

VIOLENCE PREVENTION AND PREPARATION IN EMERGENCY DEPARTMENTS

Meta Synthesis

METHOD

- This meta-synthesis combines the findings from a set of peer-reviewed research studies on emergency department (ED) design considerations to bring insights into how violence can be prevented in the ED through design and decision-making support.
- All peer-reviewed articles are collected through scholarly databases such as Google Scholar, PubMed, Elsevier, and IEEE Xplore.
- The insights and experience from EwingCole projects are compiled in the study.
- The Insights from Security Design Guidelines for Healthcare Facilities (IAHSS) are reviewed and added to the study.

INTRODUCTION

- Emergency department (ED) physical design can affect the efficiency and safety of operations in EDs. Ideally, design considerations in ED can be combined with risk education efforts, simulation of high-risk events, and operational protocols to prevent violence and promote workplace safety^[1]. Safety means protection from dangerous incidents that can lead to injuries, such as patient falls, medical errors, or any form of violence in EDs. However, security is the protection of patients, staff, and property from aggressive events unassociated with clinical procedures, such as Elopement and ED violence^[2]. Active shooter definition by the US Department of Homeland Security, is “an individual actively engaged in killing or attempting to kill people in a confined and populated area; in most cases, active shooters use firearms(s), and there is no pattern or method to their selection of victims”^[3]. The frequency of active shooter events at healthcare facilities is low (2.5%) but are high-threat events. EDs are the most common shooting site (29%), while the parking lot, and patient rooms, in particular inpatient mental health units, are recorded as other common spaces where a shooting has occurred^[1],^[4]. EDs are considered the most vulnerable areas for staff, patients, and visitors because of their specific operational and design elements^[1]. Based on the literature, the common reasons for violence include long waits, delays, aggressive people, gang violence, overcrowding, pain, stressful situations, alcohol abuse, and unrestricted 24/7 access^[5]. Several studies investigated the potential contributory factors of clinical expertise, clinician behavior, attitude, teamwork, and communication to develop medical errors or violent behavior^[6]^[7]. The manifestations after an incident include reduced job performance and productivity, lost time, reduction in retention rate and recruitment challenges, staff burnout, and increased staff burnout, depression, and post-traumatic stress disorder (PTSD)^[2]. To summarize, the challenges to managing active shooter incidents are:
 - Large populations of vulnerable patients, families, and visitors
 - 24/7 access to care with less staff during a night shift
 - Evacuation challenges of patients and staff due to the condition or age of patients because of age, illness or an ongoing medical procedure of patients



VULNERABILITIES ASSESSMENT

This study used ASIS International's Workplace Violence Prevention and Intervention Standard (WVP) as a resource to understand and consider the best practices in the design phase and integrate each for new or renovation projects. These evidence-based practices guide healthcare providers, ED operational managers, security managers, and designers, and they learn the threats and hazards and plan to prevent them.^[8]

ED DESIGN

Physical design attributes, space adjacencies, and risk assessment plans must be understood and discussed at the early stages of design so that sources of threats are prevented through evidence-based design during construction. These design elements can be added later to the department to reduce or prevent violence against staff, patients, and visitors. Healthcare facility safety and security, in particular, EDs, are to be divided into various key considerations, including:

Parking

- ED should have separate and dedicated parking outside a walk-in entrance, additional security support, signage, and lighting, with clear and consistent messaging for patients and visitors to facilitate transfer to care.
- All parking should have security surveillance for any event requiring security staff to intervene.

Outdoor Spaces

- “The use of enclosed spaces (e.g., gardens and courtyards) can serve as a staff respite, positive distraction, foster social interaction, reduce crowding and violence, and offer patient autonomy.” ^[9]
- Security staff should monitor outdoor areas with surveillance cameras. The hiding spaces should be limited to mitigate the risk of unauthorized access and high-risk or self-harm activities ^[9].

