift workload (PSW)} &= \text{PDW} \times 50\% \end{aligned}$$

SPACE PLANNING APPROACH

Estimating peak workloads. With so many critical issues facing EDs today, caution should be observed when using historical workloads to predict future visits. Current workloads should be analyzed by acuity, time of day, and payer mix. Future projections should be based on a detailed analysis of the hospital's current and projected service area population, use rate, market share, and expected ED length of stay. Nationally, ED use rates have increased from 356 annual visits per 1,000 population in 1992 to 424 annual visits per 1,000 population in 2012 (AHA and Avalere Health 2014). The impact of initiatives to redirect nonurgent patients to lower-cost settings should also be taken into account.

EDs typically record total visits per month or year from which average daily workloads can be calculated. Because of the random nature of arrivals to the ED, actual workloads fluctuate widely from the average — not only from month to month, week to week, or day to day — but also from hour to hour within the day. Consequently, use of a daily average, calcu-

lated from monthly or yearly total workload data, could result in a rather marked understatement of space needs. Ideally, data on visits by hour, day, and month — to determine peak periods — should be used for programming space. However, most EDs do not routinely collect such specific data.

Once the overall visit levels are established, formulas can be used to predict facility requirements. If institution-specific data are not available, a variation of the Poisson distribution formula — based on samples collected from various hospitals throughout the United States — can be used to predict workloads for peak periods on peak days.

Peak daily workload (PDW) can be estimated statistically based on the average daily workload peak month (ADWPM) and the desired level of confidence that a space will be available when a patient arrives. For example, using 2.33 assumes a 99 percent confidence level or that a treatment space will be available at least 99 percent of the time. In a typical ED, the peak shift workload (PSW) generally represents 50 percent of the peak daily workload and usually occurs from 4 p.m. to 11 p.m. This calculation can be simplified by using the factors shown in Figure 1-3 to estimate the PSW based on the ADWPM.

Nonurgent patients, who could be triaged to a separate fast track area may represent as much as 30 to 40 percent of the peak daily workload. However, the peak shift workload in a separate fast track area is generally 75 percent of the PDW (rather than 50 percent in urgent care) since most nonurgent patients tend to arrive during the late afternoon or evening hours.

These rules of thumb can be applied to the projected future annual workload to estimate the peak workload for space programming purposes. A well-planned ED provides sufficient intrinsic flexibility to accommodate sizable deviations from workload forecasts. This is accomplished by creating spaces that can be used interchangeably for various types of visits; by understanding the relationships among workload, service times, and staffing in relation to unexpected surges in workload; and by recognizing that a single flexible

**Figure 1-3
Average Daily Workload Peak Month (ADWPM) to Peak Daily Workload (PDW) Conversion Factors**

Annual Visits	ADWPM to PDW Factor
Less than 20,000	1.30
20,000 to 40,000	1.25
40,000 to 60,000	1.20
Over 60,000	1.15

- **Nonurgent care or fast track area** is provided if nonurgent patients are to be triaged to a separate area for treatment. This space includes a sub-waiting area, exam/treatment spaces, and associated support space.
- **Observation/holding unit** is optional depending on the ED's scope of services, availability of space in other locations, and an organization's specific policies and procedures regarding admission.
- **Urgent care center** is optional. It can be a freestanding or hospital-based urgent care center, and typically does not provide care 24-7 and is remote from the ED. If a freestanding facility is planned, additional support space may be required, including a receiving area, central waste holding room, soiled linen holding room, clean linen storage room, and general storage space.
- **Shared support space** includes space that is necessary to support all the treatment areas and should be accessible from the treatment areas.
- **Staff/administrative space** includes administrative offices, staff lounges/lockers, and other staff amenities that do not need to be within either the emergency/urgent care or fast track areas.

