SECTION 1

Emergency and Urgent Care Services

One of fifteen facility components

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 at any time of day. The ED is also a gateway to the hospital's other medical resources since many patients who enter the ED receive other services, such as inpatient care, specialty consultations, and ongoing outpatient care. In addition, the emergency department is the primary source of care for epidemics and other natural and man-made emergency events.

Patients arriving by ambulance, private vehicle, or on foot must move directly from the entrance to the reception or triage station and the appropriate treatment area. Non-emergency patients who consider themselves in immediate need of medical care are screened and directed to a treatment area for nonurgent conditions, a outpatient services. Individuals seek care in cluding problems with access to services in other settings a hallenge of determining the urgency of symptoms such as chest or abdo en pain without further diagnostics.

Introductory descriptive narrative

Emergency department visits generally fall into one of three categories: those that result in a hospital admission (admitted patient), those that do not result in hospital admission (treat and release), or those with a primary or secondary diagnosis of a behavioral health or substance use disorder regardless of hospital admission. Patients who receive *observation services*, meaning they are put under observation (usually less than 24 hours) while determining whether they need to be admitted, can be included in any of these three categories, depending on how their visit resolves.

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 also 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. In the United States, a hospital can receive trauma center verification by meeting the 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 have trauma surgeons available, including surgeons trained in such specialties as neurosurgery and orthopedics, and sophisticated medical diagnostic equipment. Lower levels may only 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 costly. Trauma centers often have a helipad for receiving patients who have been airlifted to the hospital from areas where trauma capabilities are not available. However, all EDs, regardless of trauma-level designation, must evaluate and stabilize trauma patients. If the patient cannot be treated at that facility, they are 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, and a behavioral health crisis unit — while others provide only basic services. The location of imaging services and specialty diagnostics, intensive care beds, the surgery suite, and t[illegible]y suite also need to be considered when planning an[illegible]ment.

Current Trends

CURRENT TRENDS

Emergency departments 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. Unfortunately, hospital emergency departments have spent the last two years trying to balance being in a state of emergency readiness waiting for the next COVID-19 wave and safely delivering care to injured and acutely-ill patients. The usual challenges that existed before — overcrowding due to a lack of inpatient beds for admitted patients, a rising number of patients with behavioral health issues, staff shortages, and narrow operating margins — have become worse during the pandemic. Fluctuating utilization and new safety protocols have created additional challenges.

Fluctuating utilization and forecasting challenges. Emergency department visits have increased steadily since World War II. That is until 2020, when the first significant drop in ED volumes occurred. According to the Centers for Disease Control and Prevention, there was a 42 percent drop in ED visits in the spring of 2020 at the start of the COVID-19 pandemic compared to the year before. This initial reduction in ED volume was caused in part by the government's call to stay at home, which in turn led to fewer accidents and other traumatic injuries. Unfortunately, individuals who needed immediate care for medical emergencies either delayed care or avoided care altogether due to a fear of being exposed to COVID-19 while in the ED. ED volumes started to pick back up by the end of 2020 but declined again in January 2021 to about 25 percent below pre-pandemic levels. Starting the third year of the global pandemic, EDs continue to struggle with new waves of the coronavirus while seeing an increased number of high-acuity patients who delayed their care in the previous two years. Patients who postponed care are now much sicker than before the pandemic, requiring an extended stay in the ED and admission to an inpatient bed. At this point, forecasting future ED visits and inpatient bed need is challenging at best, and there appears to be no agreement on what will be the new *normal*.

Shortages of nurses. Even before the pandemic, the United States was projected to experience a shortage of registered nurses (RNs) as aging baby boomers require more health services, and a large portion of the nursing workforce is retiring. The global pandemic has put further stress on an already dire situation. With many nurses leaving the profession due to burnout, the Bureau of Labor Statistics projects that 1.2 million new RNs will be needed by 2030 to address the current shortage. Many hospitals are forced to hire traveler nurses whose rates are rising exponentially, dramatically increasing costs for hospitals. Consequently, EDs are being designed to facilitate efficient staffing patterns, reduce walking distances, provide a safe working environment, and promote collaboration and teamwork.