Ambulance Entrance

- Placement of ambulance bays and helipad sites designed to avoid pedestrian and vehicular traffic conflicts and based on the security vulnerability assessment.
- The ambulance entrance should be monitored and restricted to EMS and HCF-authorized personnel. The ambulance entrance door should be visible to a nursing station and equipped with a marked communication station on the exterior side of the entrance with direct visual observation capability or a video surveillance system to manage the access control system, especially at nighttime.
- Unobstructed visibility: To preempt violence or any aggressive and escalating behavior, locate the ambulance and walk-in entrance doors in the direct line of sight of security personnel/desk and registration area and triage to provide visual access. Curved mirrors in hallway intersections or hidden areas can allow monitoring of any hidden risks using surveillance cameras for monitoring the walk-in entrance and patient drop-off/valet ^[2]. Clear visibility supports physician-directed queuing and greeting intake and triage models.
- A study of re-designing an ED using discrete event simulation (DES) and space syntax analysis (SSA) resulted in a pod layout with an ambulance entrance adjacent to trauma rooms and the Imaging Department to reduce turnaround times.



Entry Zone

- Demographic assessment of the area, analysis of historical events, and social determinants of the ED location plays a vital role in including some design features, such as bolted furniture and metal detectors in the entrance.
- Walk-in entries are the most vulnerable areas for patients and staff; one study suggested having one controlled entrance ^[10] and a separate private entrance for staff ^[9].
- “ED entrances positioned at an angle from driveways and parking areas to prevent intentional or accidental vehicle ramming attacks” ^[11].
- Solid physical barriers such as bollards, planters, or non-mountable curbs that protect the entrances from sidewalks and facility drives should support entrances.
- Exterior wayfinding defines access pathways from public thoroughfares to the emergency department entrance. Consider installing emergency communication stations where entrances may be locked.
- “Clear distinction between the ambulance and walk-in entrance that is marked and provides a reasonable degree of separation between the two. The line of sight between these entrances should be disrupted using physical or other visual barriers” ^[11].
- Consider including multiple entrances to allow for separation during a communicable or infectious disease event.
- All external entrances should be equipped appropriately to control and quickly restrict access into the ED. The ED walk-in entrance(s) and drop-off locations should be video monitored. Also, intrusion alarms should be used in all spaces with adequate lighting and communication equipment that connect the care providers, security staff, and the public.
- “ED signage with clear messages depicting authorized passage points for patients and visitors and HCF staff” ^[11].
- Security alert systems in the lobby can alert the ED core staff and security to potentially violent events.
- Registration and triage spaces should have an egress path (safe drop-back zone).
- The type of material used for walls, glasses, and doors should be based on security vulnerability assessment ^[11].
- Security presence: “Weapons, explosives, and chemical- or biological-agent screening may be indicated per a facility’s risk assessment” ^[5].
 - Metal screening may be utilized based on the security vulnerability assessment concerning the population served (present and future). Design considerations should include space for queuing and screening patients and visitors and their belongings before access to the waiting area or entering the treatment space ^[11]. A 2011 study reported that 38% of EDs participating in the study screened for weapons using metal detectors.
 - Install metal detection at the ED entrance to reduce the entry of weapons into the ED and to convey concern for the safety and protection of visitors and staff. Both staff and visitors will perceive the ED as a safer environment with metal detectors at the entrance. Training of staff for the operation and maintenance of the equipment will likely be required.
 - A secure and pre-determined storage area for weapons and other items of higher value should be provided within the ED or close proximity ^[11].
 - Consider exit doors for rapid egress from secured spaces ^[1].

ED Security Office

- Security offices should be located at the ED entrance to allow for active monitoring and any needed possible intervention while giving the patients and visitors a sense of safety through a visible security presence.
- Registration, central workstation, triage, and treatment areas should include duress alarms and lock-down activation buttons that are easily accessible and that connect staff to security or law enforcement should be placed at the central workstation and in strategic locations throughout the department for easy access by staff ^[5].
 - Idea: Include a designated safe room in the design, equipped with a duress button, telephone, reinforced door, a peephole, and external lock and critical access that can be locked from the inside as a place for staff, patients, and visitors to retreat in the event of an immediate threat of danger. Consider including unobtrusive “panic buttons” in several locations of an emergency department.
- Real-time location systems (RTLS) act similarly to RFID systems and can track equipment, material, and staff while facilitating communication among agents in the system. In case of danger, the system sends an alarm to security and a tracked location.
- Educate and train the staff and patients about egress pathways from different care areas.