Specific rooms and areas within each category of space are either *fixed*, *workload dependent*, *variable*, or *optional*. Fixed spaces generally do not vary in either number or size regardless of the overall scope of activities of the department. The number of general treatment spaces varies depending on the projected workload. Other spaces vary based on the total number of general treatment spaces programmed. Finally, a variety of spaces are optional and depend on the scope of services, specific operational concepts, and desired level of amenities to be provided. The net square feet (NSF) identified in the room-specific space program — or net square meters (NSM), included in the supplemental template —

**Figure 1-5
Estimating Emergency Treatment Spaces Based on Annual Visits**

Performance	Average Treatment Space Turnaround Time (Minutes)	Average Annual Visits per Treatment Space
Poor	210	1,100 to 1,200
Average	150	1,200 to 1,600
Best	120	1,600 to 1,900

refers to the usable space within a room or area (inside wall-to-wall dimensions).

Estimating department gross square feet (meters). To convert the sum of all net spaces to an estimate of the actual department footprint, a net-to-department gross space conversion factor is used. Multiplying the net-to-department gross space conversion factor by the net area results in an estimate of the department gross square feet or DGSF (department gross square meters or DGSM). DGSF (DGSM) includes the net space of all rooms/areas within the ED or functional component as well as the space occupied by intradepartmental circulation and the walls and partitions. It excludes shared public corridors

and atriums, elevators, stairs, the space occupied by the building's exterior wall and major mechanical spaces. The primary purpose of this factor is to assist in the translation of the functional and space program into meaningful block schematic drawings as location issues are being resolved, and to estimate renovation or construction costs prior to design.

Net-to-department gross space conversion factors generally range between 1.45 and 1.55 for EDs. A smaller factor of 1.45 can be used in planning an urgent care center. If staff/administrative space is located apart from the ED, a reduced factor of 1.25 to 1.30 should be used for this area alone. These factors will also vary depending on whether new construction is planned (lower factor) or if the function is to be retrofitted into existing space (higher factor).

The same space planning approach is used to plan a remote or freestanding emergency or urgent care center. If a freestanding facility is being planned, additional factors may be required. For more information, see "Conversion Factors" heading in the *Using This*

Achieving Optimal Performance

ACHIEVING OPTIMAL PERFORMANCE

Not all EDs are burdened with operational and customer service problems — some EDs are sources of pride for hospitals and healthcare systems. These "best practices" EDs can serve as models of optimal

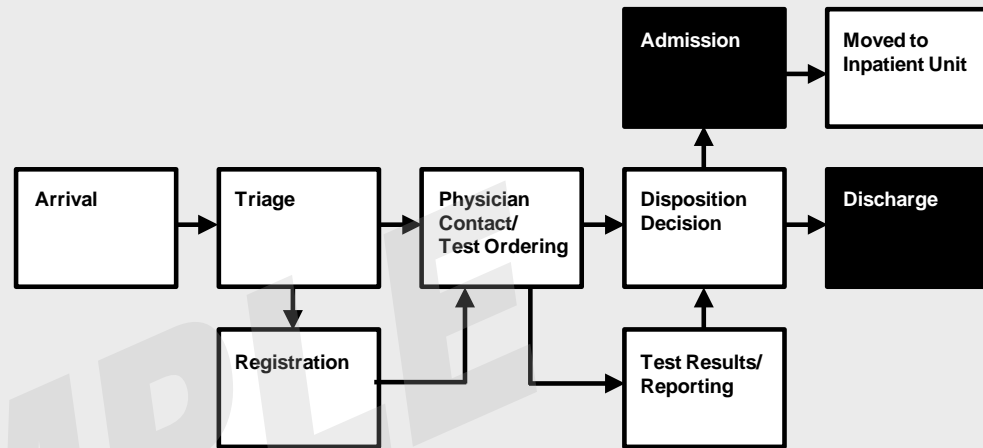
performance that can be achieved given the right environment and resources. EDs are complex operational systems impacted by many other parts of the hospital and healthcare delivery system. Not surprisingly, then, analyzing the root of current operational problems and developing appropriate solutions for improving performance are also frequently complex. A detailed analysis of the key transition points in the patient care process — shown in Figure 1-6 — will reveal opportunities to improve staffing efficiency, reduce supply costs, reduce medical errors, and potentially enhance customer service.