New safety protocols. For several decades, hospitals have focused on controlling nosocomial (hospital-acquired) infections with ample handwashing stations and easily-cleaned surfaces. However, the coronavirus has brought new attention to airborne transmission. As a result, emergency departments are modifying their triage processes and implementing a split-flow model to cohort patients based on their acuity and the level of suspected infection. They are also converting staff break rooms to don/doff zones for personal protective equipment (PPE), creating quiet spaces for staff respite, and embracing telemedicine. Where possible, EDs are increasing the number of airborne infection isolation (AII) treatment rooms and compartmentalizing spaces that can be efficiently shut down and isolated to control the spread of infection.

comfortable environment with open spaces rather than the frenetic atmosphere of the ED. Behavioral hea[illegible] of the ED, located on the same floor, or else[illegible]us.

MAJOR PLANNING ISSUES

Major Planning Issues

Key functional and operational issues that should be documented in the functional program before space planning include:

Patient population and type of services to be provided. Understanding 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 emergency department. This workbook includes guidelines for all potential components of a hospital-based ED, including emergent/urgent care, nonurgent care, and observation/holding. It can also be used to plan freestanding emergency and urgent care facilities.

Patient acuity and triage. Triage in the ED prioritizes incoming patients and identifies those that cannot wait to be seen. The triage nurse performs a brief, focused assessment and assigns the patient a triage acuity level indicating how long the individual patient can safely wait for a medical screening exam and treatment. The Emergency Severity Index (ESI) is a tool commonly used in emergency department triage that provides a method for categorizing ED patients into five groups from 1 (most urgent) to 5 (least urgent) based on their acuity and resource needs (ENA 2020).

- **Level 1 (Immediate)** — patient requires immediate life-saving intervention
- **Level 2 (Emergent**) — patient who is high-risk and requires treatment within 10-15 minutes
- **Level 3 (Urgent**) — patient can remain untreated for 15-60 minutes
- **Level 4 (Semi-urgent)** — patient can remain untreated for one to two hours
- **Level 5 (Nonurgent)** — patient can remain untreated for two to 24 hours

Figure 1-1 provides an estimate of the national distribution of ED visits by acuity level (Theiling et al. 2020), although these percentages vary for each community.

As the first point of contact for patients arriving at the ED, the triage station is critical to ED operational performance. The triage nurse ensures that patients who require immediate treatment are moved directly from the entrance to the appropriate treatment area. Non-emergency patients are screened and then directed to a waiting area, appropriate treatment area for nonurgent conditions, or other outpatient services. Even with incentives to direct nonurgent patients to lower-cost settings, utilization of the ED by medically underserved patients for non-emergency care remains a challenge in many communities.

Patients may also be triaged into specific components of the ED. When the total number of patients reaches certain levels, it may be economically and operationally desirable to design separate areas for medical, surgical, pediatric, obstetric, geriatric, cardiac, or behavioral health patients. For part of the day, it may also be desirable to triage nonurgent patients to another area of the hospital that is more appropriate to their needs, such as a primary care or specialty clinic.

EDs are also experimenting with new triage concepts to expedite care and reduce overcrowding in the waiting room. Some hospitals have implemented a rapid assessment unit (RAU), also called a rapid evaluation unit (REI), as a potential solution. With this concept, when patients arrive at the ED, they register and are seen by a team — including a doctor, nurse, and assistant. The patient has to answer questions about their condition only once, and the doctor can move the patient to different areas of the ED, depending on the severity of their condition. Lower-acuity patients may be sent to a sub-waiting area to wait for an X-ray or another test.

Accommodating nonurgent patients. In many communities, a large number of patients seeking care in the ED have non-emergent conditions that can be safely and efficiently treated in a clinic-type setting without consuming the more expensive resources of an ED. Any ED with an

- 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? Will space be designated that can be used by the hospital incident command system team when necessary?
- How will supplies be delivered, stored, and inventoried? What materials distribution system will be used to supply the facilities with sterile supplies, general supplies, nourishments, and medications? How will trash, hazardous waste, and recyclables be removed?
- What staff/administrative spaces will be provided? Which spaces can be shared with other clinical services — such as staff lockers/changing facilities and conference/classrooms? Who will need private offices? Which administrative offices and workstation[illegible]ent or remote administrative office suite?

Figure 1-2
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

SPACE PLANNING APPROACH

Space Planning Approach

Estimating peak workloads. As a starting point, current and historical workloads should be analyzed by acuity level and time period to determine trends in utilization. Future projections should be based on a detailed analysis of the hospital's current and projected service area population, use rates, market share, and expected ED length of stay. Nationally, ED use rates have increased from 360 annual visits per 1,000 population in 1995 to 437 annual visits per 1,000 population in 2018 (AHA 2022). The impact of initiatives to redirect nonurgent patients to lower-cost settings should also be taken into account. However, with so many critical issues facing EDs today, caution should be observed when using historical workloads to predict future visits.