Registration Area

- Another result of the DES and SSA was the location of a pod near a public lobby with “quick registration” and “quick look” stations for immediate triage of walk-in patients.
- Bullet-proof glass barriers at registration desks ^[10].
- Separate booths in check-in area ^[10].
- Instead of long U-shaped desks, consider multiple smaller areas of touch-down stations (6’ or 8’ long).
- The reception area should be placed against the wall with a back door allowing for immediate escape.

ED Waiting Area

- There should be one primary access control point to the waiting area ^[11].
- Waiting areas should be shielded/covered from outside view to avoid targeting those in the waiting room.
- There should be a clear distinction between waiting and treatment areas to define independent activities.
- Waiting areas should be separated as much as possible to reduce verbal and physical disruptions. Waiting room chairs should be arranged to avoid U-shaped pockets in favor of open rows to aid in the evacuation. Furnishings, wall hangings, coat hooks, plants, free extinguishers, or

other hard/hung objects should be either securely fixed to each other/ wall/floor or positioned at a height to prevent objects from being used as weapons as well as prevent a safety risk for an average sized person while maintaining clear sight paths. In general, the protrusion of hung objects into a corridor should be minimized or protrusion-free architecture incorporated. ^{[5] [11]}.

- Small or singular pieces, unsafe design elements, furnishings, and furniture that can be used for barricades, projectiles, and entrapment should be avoided as well ^[9].
- Consider providing TVs, children's play areas, internet access, charging stations, washrooms, vending equipment, and telephones to pass the time while waiting. TVs should be installed behind protective glazing points and not pose any ligature risk. All the typical evidence-based considerations for lighting, furniture, and finishes should be followed, including entrance lighting that provides a feeling of security and color schemes in calming hues ^[5].
- "There should be a clear distinction between registration area and the ED waiting area(s). Work areas should be protected to prevent unwanted access and be of sufficient height and strength to make it difficult for someone to jump over a barrier or assault an employee. The degree of enclosure and protective material used should depend on the security vulnerability assessment. Workstations should be positioned to provide direct access to an exit portal (safe drop-back zone)".
- "A family consult room should be located between the waiting and the medical care area with open access from the waiting area and restricted access to the medical care area. A small view panel or window should be located in the door to/from the medical care area to allow staff to check in on the family" ^[11].





- The line of sight between triage workstations and the ED walk-in entry should be maintained. Triage access should be controlled with two points of entry/exit for staff. Care provider workstation(s) should be positioned to provide direct access to an exit portal (safe drop-back zone) and equipped with strategically located duress alarms ^[11].
- Controlled and restricted access into and out of treatment areas is crucial to minimizing risk. Secure high-risk departments or areas, cordon off (isolate) the ED entrance and access to the rest of the facility, create safe spaces for staff, and provide opportunities for rapid egress from secured spaces ^[5].
- Access to medical treatment areas, including all doors, interior elevators, and stairwells controlled and restricted to authorized HCF personnel only. Relationships with other departments should be considered when designing access to the medical treatment area (e.g., radiology) ^[11].
- Provide varied seating arrangements and options, giving visitors choice.
 - Include sofas, bariatric chairs, end tables, and movable seating that allows visitors to rearrange the furniture to suit their group waiting needs for communication and privacy.
 - Consider including some recliners.
 - Provide children's furniture.
- Implement noise reduction design interventions, such as ceiling baffles, low-impact flooring and fabric-covered temporary partitions, rather than setting aside zones for quiet waiting.

Sub-waiting Area

- Sub-waiting or inner waiting areas can be used for results waiting, inpatient transfer boarding or for waiting for transit to an observation unit. They function as additional or alternative spaces to reduce traffic, eliminate patient backflow and absorb overflow, which is documented as having positive effects on efficiency and safety.
- Include a post-screening area with comfortable chairs, which reduces LOS and LWBS. Design flexible internal sub-waiting spaces or alcoves that include life support utilities to accommodate acute patients when needed, such as pending transit to the ICU ^[9].
- Recliners replace chairs and stretchers. Most visitors find recliners more comfortable, particularly among older patients.

Supply Rooms

- Storerooms with medical supplies and medications secured from public access.