In the struggle to improve operational performance in the ED, the most common challenge is managing critical information. Handwritten physician and nursing notes are often incomplete and inadequate for capturing charges appropriately. Template documents, or even dictated notes, are not entered into an electronic health record that allows rapid retrieval and database query. Handwritten or verbal orders contribute to medical errors in an already high-risk setting. Opportunities to identify bottlenecks in patient flow, to ensure regulatory compliance, and to reduce variations in physician practice are missed. The length of time required for individual steps in the patient care process is not routinely captured and time flow studies to evaluate them are difficult and costly. The same inefficient process is used to report laboratory and imaging results back to the emergency physician. It is not surprising that most EDs are inefficient.

Rapid collection of patient data, quick access to clinical history data, and real-time dynamic patient tracking are now a realities and they enable the medical staff to more effectively treat patients. Standard order sets and protocols and triage assessment templates help the medical staff perform their jobs more efficiently with fewer errors. Barcoding technology uses the patient's ID bracelet to track medications administered, specimens collected, and supplies used. Clinical results are available online as soon as they are entered into the system, allowing for quicker diagnosis and reduction in the patient's length of stay. Statistical reporting capability is supported and available online for management and the medical staff to analyze for trends and identify operations improvement opportunities.

As EDs change their processes and improve treatment space turnaround time, they find that a substantial increase in volume can be

Figure 1-6
Achieving Optimal Performance by Focusing on the
Transition Points in the Patient Care Process



accommodated without additional space or reduces the associated construction costs.

Facility Layout Considerations

FACILITY LAYOUT CONSIDERATIONS

The ED should be designed with a major emphasis on creating an efficient flow of patients through the department and adjoining fast track and diagnostic areas. Patients arriving by ambulance, private vehicle, or on foot who require immediate treatment for life-threatening, traumatic, or other acute health conditions, must move as quickly as possible to the appropriate treatment area. A separate ambulance entrance is frequently provided and it is assumed that patients arriving by ambulance bypass the triage station. The triage nurse ensures that all other patients in need of immediate care move directly from the walk-in entrance to the appropriate treatment area. Non-emergency patients who consider themselves to be in immediate need of medical care must be screened and then directed to a waiting area until an appropriate treatment space is available.

Within a medical center, the ED interacts most closely with the imaging department, labor and delivery suite, intensive care units, and surgical