Emergency departments 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 from month to month, week to week, and day to day — requiring an analysis of average versus peak workloads. Most hospitals already collect detailed data on monthly and daily fluctuations in workload to predict staffing levels for annual budgeting. When available, this data should be used to compare the average daily number of visits with peak daily visits to determine the number of patient treatment spaces.

In the absence of such institution-specific data, a variation of the Poisson distribution formula can be used to estimate the peak daily workload. First, the peak monthly workload (PMW) can be estimated at 10 percent of the total annual visits if actual data is not available. Then, the average daily workload for the peak month (ADWPM) can be calculated by dividing the peak monthly workload by 30.5 days. Finally, 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 treatment 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.

$$\text{Peak daily workload (PDW)} = \text{ADWPM} + [2.33 \times \sqrt{\text{ADWPM}}]$$

This calculation can be simplified by using the factors, as shown in Figure 1-2 to estimate the PDW based on the ADWPM. Furthermore, 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. Nonurgent patients, who could be triaged to a separate fast track area, may represent 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 for urgent care) since most nonurgent patients arrive during the late afternoon or evening hours.

Estimating treatment room turnaround times. Appropriate treatment room turnaround times can be estimated once the peak shift workload is projected and a decision made whether or not to create a separate fast track area. Room turnaround time refers to the patient's actual time in a treatment room, cubicle, or bay — not the time the physician spends with the patient or the total time the patient spends in the ED. The specific room turnaround times used for planning space in a given facility represent a major decision in the planning process because they have a significant impact on the number of treatment spaces. Although this decision will be somewhat arbitrary, it should be based on some combination of historical data and realistic expectations.

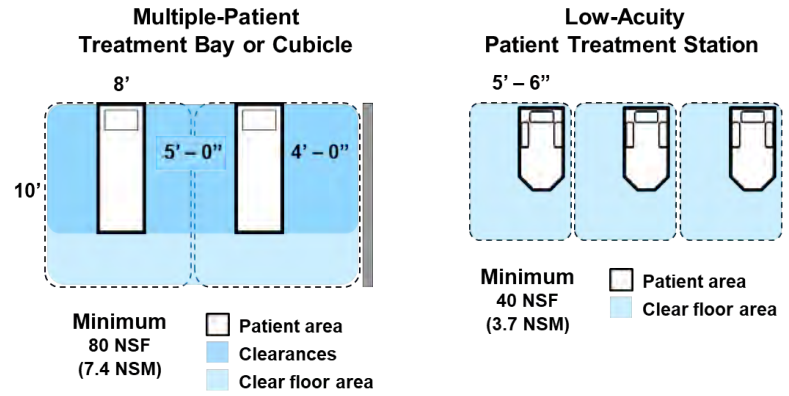
Some typical ranges are shown below:

- 180 to 360 minutes for an admitted patient
- 120 to 180 minutes for a discharged patient
- 60 to 120 minutes for a fast track patient

On average, an emergent patient remains in a general treatment cubicle for 150 minutes. The patient is then either discharged, moved to a specialty diagnostic or treatment area, moved to an observation unit, or admitted to the hospital. This excludes patients who are initially triaged to a trauma/resuscitation area or separate fast track area. The *Quick Space Calculation for an Emergency Department* template on the following page can be used to estimate the number of treatment spaces required based on different treatment room turnaround time assumptions.

Estimating the number and type of treatment spaces. The number of general treatment spaces can be calculated by multiplying the expected peak shift workload by the average room time and dividing this figure by 480 minutes (eight hours). Patients receiving general care may be placed on a stretcher in a single-patient treatment room or multiple-patient treatment area with cubicles (with three walls and a curtain closure) or bays (with a headwall and curtain closure on the remaining three sides). Alternately, less acute patients may be placed in a chair (a typical chair, lounge chair, or recliner chair appropriate for patient consult and examination) in a low-acuity treatment station. The low-acuity treatment station provides a space-saving alternative to the traditional multiple-patient cubicle or bay, as shown in Figure 1-3. Once the number of general treatment spaces has been calculated (for both the emergent/urgent care and nonurgent/fast track areas), some of these spaces can be designed for use by special patient populations. Additional observation or holding spaces and other unique treatment spaces are added to arrive at the total number of patient care spaces to be programmed for the emergency department.

Figure 1-3
Comparison of Multiple-Patient Treatment Bays/Cubicles and Low-Acuity Treatment Stations



Treatment rooms for the following special patient populations can be designed flexibly to also serve as general treatment spaces:

- **Airborne infection isolation (AII) treatment room.** At least one AII treatment room with a contiguous patient room should be located in the ED. Personal protection equipment (PPE) storage must be located either directly outside the room, in an anteroom, or inside the entry door to the room. The AII treatment rooms can be used for non-infectious patients when not in use for isolation.

- Multiply the total number of treatment spaces by a range of 550 to 650 department gross square feet or DGSF (51.1 to 60.4 department gross square meters or DGSM) per treatment space to estimate the total footprint for the department. If a separat being programmed, approximately 450 to 55 DGSM) per treatment space can be used to required for the center.

Helpful Rules-of Thumb

The number of treatment spaces can also be estimated based on the total annual visits, using the guidelines shown in Figure 1-4.

Figure 1-4
Estimating Emergency Department 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 Practice	120	1,600 to 1,900

Developing a detailed space program. The space within an ED can be divided into the following major components:

- **Patient intake area** begins with the triage station and includes the registration function, patient/visitor waiting, and related space that is not generally part of the patient treatment area. An optional rapid assessment unit may be provided instead of the triage station if this operational concept is being implemented.
- **Emergent/urgent care area** represents the main emergency department and includes all spaces related to treating high-acuity patients, including spaces for trauma/resuscitation, general and specialty treatment, and associated support space.
- **Nonurgent care/fast track area** is provided when nonurgent patients are triaged to a separate area for treatment, including a subwaiting area, treatment spaces, and associated support space.
- **Observation 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.
- **Behavioral health crisis unit** is optional depending on the ED's scope of services and availability in other locations.
- **Shared clinical support space** includes space that is necessary to support all the treatment areas and may include dedicated X-ray, CT, and ultrasound rooms, or space to house portable imaging equipment; a satellite laboratory or pharmacy may also be provided.
- **Staff/administrative space** includes administrative offices, staff lounges/lockers, and other staff amenities that do not need to be within the patient treatment areas.

The relationship between the functional components in an emergency department is illustrated in Figure 1-5. Guidelines for planning an MRI suite are provided in *Section 3: Imaging and Other Diagnostic Services*. Some emergency departments may also provide hyperbaric oxygen therapy, addressed in *Section 9: Ambulatory Care*.

Estimating department gross square feet (meters). A net-to-department gross space conversion factor is used to convert the sum of all net spaces to an estimate of the actual department footprint. Net-to-department gross space conversion factors generally range between 1.50 and 1.60 for EDs. A smaller factor of 1.45 or 1.50 can be used in planning an urgent care center or an observation unit. 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 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 planned, additional factors may be required to estimate the total building gross squar (meters) described under the "Space Conversion Fa heading in the Using This Workbook chapter.

Future Flexibility and Adaptability

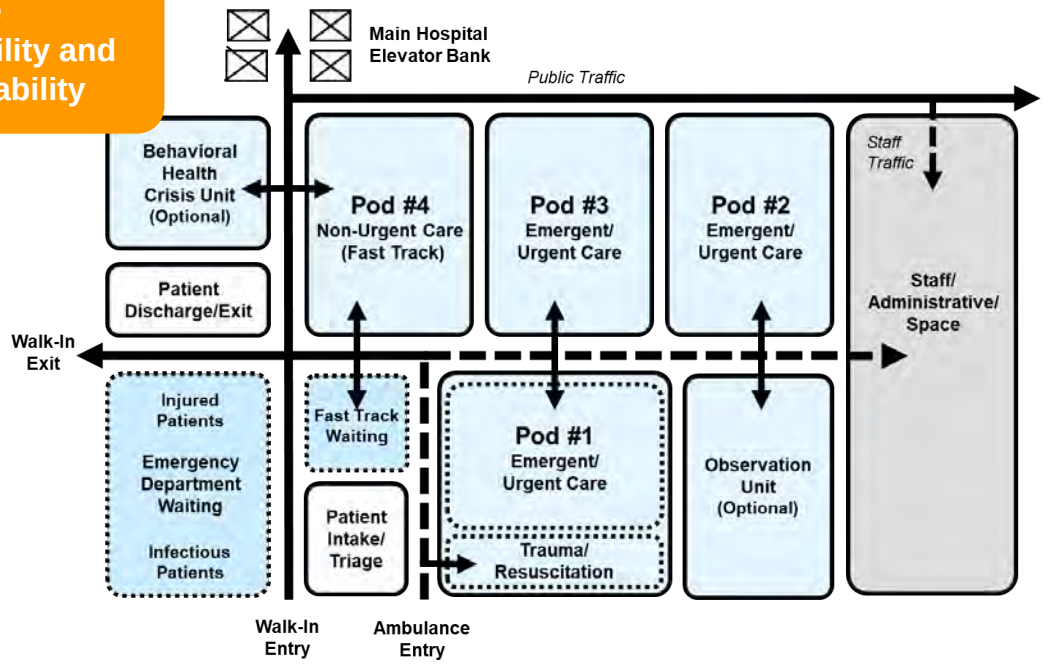
FUTURE FLEXIBILITY AND ADAPTABILITY

Before the COVID-19 pandemic, emergency department planning efforts were routinely focused on improving treatment space turnaround time to combat ever increasing-workload volumes. Improving treatment space throughput can dramatically increase the capacity of an ED without adding staff or expanding the physical space. For example, using the average treatment space turnaround times in Figure 1-4, an emergency department with 40,000 annual visits could increase its capacity by 25 percent (adding 10,000 annual visits) if it improved its treatment space turnaround time from "average" to "best." Going from "poor" to "best practice" could increase its capacity by 75 percent (adding 30,000 annual visits).

Improving treatment space turnaround time usually begins with a detailed analysis of the key transition points in the patient care process, as shown in Figure 1-6. However, moving patients from arrival to the point where a decision is made on their disposition is not always within the control of ED staff. Emergency departments are complex operational systems impacted by many other parts of the hospital and healthcare delivery system. For example, when the decision is made to admit a patient, an inpatient bed may not be available, resulting in patient boarding within the ED. Treat-and-release patients may still have to wait in the ED for a diagnostic test or while the ED staff are waiting for their test results. ED staff may also need to rely on a specialist for consultation before they make a decision.

Before the COVID-19 global pandemic, it was commonly assumed that most patients arriving at an emergency department would be ill or injured, with little thought given to the design implications if many patients were infectious. Although airborne infection isolation (AII) rooms were provided to accommodate local or seasonal outbreaks of infectious patients, hospitals were typically focused on infection prevention and reducing healthcare-acquired infections (HAI). Very few people anticipated an event that would cause the numbers of patients with an infectious disease to rise beyond dozens locally, let alone into the hundreds of thousands nationally. As a result, emergency departments have shifted their focus from throughput to just keeping their patients, staff, and community safe.

Figure 1-5
Example of an Emergency Department Functional Layout



Future planning must also include contingencies for weather, wildfires, chemical exposure, and other natural and man-made emergency events. In response, identification of surge space elsewhere in the hospital should be part of any disaster preparedness plan. In addition, emergency departments may need to enhance their perimeter security and access control, provide a means for detecting metal detector, and install video surveillance syste

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 who require immediate treatment for life-threatening, traumatic, or other acute health conditions must move to the appropriate treatment area as quickly as possible. A separate ambulance entrance should be provided because it is assumed that patients arriving by ambulance will bypass the triage station. The triage nurse ensures that all other patients who need immediate care move directly from the walk-in entrance to the appropriate treatment area. Non-emergency patients who consider themselves 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 unit, and surgical suite. 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.

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 no closer than 10 feet (3.1 meters) from other entrances, along with an interior entrance to an ED corridor.
- The reception/triage station should allow staff to monitor the patient and visitor waiting area and control access to the ambulatory entrance and the treatment areas. Ideally, the triage station should be adjacent to the care team work area within the emergent/urgent care 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, an inpatient unit, or another hospital area and should not have to travel through an ED treatment area. However, visitors should be restricted from circulating throughout the hospital during the evening and nighttime hours for security purposes. Depending on the overall building layout, food and beverages may need to be provided adjacent to the patient/visitor waiting room.
- Convenient access to wheelchair and stretcher storage is required for arriving patients but should not impede circulation.
- Emergency department staff need PPE donning and doffing areas that are safe and easy to use. In addition, a space should be provided near a designate Ideally, separate circulation patterns should arriving and departing.

Potential Facility Planning Pitfalls

POTENTIAL FACILITY PLANNING PITFALLS

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