Nursing Stations

- Nursing stations should be of sufficient height, depth, and strength, with consideration given to being enclosed as per the security vulnerability assessment to make it difficult for someone to jump over a barrier or assault an employee. The stations should include multiple points of entry/exit, as well as be designed to help protect private health information (PHI).
- Workstations should be equipped with strategically located duress alarms and video surveillance monitors for high-risk patient rooms. Clear sight paths from the nursing station to patient care rooms within the responsible care area should be maintained ^[11].
- Private lockers outside or at the ED entrance for personal belongings should be considered ^[5].

Care Zones

- All ED windows should be non-operable because of the operational efficiency, cost reduction and control enhancement over the ED environment.
- The second back door in the triage area provides an immediate escape for staff in case of danger. Consider having more than one door in staff gatherings areas to avoid creating a dead end for staff escape. The rule of thumb is to think about escape paths for staff members in their workspace and eliminate as many dead ends as possible ^[12].
- Patient room clustering and care processes affect visual and auditory access, security support awareness, and walking distances ^[2].
- Care zones and room clustering: Pod configurations should be done in a way that results in the optimal number of doorways, corridors, entrances, and exits to decrease transportation time and create a hindrance point in the case of a violent event ^[5]. Include an electronic locking system that controls access to the department.

- Patient rooms should be observable from nurse stations, and in any blind spots convex mirrors or cameras should be considered to enhance patient-staff and staff-staff visibility ^{[2][9]}. Likewise, back rooms in a dead-end corridor—or any room without a clear line of sight—pose potential threats to the security and safety of staff, especially women ^[5].
- The type of protective material used for exterior walls and glass should depend on the security vulnerability assessment.
- Acoustical glass doors for exam rooms ^[10]
- Private and huddle areas for team consult in the pods ^[10]
- If standardizing rooms, design them to be flexible for changes in the acuity level of patient occupants. The concept of the “breathing ED” that cyclically opens and closes specific functional areas in response to the ebb and flow of ED arrivals is another approach to managing throughput ^[13].
- Consider creating a dedicated virtual observation unit (OU) within the ED or a dedicated OU adjacent to the ED instead of using acute care inpatient beds in other hospital areas, in both cases administered by ED practitioners. A dedicated observation area is an American College of Emergency Physicians “best practice.”
- Set the number of beds in the OU equal to a percentage of annual ED visits to be at most 10% or less than 4%, depending on available square footage and staffing availability.
- Consider creating an OU “area” within the ED – several observation rooms in proximity - to minimize patient waiting time between ED treatment and transit to observation care.
- Design the layout of the OU to provide nursing staff and physicians adequate visibility of patients from nursing stations. Use glass at OU room fronts and in-room doors to increase visibility from outside the rooms.
- Pod layout with an ambulance entrance adjacent to both trauma rooms and the Imaging Department to reduce turnaround time.
- Specialized rooms: Behavioral health patients or forensic/prisoner patient rooms require special consideration, such as rooms should be clustered in a monitored area, away from other treatment spaces, and from exits to prevent elopement. Security staff should be located close to the specialized rooms to minimize the response time in case of emergency needs ^[5].
- “A locked roll-down wall, locked cabinetry and gates, and impact-resistant laminate can be used to hide or secure the headwall and other equipment to prevent patients from harming themselves” ^[5]. Typical examination rooms can be converted to tamper-proof or suicide-proof spaces as needed. “Tamper-proof hardware and observation windows from the outside are recommended” ^[5].



- Many studies reported that suicide attempts by patients that are difficult to manage to occur in private areas of the unit/pod, such as bedrooms or bathrooms, and fewer incidents occur in public areas ^[14]. The environments considered for these types of patients should be suicide- and ligature-resistant environments meaning there are no points where a cord, rope, or fabric can be looped or tied to create a point of attachment for the purpose of hanging or strangulation that may cause self-harm or any suicidal attempt ^[15].
- Windows with controlled operability (i.e., sash openings limited to 4" or less) or non-operable windows can reduce the risk. The type of glass in windows should be chosen based on the location, required strength, and breaking properties to minimize the risk of harm to self or others ^[9].
- Restrict and monitor access into the room with two points of access/egress in the ambulance bay and inside the medical care area ^[11].
- Separate care area and exit doors for behavioral patients. The doors in the rooms need to be opened outward with an electronic pad close to the door to provide fast escape when needed ^[12].

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