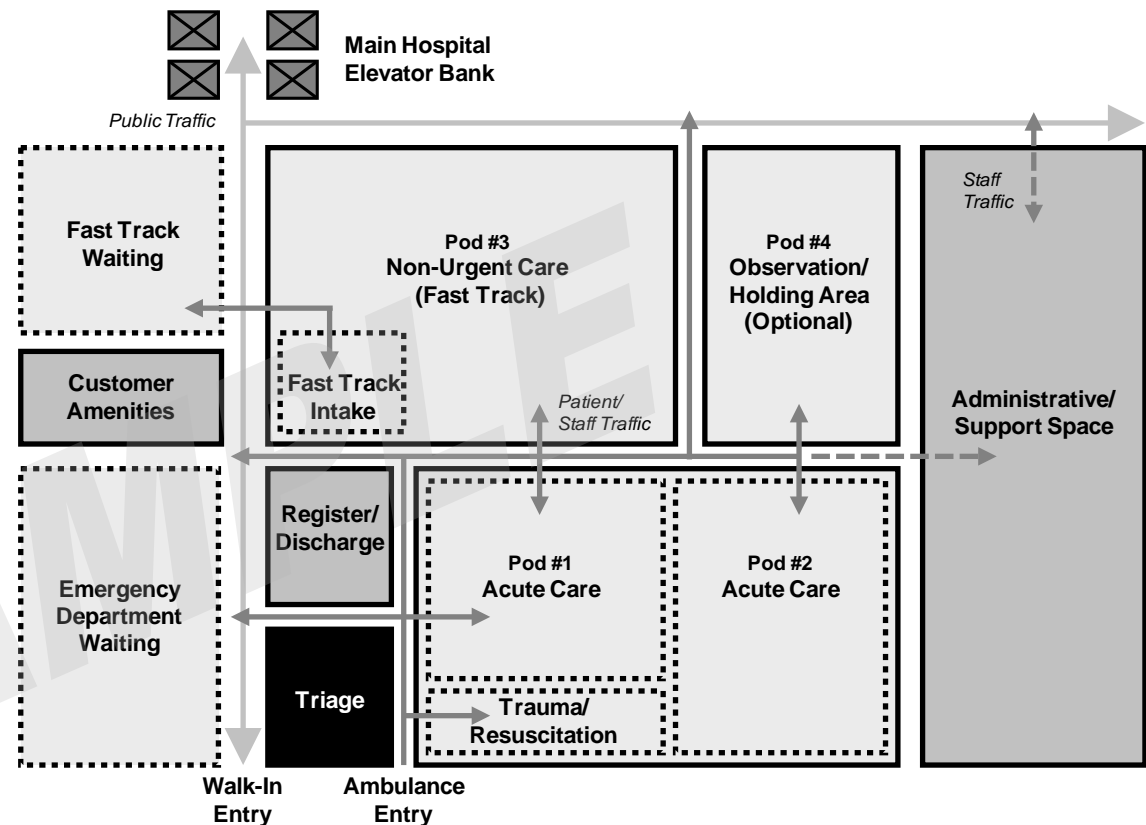
suite and these areas should be adjacent to the ED or directly accessible via an oversized elevator designed to accommodate a stretcher, transport staff, and several pieces of patient care equipment.

Higher-volume EDs typically have dedicated X-ray, computed tomography (CT), and ultrasound equipment — and even magnetic resonance imaging (MRI) — within their EDs. Some trauma patients, arriving in the ED, may be transferred immediately to the surgery suite. Admitted patients — who require close monitoring, medication, and advanced medical equipment — will be transferred to an intensive care unit or another patient care unit within the hospital.

Specific facility layout and design considerations include the following:

- The emergency (or urgent care) entrance should be at grade level with clear signage, supported by other visual cues or architectural elements, and protected from the weather. Direct access from a heliport (if provided) and public roads for ambulance and vehicle traffic is also necessary.
- When a human decontamination room is provided, it should have a separate independent exterior entrance adjacent to the ambulance entrance — but not closer than 30 feet (9.1 meters) — along with an interior entrance to an ED corridor.
- The reception/triage station should be located to permit staff observation and control of access to the treatment area, ambulatory entrance, and patient/visitor waiting area. Ideally, it should be adjacent to the administrative communication center within the main ED treatment area so that staff can circulate between the two areas. Patients arriving by ambulance should not be visible from the patient/visitor waiting area.
- A public corridor should be provided that links the emergency department walk-in entrance and patient/visitor waiting area to the main hospital entrance and elevator lobby. Visitors may need to access the hospital cafeteria, a patient care unit, or another area of the hospital

and should not have to travel through an ED treatment area. However, for security purposes, visitors should be restricted from circulating throughout the hospital during evening and nighttime hours. Food



and beverages may need to be provided adjacent to the patient/visitor waiting room, depending on the

- Convenient access to wheelchair and stretcher for arriving patients but should not impede circulation

Potential Facility Planning Pitfalls

POTENTIAL FACILITY PLANNING PITFALLS

Potential facility planning pitfalls that may result in inappropriate ED facilities include the following: